March 2011 • US$33*

euro Wire

The International Magazine for the Wire & Cable Industries

INTERWIRE TRADE EXPOSITION

ISSN 1463-2438

CENTRAL STRANDING MACHINE *(Bakir 07)*
PATENT : TR 2008/06114 B

CENTRAL STRANDING MACHINE *(Bakir 07)*	
Wire diameter size	1,80 - 3,40 mm
Rotating speed, max	500 rpm
Line speed, max	60 m/min
Wire quantity	61
Round conductor crossection (Cu)	1000 mm²
Sector form crossection	630 mm²

CENTRAL STEEL WIRE ARMOURING MACHINE *(Celik 08)*
PATENT : 2008/07003

CENTRAL STEEL WIRE ARMOURING MACHINE *(Çelik 08)*	
Wire diameter size	0,90-1,25-1,60 mm
Rotating speed, max	500 rpm
Line speed, max	70 m/min
Wire quantity	36
Armoured cable diameter	22 mm
Power consumption	15-20 kW

OUR PRODUCTS & COMPANY ACTIVITIES

- CENTRAL STRANDING MACHINE *(Bakir 07)*
- INSULATION LINE
- SHEATING - TANDEM LINE
- STRANDING AND ARMOURING LINES (DRUM TWISTER)
- CENTRAL STEEL WIRE ARMOURING MACHINE *(Celik 08)*
- MICA TAPING LINE
- REWINDING LINE
- OTHER CABLE MACHINES

- TURN-KEY CABLE FACTORY
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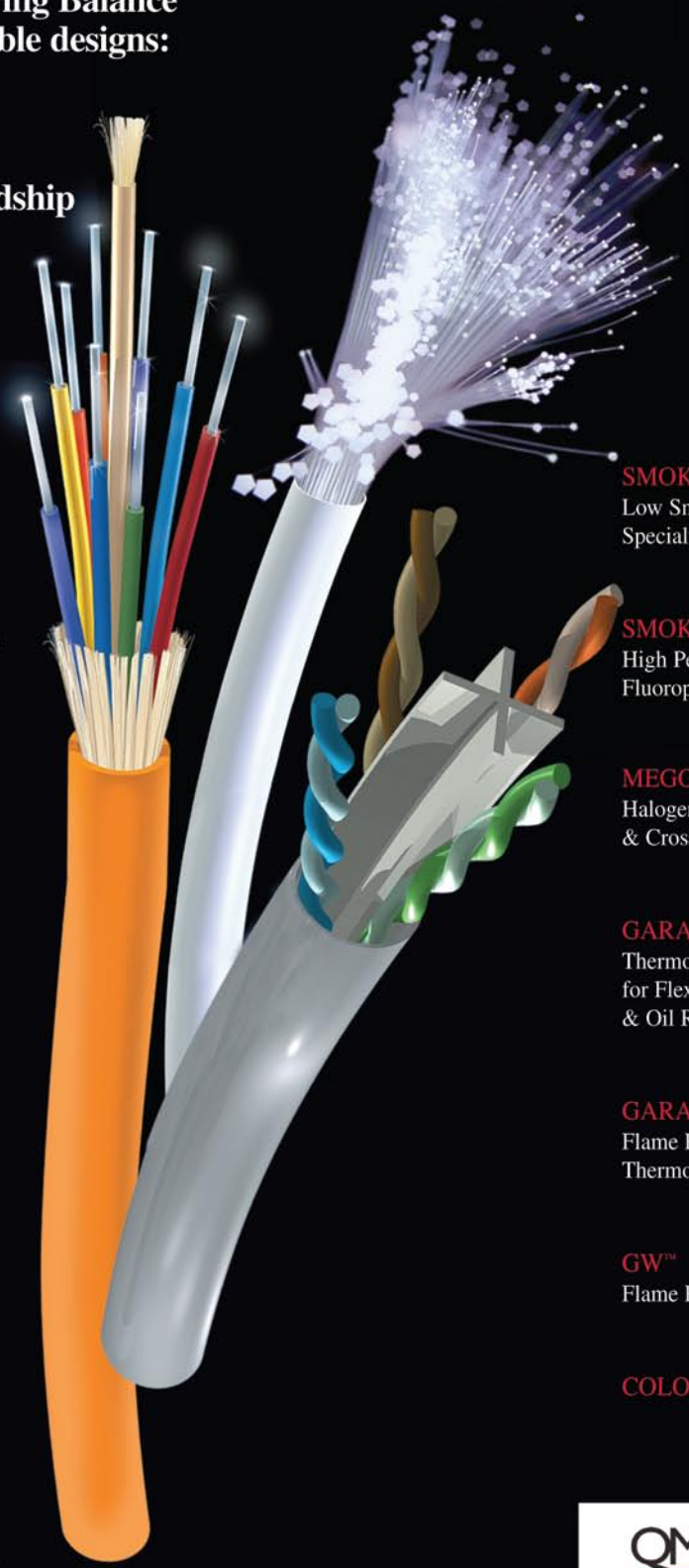

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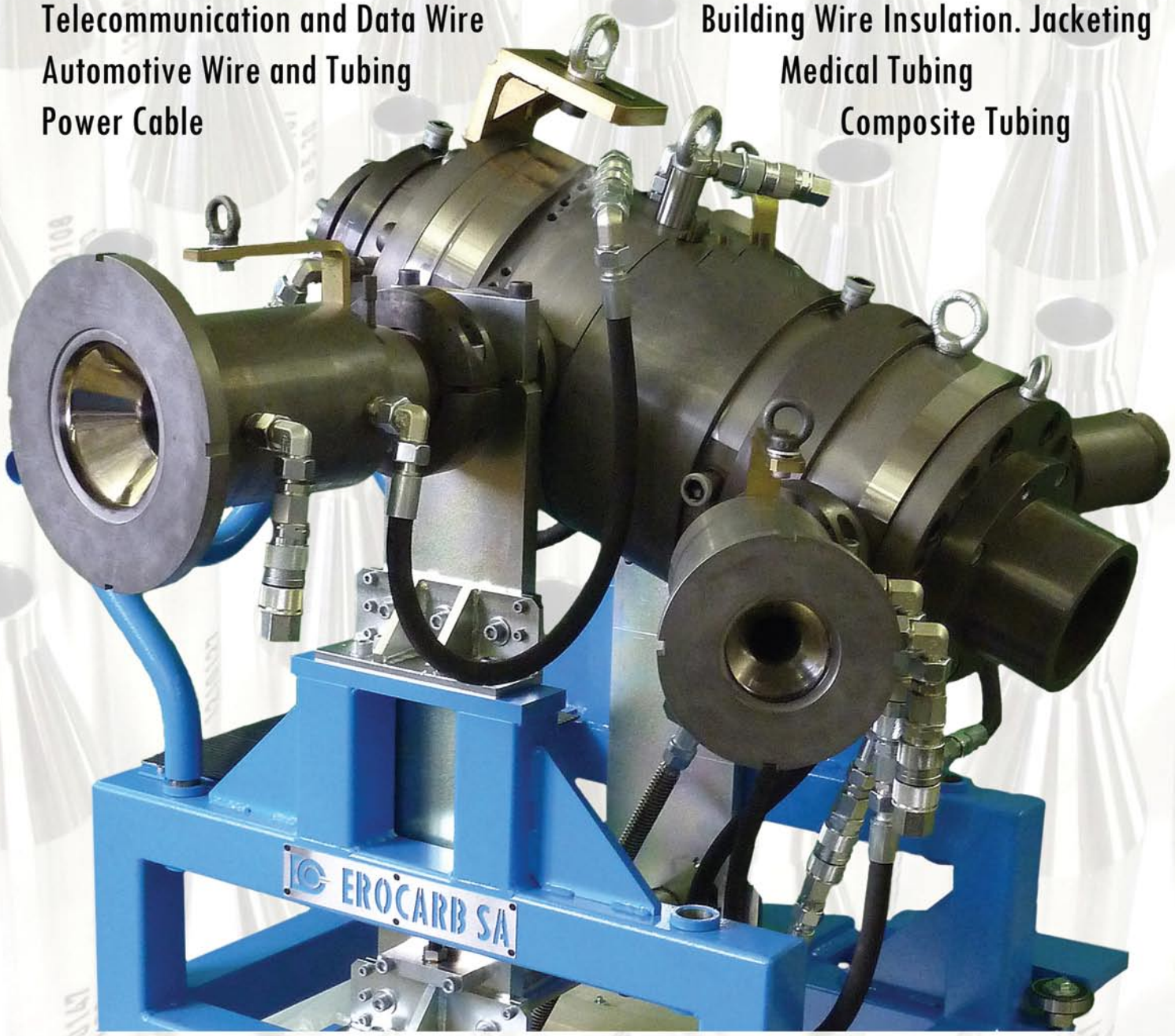

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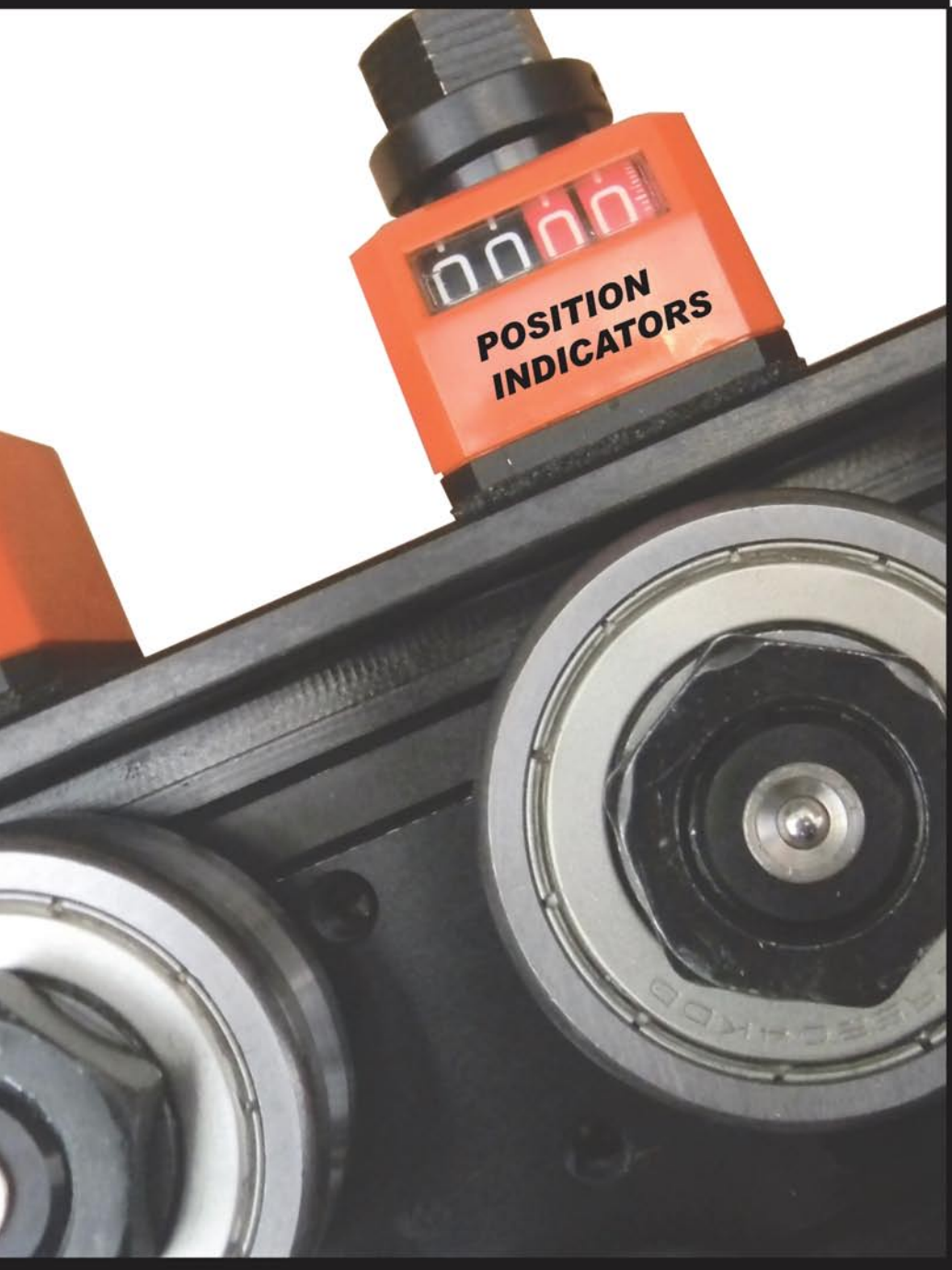

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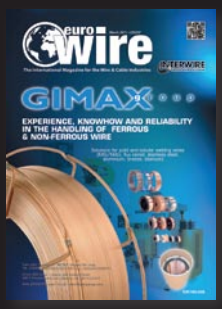

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See page 159 for further details

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ISSN 1463-2438

Technology gives us all a quick route to information

You may have noticed a new addition to the front cover of this issue of EuroWire: a QR code.

QR (Quick Response) codes, which take the form of a black and white matrix of squares, can hold information such as website and email addresses, telephone numbers, or short messages.

The codes can be read by a range of devices: many mobile phones already have the capability to read the codes, while others can be enabled by downloading appropriate software (for example, the free RedLaser app for the iPhone).

These codes have been widely used in Japan for a number of years, but they are now starting to become popular worldwide.

They can direct potential customers to your website or email address, quickly and accurately, and can even act as a replacement for the traditional business card.

We are confident that QR codes are going to become an increasingly common sight, and in the near future we plan to offer the facility to add these codes to adverts appearing in EuroWire.

If you have a compatible mobile phone, please give the codes a try, and let us know what you think of them.

For those of you who haven't, the QR code on this page simply states: Welcome to the latest issue of EuroWire.

To those of you attending Interwire, please feel free to call in at the EuroWire booth (1806) and say hello.

I shall, of course, be making the rounds during what promises to be an exciting exhibition. See you in Atlanta.

David Bell
Editor

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Katja Giersch, Head of Corporate Communications,
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contents

Technical Articles

In The Next Issue

Features On

- Drawing dies & cones
- FTTx, networks (inc LAN) & infrastructure

Getting Technical

Analysis of surface flaws on drawn wire and wire breaks

wire Russia 2011

May

23–26: **wire Russia 2011** – trade exhibition – Moscow, Russia
Organisers:
Messe Düsseldorf GmbH
Fax: +49 211 4560 7740
Email: info@wire-russia.com
Website: www.wire-russia.com

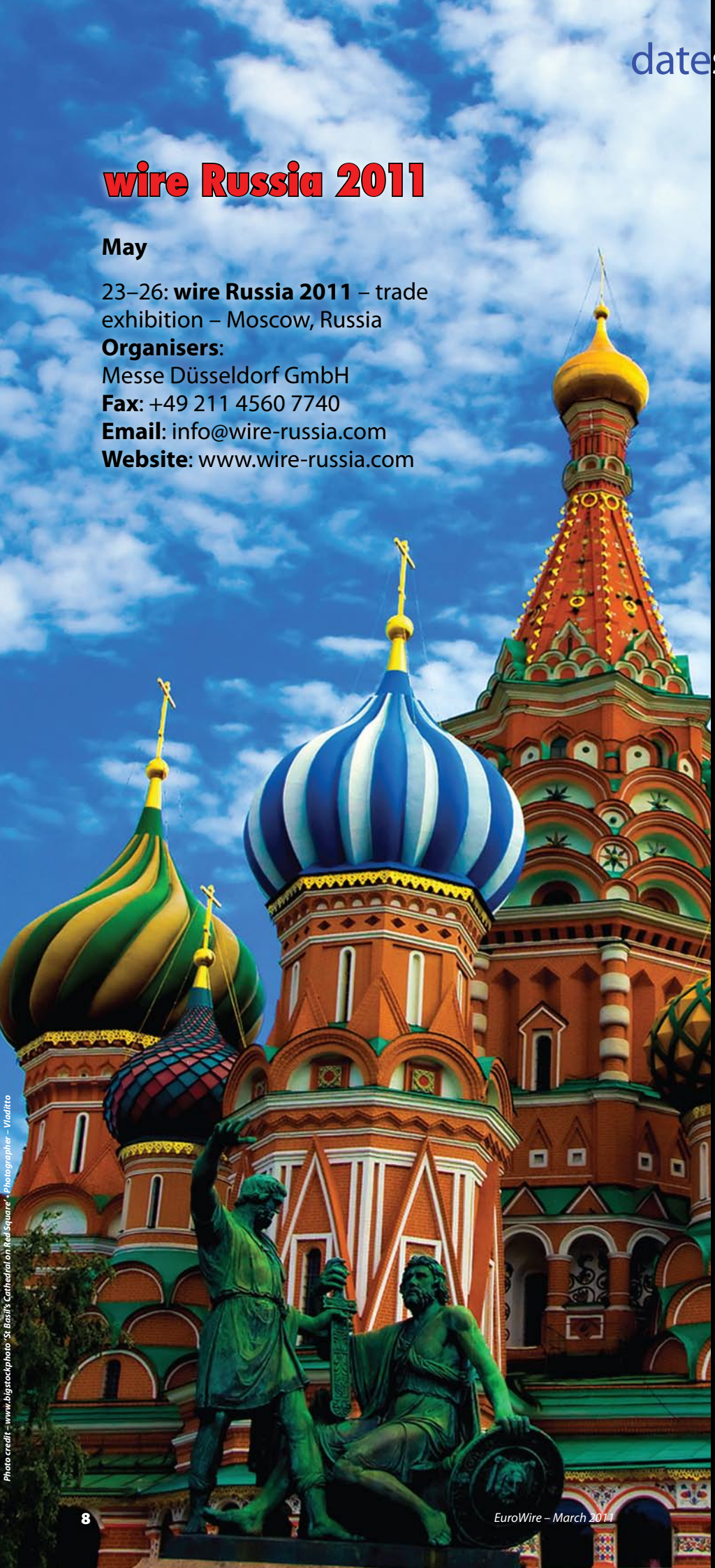

Photo credit – www.bigstockphoto 'St Basil's Cathedral on Red Square' • Photographer – Vladitto

2011

May 2011

3–5: **Interwire 2011** – trade exhibition – Atlanta, Georgia, USA
Organisers:
Wire Association International
Fax: +1 203 453 8384
Email: info@wirenet.org
Website: www.wirenet.org

June 2011

19–23: **JICABLE** – conference and trade exhibition – Versailles, France
Organisers: SEE
Email: jicable@see.assoc.fr
Website:
www.jicable.org

September 2011

13–15: **wire Southeast Asia** – trade exhibition – BITEC, Bangkok, Thailand
Organisers:
Messe Düsseldorf Asia Pte Ltd
Email: wire@mda.com.sg
Website:
www.wire-southeastasia.com

October 2011

4–6: **WiCAB 2011** – trade exhibition – Centro de Exposições Imigrantes, São Paulo, Brazil
Organisers: Grupo CIPA, Brazil
Fax: +55 11 5585 4359
Email: feira@cipanet.com.br
Website: www.cipanet.com.br

2012

March 2012

26–30: **wire/Tube Düsseldorf** – trade exhibition – Düsseldorf, Germany
Organisers: Messe Düsseldorf
Fax: +49 211 45 60668
Email: wire@messe-duesseldorf.de
Website: www.wire.de

September 2012

25–28: **wire/Tube China** – Shanghai New International Exhibition Center, Shanghai, China
Organisers:
Messe Düsseldorf GmbH/
Messe Düsseldorf China, SECRI
Website: www.wirechina.net

AlphaGary sold off for $300m

By our US correspondent

ROCKWOOD Holdings has sold its AlphaGary Compounding Group to Mexichem SAB de CV in a deal worth $300m.

The deal, announced on 17th December, was expected to be completed in the first quarter of 2011.

It sees Mexichem, Mexico's largest manufacturer of PVC pipe, vinyl resins and compounds, take its acquisitions spending to some $800m plus in a three-year period.

AlphaGary – the largest division in Rockwood's speciality compounds segment – had sales last year of $231m.

> "We identified AlphaGary as a noncore business several years ago. I think it's a good deal for both parties

The Massachusetts-based company develops high technology compounds for niche applications. Its range of compounds includes flexible PVC and halogen-free alloys, styrene, vinyl and olefin-based thermoplastic elastomers, nylon alloys, polyurethane blends and cross-linkable polyethylene.

The company has four sites in the USA, UK and Canada.

"We identified AlphaGary as a noncore business several years ago," said Timothy McKenna, Rockwood vice-president of investor relations. "I think it's a good deal for both parties."

▲ *AlphaGary's Leominster site*

Seifi Ghasemi, Rockwood chairman and chief executive officer, said: "The completion of the sale of this compounding business is another step in concentrating our portfolio on high-margin, specialty chemicals and advanced materials businesses."

Mexichem, which produces a variety of chemical products at 40-plus plants in Latin America, USA, UK, Japan and Taiwan, announced net sales of some $2.17 billion for the first three quarters of 2010.

"With this acquisition, we can combine AlphaGary's research and development potential and innovative products with Mexichem's geographic diversification, thus generating important synergies," the company posted on the Mexico City stock exchange.

The deal still has to be approved by antitrust authorities.

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Email: info@alphagary.com
Website: www.alphagary.com

Mexichem – Mexico
Fax: +52 55 5397 8836
Email: info@mexichem.com
Website: www.mexichem.com

$30m deal as Quaker reaches the Summit

Quaker Chemical Corporation has bought Summit Lubricants Inc, a leading speciality grease manufacturer, for $30m.

Summit Lubricants is a North American manufacturer and distributor of speciality greases and lubricants whose proprietary formulations encompass a broad spectrum of speciality greases which are sold through major grease distributors and utilised in military applications.

Summit also performs grease toll manufacturing for third parties and will operate as a stand-alone subsidiary of Quaker. Included in the transaction are Summit Lubricants' commercial operations and two manufacturing operations located in Batavia, New York.

▼ *The Summit plant in New York*

Michael Barry, chairman, CEO and president, said: "Summit Lubricants is an excellent strategic fit for Quaker as it is complementary to our existing business.

"In addition to Summit's ability to grow its business through its current customer base, we are excited at the prospect of offering Summit's complementary product line to our existing customers both in the US and globally."

Quaker Chemical – USA
Email: info@quakerchem.com
Website: www.quakerchem.com

Tyco sells off electrical and metal arm for $720m

TYCO International has sold a 51 per cent stake in its electrical and metal products business to the private equity firm Clayton, Dubillier & Rice LLC for $720m.

The business will operate as a stand alone entity under the name Atkore International.

The business designs, manufactures and sells galvanised steel tubes and pipes, electrical conduit, armoured wire and cable, metal framing systems and building components serving a wide range of construction, electrical, fire, security and mechanical applications.

The business generated revenue of $1.4 billion in 2010.

Tyco International – Switzerland
Fax: +41 52 633 0299
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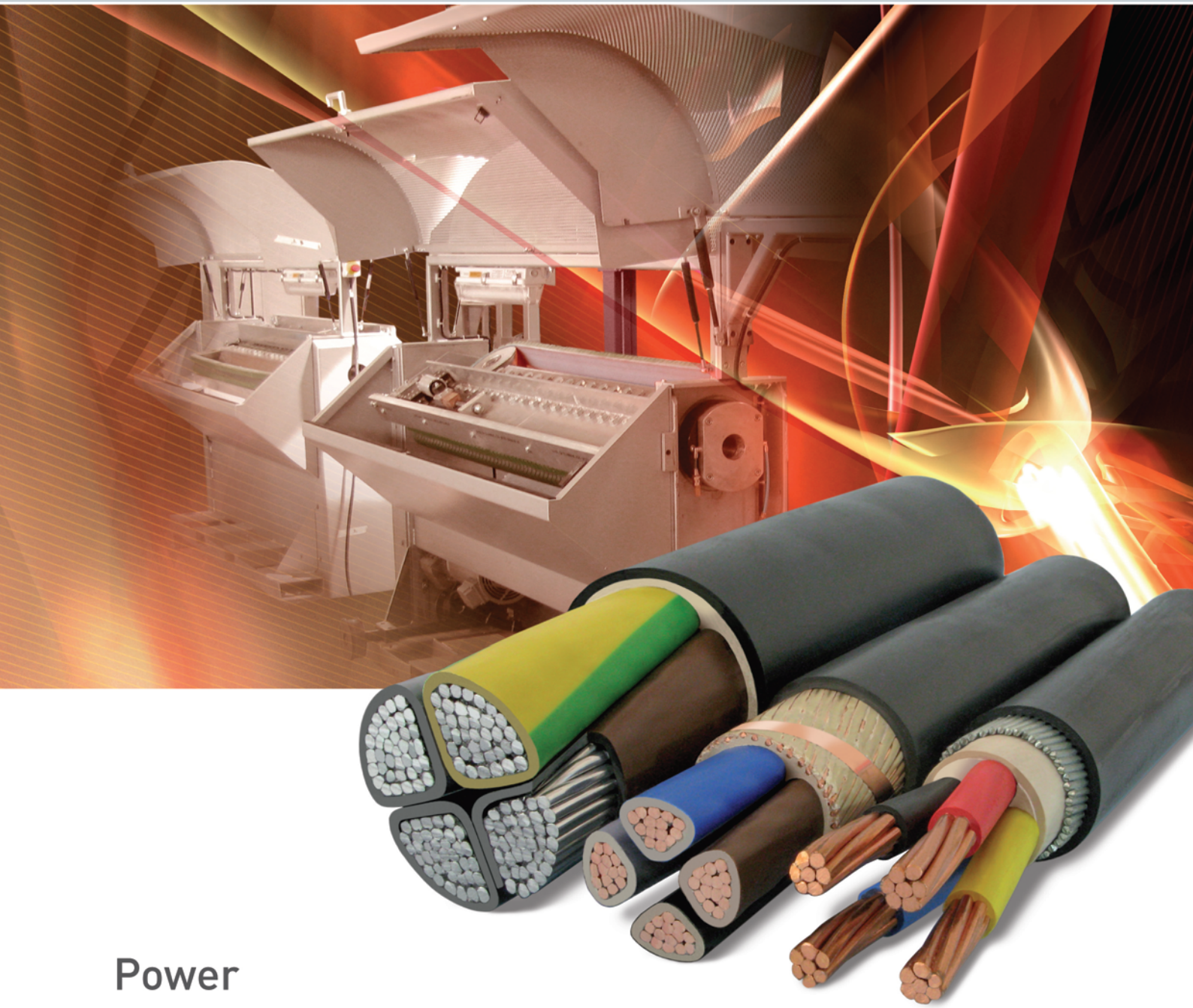

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Korean order for Zumbach

ZUMBACH Electronic has won a contract from Posco Pohang works in Korea for 10 Steelmaster diameter/ profile measuring systems.

These new systems will partially replace existing gauges or complete unequipped locations in the finishing sections of their 1, 2 and 3 rod mills.

All gauges are equipped with 6 ODAC high speed laser scanners (in 6 axes) delivering 6,000 calibrated measurements per second, as well as with the latest hardware – and software concept.

The systems will be fully networked over Ethernet with Posco's material flow and quality control system.

The gauges are extremely compact and require close-to zero maintenance.

Zumbach Electronic AG – Switzerland
Fax: +41 32 356 0430
Email: sales@zumbach.ch
Website: www.zumbach.com

▼ *Steelmaster SMO measuring unit*

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Here comes the . . . NATO order!

DUNSTABLE, UK-based Sedgewall Communications has picked up its first NATO manufacturing order – just a day before sales account manager Mark Atkins was due to head off on honeymoon.

The additional wedding present is for manufacturing cable harnesses.

"Relatively few companies can supply this type of organisation because it requires AS/EN9100 accreditation, which we have recently achieved," said Mark.

"Although we do everything possible to win on both price and quality, I think examples of existing customers proved that we have the appropriate capability.

"These included the pager and radio manufacturing and maintenance services we provide the MoD."

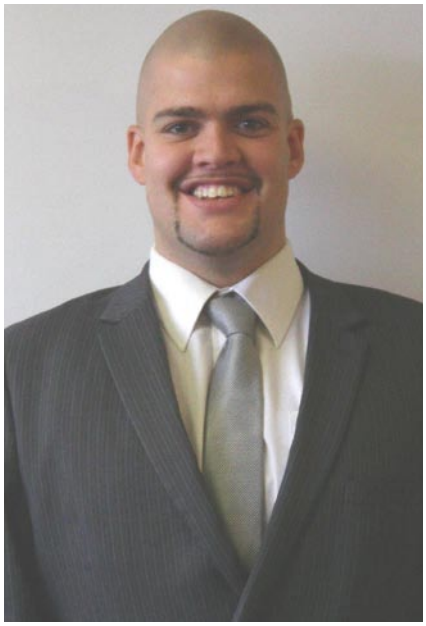
AS/EN9100 is designed to ensure high standards throughout supply chains. "This accreditation surpasses ISO9001 and has taken three years to attain," said managing director Simon Green.

"In personally knowing each member of our team, I have first-hand knowledge of their determination to achieve these standards.

"Together they remain ahead of other manufacturers by being one of the first to apply for an SC21 (Supply Chain for 21st Century) accreditation.

"Mark is a fantastic example of the team's dedication. He came into work during his annual leave to make sure we had received the contract from NATO and that we were ready to deliver."

Sedgewall Communications – UK
Fax: +44 1582 475553
Email: websales@sedgewall.co.uk
Website: www.sedgewall.co.uk



▲ *Mark Atkins*

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qunye@qunye.com.cn

New role for Niina

Niina Saarto took over as the new group treasurer at Componenta, on 1st February.

Saarto started with Componenta as treasury manager in February 2010, and prior to that worked as group treasurer at EM Group Oy.

Linda joins Inhol

▲ *Linda Calis*

Linda Calis has joined Inhol as office manager in its offices in Soest, The Netherlands.

The new post involves administration, process and certification management, customer service, coordination of marketing activities and general supervision of the sales office.

Inhol BV is a supplier of special (irradiation) crosslinkable compounds.

▲ *Extended range from Daetwyler*

As thin as it gets

DAETWYLER Cables has extended its Fibre-to-the-Home (FTTH) portfolio to include special fibre-optic cables with a large number of fibres which are extremely thin and fit in even the narrowest microducts.

Employing the new "S-Micro" cables for connections in the local or "drop" loop, public utility companies and energy suppliers are able to utilise the existing pipe infrastructure, particularly from the vertical duct to the building basement to connect up more homes and to reduce the trench work.

Daetwyler Cables developed the "S-Micro" Optofil outdoor cables in collaboration with the electricity and public utility companies of Zurich (ewz), Sankt Gallen (sgsw) and Berne (ewb).

The first models have 48 and 96 monomode fibres (E9/125) in stranded loose tubes, each with up to 12 fibres. Both models are available with bend-optimised G.657. A fibres, and the 96-fibre cable is also available with standard G.652.D fibre.

The metal-free S-Micro cables have an external diameter of just 4.2 or 6.2mm. This means that the 48-fibre version can easily be blown into microduct systems with external diameters of 7mm upwards (with 0.75mm wall). The 96-fibre S-Micro is suitable for microducts from 10 or 12mm (depending on cable sheath thickness). Initial blowing experiments have shown that the compact S-Micro cables can cover distances of up to 500 metres.

Previously, it was only possible to blow a 24-fibre Micro cable into a microduct with 7 or 10mm external diameter. The new Optofil S-Micro has doubled the maximum number of fibres available to these ducts. Compared with its predecessor at least, the 96-fibre S-Micro makes it possible to use narrower microducts (10-12 instead of 14mm) and therefore to connect more buildings.

The installation benefits and safety features of this FTTH outdoor cable are the same: every S-Micro has a ripcord and an easy-to-lay, installation-friendly cable structure.

These cables are halogen-free and do not generate corrosive gases in the event of a fire.

Daetwyler Cables – Switzerland
Fax: +41 41 875 19 86
Email: info@daetwyler-cables.com
Website: www.daetwyler-cables.com

DSM board appointment at AGM

Royal DSM NV will appoint Mrs Pauline F M van der Meer Mohr as a member of its supervisory board at the annual shareholders meeting on 28th April.

Dutch-born Mrs Van der Meer Mohr (50) is currently president of the executive board of Erasmus University Rotterdam. Before that she was the founder and managing partner of Amstelbridge Human Capital Strategies, senior executive vice president and head of group Human Resources of ABN AMRO Bank NV, Group Human Resources Director of TNT NV, and held several senior positions at the Royal/Dutch Shell Group of Companies. She earned a Master's degree in Alternative Dispute Resolution (cum laude) of the University of Amsterdam and a Masters Degree in Dutch Law of Erasmus University, Rotterdam.

She is also member of the supervisory board of ASML NV, chair of the supervisory board of the Rotterdam School of Management, member of the supervisory board of Nederlandse School voor Openbaar Bestuur and a director of the Hollandsche Maatschappij van Wetenschappen. She is also a member of the economic development board of Rotterdam and the Duisenberg School of Finance Board.

Royal DSM NV – Netherlands
Fax: +31 45 571 97 53
Email: info@dsm.com
Website: www.dsm.com

Draka completes fibre backbone in centre

DRAKA Communications has completed installation of an advanced fibre backbone for the Rotterdam Exchange and World Trade Centre, using its RiserNetXS solution.

Designed for internationally operating entrepreneurs, the original Exchange WTC building dating back to the mid-1930s was extended with a stylish elliptical shaped tower in 1987. The 93m high tower with its 25 floors and six elevators is now fully equipped for the future with a ready-to-connect backbone of fibres for ultra-fast broadband communications.

Draka engineered the RiserNetXS technique to ease the task of modernising older generation mid and high rise buildings requiring dense concentrations of broadband access points. The Draka solution consists of a cable with a slim, tough, flame retardant outer sheath and dielectric reinforcement, housing flexible micro-modules each with six Draka BendBrightXS optical fibres. These internal fibres are colour coded to facilitate installation on each floor. This design provides enhanced strain resistance without compromising the benefits of simple, direct, field termination.

A special feature of these indoor riser cables is the optical fibre breakout unit system that allows for fibre micro-module retractions of up to 20m. The solution makes use of window cuts along the cable allowing individual fibre modules to be cut and pulled back through an earlier window on another floor level.

Colour identified fibres are then easily pushed through separate microducts on the new floor, ready to be brought to a termination or distribution point within the customer premises. The use of flexible micro-modules provides easier storage, faster installation and access to the fibres without the need for special tools.

Draka BendBrightXS fibres are a key part of this solution – they have the flexibility to be pushed, pulled, bent, branched and handled in ways that allow easy manipulation for installation, without degrading the transmission signal.

With ultra bend-insensitive fibres making their way into some of the most demanding Multi-Dwelling Unit (MDU) environments, these modern fibre solutions offer an excellent ratio between cost and bend loss performance.

Draka Holding NV – Netherlands
Fax: +31 020 56 89 899
Email: info@draka.com
Website: www.draka.com

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Top 30 place

Bremen, Germany-based Sikora AG, manufacturer of measuring and control technology for the wire and cable industry, takes 21st place of the top 100 medium-sized companies in Germany.

This is the result of a study, published in German national newspaper "Die Welt" in October last year, in cooperation with the Munich Strategy Group.

Boost to team

▲ *Dr Gabriel Barton*

Simufact has strengthened its engineering team with the appointment of Dr Gabriel Barton. He will focus on ring rolling and open die forging applications.

Relying on his expertise in the area of incremental forming simulation, he will help broaden the application range of its software.

A restful night for patients. . .

VOLEX Group plc, a global designer and manufacturer of high performance interconnect solutions and power cords, is working with one of the healthcare industry's leading hospital bed manufacturers, to provide an engineered cabling solution for its latest bed offering.

The design collaboration of both companies has enabled Volex to develop a unique interconnect solution for the bed's control panel and hand pendant.

The cable assembly solution is Volex's first to be supplied for use in hospital beds, indicative of its ongoing expansion of activities in the healthcare sector. The cables supplied will connect hand-held pendants via a coiled cable, and control panels via a flexible arm to the bed's actuators, allowing smooth movement of the bed so as to minimise discomfort to the patient.

Volex's engineering team worked closely with design engineers from the manufacturer to develop a moulded strain relief, which allows for the best flexibility of the cable during its life cycle.

With the bed going through several test phases before its introduction to full production, Volex was on hand to deliver samples that met manufacturer deadlines every step of the way.

Jeff Bierman, senior vice-president at Volex said: "The healthcare sector is one in which Volex is gaining increasing momentum, and the provision of cables for this hospital bed marks an important expansion in our product portfolio.

"Healthcare is an important focus for Volex and I am confident that the relationship with this manufacturer will effectively demonstrate our services and capabilities and our commitment to the sector."

Volex Group – UK
Fax: +44 203 370 8831
Email: webmaster@volex.com
Website: www.volex.com

Forming a closer working relationship

Leoni and euromicron AG, will be working together more closely in the future. Rooted in an already successfully established customer-supplier relationship, the two companies will deepen their partnership further in the market for fibre optic-based network infrastructures.

As part of this move, Leoni sold the two subsidiaries, Leoni NBG Fiber Optics GmbH based in Gmünd, Austria and Leoni WCS Benelux BV in Amersfoort, Netherlands, to euromicron.
euromicron AG is listed in Deutsche Börse's Prime Standard and is a provider of all-in solutions for communication, data and security networks.

The company will, with this strategically motivated takeover of these two businesses, expand its development and production know-how in the field of glass fibre-based passive components, further enhance its expertise in the Fibre-to-the-Home (FTTH) solutions market and strengthen its presence in Austria and Benelux.

FTTH describes the most advanced development level of wireline broadband internet connections with a glass fibre link all the way through to the consumer's home.

As an all-in solution provider, NBG Fiber Optics GmbH – to be known in the future as euromicron NBG – covers a broad spectrum of passive system components such as glass fibre cable, empty conduit systems and connection technology and provides planning, engineering, project management as well as installation services in the FTTH segment, primarily so in the German-speaking region.

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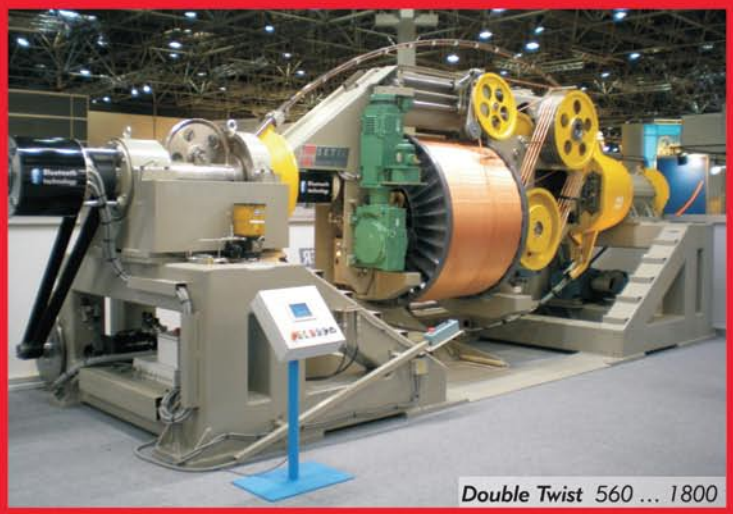
POWER CABLE



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What's in a name? Skako is rebranded

Highly developed technologies

▲ *More than 250 years' experience in wire drawing*

With highly developed tech nologies and more than 250 years' experience in wire drawing, Künne can rightly boast of its expertise in the making of spring wire, rope wires, special wires for flat wire, screen fabrics, flexible parts, steel brushes, flexible shafts, hose reinforcements, wire pellets and Bowden wires.

Coupling the experience with a determination of constant development, Künne guarantees a wide-ranging know-how and also a successful and trusting partnership with its customers.

Modern production techniques denote maximum quality and precision for wire thicknesses from 0.2mm to 10mm.

H Künne GmbH & Co. KG – Germany
Fax: +49 2372 9092 60
Email: info@kuenne-draht.de
Website: www.kuenne-draht.de

IT'S all change for Skako Comessa who have now been renamed and branded Skako Vibration.

Other Skako companies have also undergone a name change, with Skako Concrete and Skako Lift now being marketed.

Skako Vibration develops, produces and sells vibratory feeders and conveyors to activate, transport and separate all kinds of bulk solids.

The Skako Vibration storage feeder type FV is used particularly for continuous and weight-specific charging of materials for:

- Hardening and annealing furnaces
- Preparation machines
- Packaging machines
- Electro-Plating machines
- Melting furnaces
- Machines for quality control
- Separating plants
- Washing machines

Skako's furnace feeding systems are a very important part of many industrial processes, eg for the automatic and weight guaranteed:

- feeding of belt-, annealing – and tempering furnaces
- discharge of industrial washing and drying machines
- feeding and discharge of industrial electroplating- and surface treat ment lines

Controlled, automatic and weight guaranteed feeding of bulk material ensures a steady product quality, optimised efficiency of the downstream equipment to be fed as well as reproduceable and traceable production parameters."

According to the permanent pc-operator control (if required self-adjustment) with constant target/actual – capacity-comparison and automatic

By our European correspondent

supervision of the feeding cruise of FVE-feeder and the CCE-vibration trough (if required self-adjustment) a full automatically, absolute consistent and equable furnace feeding of all kind of bulk material will be guaranteed.

To complete the programme there is Skako's Lift and Tipping system Tilde, which empties all sizes of transport boxes into the feeders.

Skako Vibration – Germany
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Resale specialists

Since 1966 Franz Teutenberg has specialised in the worldwide purchase and sale of fully reconditioned second-hand machinery and complete installations for the production and treatment of semi-finished steel and non-ferrous wires, bars, tubes, sheets, strips and plates.

The company stocks more than 100 special machines on a floor area of about 3,000m^2, and can also offer new or hardly used machines which have either been sold by their previous owners due to reorganisation or liquidations.

The special-purpose production machines and installations can still give many years of service and enable the user to achieve considerable savings in capital expenditure.

Teutenberg Maschinen GmbH & Co KG – Germany
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www.altana.com

Our business is

Future

Shaping the future means having the courage to branch out in new directions. This is precisely the principle that guides all our thinking and actions at ALTANA.

Specialty chemicals are our business. A business we pursue with passion and dedication in more than 100 countries. Four specialized divisions work together to ensure that ALTANA's unrivalled competence and service excellence continue to improve and expand. With a clear vision of what our customers expect of us, it is our ambition at all times to develop solutions that turn opportunities into future reality.

BYK Additives & Instruments
ECKART Effect Pigments
ELANTAS Electrical Insulation
ACTEGA Coatings & Sealants

ALTANA

New site goes live

Modular Wiring Systems, a subsidiary of electrical cable manufacturer Tratos Ltd, has launched its new website, www.modularwiring.com

Providing a valuable resource, the website explains what modular wiring systems are for those unfamiliar with the concept as well as the benefits of such systems over traditional fixed installations.

In the hot seat

Tarun Daga, managing director of the the Tinplate Company of India Limited (TCIL), has been re-nominated to continue as chairman of its Tinplate Group.

Mr Daga has been an active supporter of the Tinplate Group, which represents a powerful network for the tinplate industry, encouraging collaboration on priority technology issues and interaction with other networks.

Association's new president

DOMINIQUE Perroud began his one-year term as president of the Wire Association International (WAI) on 1st January.

Perroud will serve as chairman of the Board of Directors and as the 57th president of the 81-year-old association, which is headquartered in Guilford, Connecticut, and has a subsidiary office in Pune, India.

Continuing the efforts of his predecessor, 2010 WAI President Dane Armendariz, Perroud will lead the association's growth initiatives.

▲ *Dominique Perroud*

Organisational priorities for 2011 include the logistics associated with hosting Interwire 2011and the Global Continuous Casting Forum in Atlanta, Georgia, USA; as well as developing new product and service offerings for WAI's member and volunteer base, and network of international constituents.

Perroud, a WAI member since 2000, has served on the Association's Board of Directors, its Executive Committee, and on multiple committees and task forces.

Wire Association International – USA
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Expansion for Evonik

Essen, Germany-based Evonik Industries has succeeded in implementing the expansion of its laurolactam capacity in Marl.

Laurolactam is the starting material for polyamide 12, which the Group markets as a construction material and as a powder: VESTAMID® and VESTOSINT®, respectively.

To ease the supply situation of polyamide 12-based molding compounds Evonik will further increase its laurolactam capacity, as announced in November. Evonik is strengthening its leading global market position in polyamide 12 and is offering its customers supply security, both now and in the future.

Beginning with butadiene, Evonik produces laurolactam in a multi-step process and then polymerises and compounds it to yield an extensive range of polyamide 12 products precisely customised to the requirements of processors and end users.

Thanks to its properties, VESTAMID® applications run the gamut from sophisticated line systems for motor vehicles, through large-volume pipes used in crude oil production, wire insulation in the cable industry, and catheters in medical technology, to precision injection-moulded parts such as pump impellers and control-valve housings in machine and equipment manufacture.

VESTOSINT® is used to coat metal parts and wire products such as dishwasher racks.

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Website: www.evonik.com

New mill for Indiana

TENOVA I2S has recently signed a contract with Olympic Steel to supply a 444 & 1,067 x 2,134mm 4 High Temper Mill at the company's planned new site at US Steel's Gary Works plant in Gary, Indiana.

The new Tenova I2S Mill will be the third Temper Mill supplied to Olympic Steel, Inc. The first two Temper Mills are located at Olympic Steel facilities in Cleveland, Ohio, and Bettendorf, Iowa, and have been in operation for over a decade. Olympic Steel is a national steel service centre.

The new Tenova I2S Mill will be placed in a cut to length line which will produce over 150,000 (tpa) of high quality tempered sheet. The Tenova I2S Mill is equipped with the latest automation and control systems and includes Tenova I2S Automatic Elongation Control (AEC) and I2S Thickness Gauges.

The new Tenova I2S 444 & 1,067 x 2,134mm 4 High Temper Mill produces high quality sheet steel from 1mm to 10mm thickness and width range of 610mm to 1,900mm.

Tenova – Italy
Fax: +39 0246 93026
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Thousands of reasons for charity cheer!

THE Make-a-Wish Foundation was chosen as the top charity to receive cash from Allied Wire and Cable's fourth annual charity week in December, which raised a superb $12,808.64 for charities.

The company asked customers to nominate a charity to receive a large donation, while other selected charities received smaller contributions – and the Make-a-Wish Foundation recevived $11,808.64 when Dennis Heron, president and CEO of the Make-A-Wish Foundation of Philadelphia and the Susquehanna Valley, and Karen Traten, director of development, visited Allied Wire & Cable's Collegeville headquarters at the start of the year.

The charity week tradition began four years ago and is now held during the holiday season every year, when one per cent of all sales is donated to charitable organisations.

Because the amount of the donations is up to the customers and their orders, they are asked to play an active role in the charity selection, voting for the organisation of their choice in an online poll.

The money benefitted a diverse selection of local and national charities, including the Make-A-Wish Foundation, as well as the ASPCA, the Coalition to Salute America's Heroes, the Cystic Fibrosis Foundation, and the Meals on Wheels Association of America, which each received a cheque for $250.

▲ *Pictured from left are: Tony Spina, Dennis Heron (president and CEO of the Make-A-Wish Foundation of Philadelphia & the Susquehanna Valley), Libby Achenbach, Tim Flynn, Chris Burke, Dan Flynn, Karen Traten (director of development for Make-A-Wish), and Natalie Beers.*

This year's big donation will help Make-A-Wish grant the wishes of children with life-threatening illnesses. These wishes can cost upwards of $7,000 each and range from a new laptop to wishing for a family holiday to Disney World.

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New marketing director for Dow

Dow Wire and Cable has appointed Brad Miller as global marketing director.

In this role, Brad will drive strategic growth initiatives utilising Dow Wire & Cable's portfolio of products, technologies and power industry expertise.

This will include executing global product launches for solutions in the traditional power and alternative energy industries as well as market segments like personal electronics, building and construction and transportation wires, cables and accessories.

"As we continue to grow in the global power industry and its ancillary markets, it is more important than ever to complement our product and technology offering with strategic marketing and branding programmes," said Tim Laughlin, general manager, Dow Wire & Cable.

"We look forward to having Brad on our team to continue and enhance the excellent progress we've made in this important facet of our business."

Mr Miller has been with Dow for over 20 years and previously served as Global Business Director for Dow Fiber Solutions. He also has held a number of commercial roles in Dow's chemical and plastics businesses.

He holds a BA from Michigan State University and an MBA from Indiana University. He will be located at Dow Wire & Cable headquarters in Houston, Texas, USA.

Dow Wire and Cable – USA
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The floor show at last year's IWCS

Diamond anniversary call for papers

THE International Wire and Cable Symposium (IWCS) has announced a call for papers for its 2011 60th Anniversary Symposium. The annual event attracts participants from around the world with a comprehensive programme including technical conference, suppliers' exhibition, professional development courses and executive track. The event will be held 6th-9th November 2011 at the Charlotte Convention Center, North Carolina, USA.

The IWCS Symposium is the prestige venue for the presentation of peer reviewed work in fields of wire, cable and interconnect technology for the communications, data, electronics, power, industrial, automotive and aerospace industries.

In 2009, the topical scope of the symposium programme was broadened to include the adjacent manufacturing segments of connectivity and wiring harness products with the joining of the IICIT (International Institute of Connector and Interconnection Technology) Symposium with IWCS. Additional conference tracks, professional development offerings and exhibition spotlights that target the interests and needs of the interconnect community are planned for 2011.

Abstracts are sought from academic, manufacturing and user communities worldwide, including subject matter experts, application solutions providers and product innovators, as well as professionals who are engaged in the various industry segments.

Topics of interest include cable, fibre and conductor design; advances in cable materials; developments in processing and manufacturing; present and future network demands; assembly and installation techniques; connectivity issues; wiring harness design and challenges; market studies; and testing and standards.

Accepted papers will be published in the conference proceedings and authors must present their work at the 2011 IWCS Conference. Awards are given for the Outstanding Technical Paper, Outstanding Poster Paper and Best Presentation.

Information on the conference, abstract and submission requirements, and selection criteria are available on the IWCS website, www.iwcs.org. Archived papers from past conferences are also accessible.

Submission deadline for the 2011 conference is 16th April 2011.

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Expert honoured

Draka Communications has announced that the International Electrotechnical Commission (IEC) has presented Dr Christian Pfeiler, manager product development, with its prestigious IEC 1906 award for his exceptional work in the area of coaxial cable standards.

IEC is the world's leading standards and regulatory body for all fields of electronics, electrical and related technologies.

The IEC 1906 award, commemorating the year the IEC was founded, honours technical experts around the world whose work is fundamental to the organisation's objectives.

Marie's US job

L-com Inc has hired Marie Walling as director of USA sales. In her new role, she will travel extensively and will be responsible for sales initiatives within Amerca. She will report directly to Earle Durham, L-com's chief revenue officer (CRO).

▲ *Harry Prunk, Harald Sikora and Bernadette Sikora*

Sikora plans for a new future

THE supervisory board and management board of Sikora have restructured the company. From 1st January Harald Sikora, present chairman and head of the R&D department at Sikora, withdrew from the operational business in order to pave the way for the next generation.

Mr Sikora has moved to the newly founded Sikora Holding GmbH & Co KG.

Mrs Bernadette Sikora is also appointed to the Holding and is responsible for the business areas finances and controlling.

Harald Sikora will support the company as consultant. His successor is Harry Prunk, present member of the board of the Sikora AG. As chairman, Mr Prunk takes over the management of the company with the business areas production, service, purchasing, sales, marketing, and research and development.

Dr Siegmar Lampe, previously deputy director of development under Harald Sikora, is appointed director of the R&D department.

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AICON generates its power from the sun

AICON 3D Systems – one of the leading providers of optical camera-based 3D measurement systems – has just set up its own photovoltaic system.

The system covers a roof area of 850m^2 and is installed on the roofs of AICON's two headquarter buildings in Biberweg, Germany. It comprises 344 solar modules that convert solar energy into electricity.

"We intend to generate 32,690KWh per year with our photovoltaic system", explains Dr Ing Carl-Thomas Schneider, president of AICON 3D Systems.

"This would cover about 50% of our own power demands.

"Actually, also in the past years, we have used green electricity for our company buildings. However, now by setting up our own photovoltaic system, we are able to make an active contribution to the expansion of renewable energies."

AICON's environmental commitment goes beyond the generation of power though. Step by step, AICON examines all company divisions and checks whether operations can be done in a more sustainable way.

As an example, AICON has planned to reduce the CO_2 emissions of the company cars significantly.

"Our goal is an average fleet fuel consumption below 5 litres," added Dr Schneider.

"Therefore, we only acquire very fuel-efficient company vehicles."

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Nadcap for China site

NAI's Suzhou, China facility has received Nadcap accreditation for electronics cable and harness assemblies.

NAI received Nadcap accreditation for demonstrating its ongoing commitment to quality by satisfying customer requirements and industry specifications. Joe Kame, NAI's global quality director, said: "This accreditation exemplifies our commitment to quality and the manufacturing requirements of our customers."

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€87m subsea HVDC power cable between Denmark and Norway

▲ *Nexans' cable laying ship*

Nexans has been awarded an €87m contract by Energinet and Statnett, the state-owned Transmission Systems Operators (TSOs) in Denmark and Norway, to deliver the subsea power cable for Skagerrak 4 (SK 4), the fourth HVDC power interconnector between the two countries.

SK 4 is scheduled for completion by the end of 2014.

The new 700 MW SK 4 cable will improve security of supply in Denmark and Norway as well as contributing to an increased exchange of environmentally-friendly power with other countries via the common Nordic electric power market.

Nexans – France
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New editor for magazines

INTERNATIONAL multi-media group INTRAS has welcomed back David Bell as editor of two of its flagship trade journals.

David, who has a 25-year career in the UK's weekly newspaper industry, will edit INTRAS's *EuroWire* and *Wire & Cable ASIA* magazines.

Returning after a two-year sabbatical in newspapers at what he describes as an "exciting time" for the magazines, he said: "The success of our publications is in always reporting the latest international wire and cable industry news, technological innovations, in-depth technical articles and trade show reports.

"We provide all that industry professionals need to know and that is why we continue to be the market leaders.

"However, the industry is constantly evolving and we've got even more fresh ideas for both magazines which we will be implementing during 2011.

"I'm looking forward to getting out and meeting our valued clients around the world."

British-based INTRAS is a leading multi-media service organisation within the wire and cable and tube and pipe industries, with four international flagship trade journals.

First launched 18 years ago, the wire magazines are produced in a range of languages with readers in 89 countries worldwide.

Managing director Caroline Sullens said: "We're delighted that David is heading our *EuroWire* and *Wire & Cable ASIA* magazines.

"His grounding in journalism enables him to get right to the very heart of what is new and exciting about the industry and he has a proven record of providing essential trade information for our global market.

"INTRAS provides its clients with unrivalled support in terms of corporate and promotional marketing, enhancing sales and promoting brand awareness through all the magazines – and at trade exhibitions across the world.

"A great advantage for our advertisers is the strong links we have – and the unique supporting role we play – with many international trade fair organisers and exhibition owners.

"Our 26 years' experience in developing and marketing niche wire & tube industry events, together with our leading industry trade publications means we are able to offer a unique and unrivalled service."

▲ *David Bell – back in the editor's chair*

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Reclaimer contract

Tenova TAKRAF has signed a contract in Belo Horizonte with VBG to supply a reclaimer with a nominal capacity of 6,000t/h, a design capacity of 7,200t/h and a 40m boom. The contract covers all engineering, FOB supply of all structural, mechanical, electrical and control components, supervision of erection and commissioning.

Tenova Takraf – Germany
Fax: +49 341 2423 510
Email: sales@takraf.com
Website: www.takraf.com

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- NTC for SAW-wire available

Semi Automatic Precision Layer Winder

- Speed 35 m/s
- Take wire baskets, plastic/fibre spools, coils
- Sevo drive motor operated traverse and dowel system
- Electrical control flange adjustment
- Ergonomically designed for easy operation
- Energy saving network
- Version for SAW-wire available

Fully Automatic Precision Layer Winder

- Speed 35 m/s
- Take wire baskets, plastic/fibre spools
- Servo drive motor operated tooling for precision automatic running
- High efficiency, low maintenance
- Touch screen HMI
- Energy saving network

Lämneå Bruk will exhibit at Interwire 2011. You are welcome to visit us at our booth no 1860!

Lämneå Bruk AB

A passion for service.

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Transatlantic Cable

Steel

Evraz North America seeks to improve its sales by changing the view from the executive suite

Will moving its headquarters from Portland to Chicago enable the Russian parent of Oregon Steel Mills to boost business in Oregon? Evraz Inc, NA, the $3 billion North American unit of Russian steel giant Evraz, thinks so, and in January announced the corporate move. Manufacturing will remain in Portland, the northwestern city in which Oregon Steel Mills was established in 1928, adding jobs if Evraz succeeds in improving sales from its transplanted home base.

The move was not welcome news in Oregon, which has seen an exodus of US and Canadian corporate operations as the result of acquisitions or business changes. Richard Read, of the Oregonian, noted that with each departure, the state loses "executive salaries, commercial prestige, local decision-making, and informed support of community causes."

But Evraz NA chief executive Mike Rehwinkel told the Portland-based daily that Oregon could in fact profit from the Russian-owned company's move to a centrally located city where managers can seek more business for underused Portland plants. He said: "It's about growing jobs in Portland for Evraz, which means we need to be in Chicago to do that." ("Parent Company of Oregon Steel Mills Moving Headquarters to Chicago," 20th January).

While the decision was said to be prompted by time-and-space considerations – it is easier, the Evraz executive noted, to fly from Chicago than from Portland to customers in Calgary, Houston, Dallas, Montreal, and Philadelphia – the move has in fact been in the cards. It advances the company's effort to integrate the North American steel conglomerate created when Moscow-based Evraz bought Oregon Steel in 2007 and, in 2008, Delaware's Claymont Steel and Canada's Ipsco. With the $2.35 billion Oregon Steel purchase, the Russian company also acquired Rocky Mountain Steel Mills, which made Evraz the largest rail supplier in North America. The recession in the US put a crimp in the company's plans but did not curb its ambitions. Evraz NA regained sales in 2010 and aims to exceed its $3 billion in revenues this year. As Mr Rehwinkel told the Oregonian: "We want to be a $4 billion company going to $5 billion."

- A major US city offers a host of obvious advantages for a global company. But it should be noted that Evraz's opening of its Chicago headquarters, slated for June, represents less a windfall for the Windy City than the calculated outcome of a campaign by Chicago's mayor Richard Daley. A year ago, Oregon passed ballot measures 66 and 67, raising taxes on corporations and high-income earners. Mr Daley said at the time that he would be recruiting Oregon companies. As noted by the Oregonian, the state of Illinois backed up the Daley initiative, laying on $3 million in incentives to sweeten the deal for Evraz, including tax credits spread over 10 years and a one-time training grant of $50,000. "Illinois competed against offers from Colorado and Delaware, where the company also has mills," wrote Mr Read. "Evraz is expected to invest $9.7 million in Chicago over ten years."

  While Illinois legislators recently raised the state's business income tax rate, Mr Read noted that it is still lower than Oregon's. An educated guess would be that Illinois will be sure to maintain that differential.

Notes on scrap . . .

- To forestall any shortage of steel scrap resulting from increased demand from China and India, the TSB Metal Recycling subsidiary of Timken Co (Canton, Ohio) is buying a scrap metal business in nearby Akron. With the acquisition of City Scrap and Salvage, announced 31st December, Timken will gain the scrap dealer's property, equipment, and relationships with its own scrap providers. Much of the scrap material generated by Timken plants around the country will now be processed at the Akron facility. Timken – a manufacturer of bearings, alloy steels and related components and assemblies – gets nearly all of its steel supply from recycled metal. As reported by Robert Wang of the Canton Repository, the company says that in 2010 it turned 1.5 million tons of scrap metal into steel bar and tube. A company source told the newspaper that City Scrap and Salvage, whose revenue for 2010 was about $17 million, has supplied scrap steel to Timken for 15 years.

- Over the last several months of 2010, almost 23,000 New Yorkers contacted the Department of Sanitation to arrange for the pick-up of unwanted refrigerators, air-conditioners and freezers. In more than 11,000 instances, the appliances disappeared before sanitation workers arrived to take them away. Although scavengers are a familiar presence in New York, the scale of the thefts – of large items that become city property upon deposit kerbside – suggests to sources in city government and the recycling industry an organised enterprise.

  As reported in the New York Times by criminal justice journalist William K Rashbaum (14th December), "the big loser" appears to be a multinational recycling conglomerate, a subsidiary of which has a large city contract to recycle the hundreds of thousands of tons of salvageable material generated each year by New Yorkers, including such bulk-metal items as appliances.

  The subsidiary, Sims Municipal Recycling of New York LLC, estimates that the thefts, along with schemes involving redeemable bottles, are costing the company $2m-$4m a year. Behind those losses, wrote Mr Rashbaum: "Some in the industry – by some accounts an $85 billion annual business in 2008 – see the hand of organised crime, although no one can point to hard evidence."

Telecom

Android overtakes Symbian as the world's best-selling smartphone platform

According to a study released on 31st January, in the last quarter of 2010 the Android mobile operating system from Google Inc, of the US, overtook Symbian, from Finland's Nokia Corp, as the world's most widely used smartphone operating system.

The period saw booming demand for smartphones and intense competition in the marketplace, of which Android now commands a 28 per cent share.

The British research firm Canalys reported that shipments of Android-powered handsets reached 32.9 million in Q4 2010, a remarkable performance for a piece of software released less than three years before. Nokia shipped 31 million Symbian-powered handsets in the quarter.

Ranked third in the Canalys report, with approximately 16 million units shipped, was the iOS from Apple, Inc of the US – the operating system that runs on the iPhone. The BlackBerry operating system from Canada's Research in Motion placed fourth, with 14.6 million units shipped.

Android was also the top mobile platform in the United States in Q4, with 12.1 million units shipped. The Google platform has benefited from adoption by some of the world's largest mobile phone makers, such as HTC, LG and Samsung. Symbian has found a berth mainly in handsets manufactured by Nokia.

According to data from NPD Group (Port Washington, New York), on a handset basis the top-selling smartphone vendor in the US for the fourth quarter was Apple, with the iPhone 4 in the No 1 slot and the older iPhone 3GS at No 4 Android handsets held three of the top five slots.

However, as noted by Dan Gallagher of the Hamilton Spectator (Ontario, Canada), the competitive dynamics may shift in the first quarter of this year, when the iPhone makes its debut on Verizon Wireless in the United States. Verizon has been a key backer of Android. ("Android Makes Strong Gains in Mobile Market," 31st January).

With respect to the Verizon-Apple agreement, Canalys looks for Verizon to move its focus away from the Droid range. Company analyst Tim Shepherd wrote that "the overall market impact will mean fewer carrier-exclusive deals, while increasing the AT&T opportunity for Android vendors such as HTC, Motorola and Samsung."

- In other news of Motorola, it was learned on 24th January that the Schaumburg, Illinois-based company is being sued by Chinese telecom equipment maker Huawei over Motorola's sale of its wireless business unit to Nokia Siemens Networks. The lawsuit, filed in the US District Court in Illinois, seeks to forestall damage to Huawei from the transfer of Motorola assets to the Finnish firm.

  Huawei and Motorola had a working relationship from 2000 until July of last year, when Motorola announced the sale to Nokia Siemens of its entire wireless infrastructure business – including products it sells for 3G wireless networks – in a deal worth about $1.2 billion.

Huawei's complaint asserts that the transfer of Motorola assets would cause "the massive disclosure of Huawei's confidential information to Nokia Siemens Networks, with irreparable harm to Huawei." Specifically, the Chinese company argues that a large number of Motorola employees, who will be transferred to Nokia Siemens under the terms of the deal, have direct knowledge of Huawei's confidential information.

Transatlantic Cable

Energy

After more than seven million installations, a backlash against 'smart meters' erupts in Northern California

"The meters are a crucial building block for what the Obama administration and the industry envision as an efficient 'green grid.' The goals are to help utilities allocate power more smoothly and to give people more information on how they consume energy and incentives to use less." Felicity Barringer, of the International Herald Tribune, was referring to wireless meters which transmit real-time data on patterns in the use of electricity. Since 2006, Pacific Gas and Electric (PG&E) has installed more than seven million of them, but the Northern California utility now finds itself up against fierce opposition from people who claim that the meters threaten their liberties and their health. In the San Francisco Bay Area, Ms Barringer reported: "Stop Smart Meters" signs and bumper stickers have been multiplying, and protesters have been arrested for attempting to prevent deliveries of the devices. ("New Electricity Meters Stir Fears," 30th January).

The campaign is supported both by left-leaning individualists and by conservatives associated with the Tea Party, the anti-government political movement that played a prominent role in the 2010 mid-term elections. Its members were key to the successful Republican bid to wrest control of the House of Representatives from President Obama's Democratic party. The Tea Party takes its name from the dumping of tea in Boston Harbour in 1773, the anti-tax gesture that has become an iconic event of the American Revolution.

Some of those objecting to PG&E's meters regard the monitoring of home appliances as intrusive, while others perceive a health threat in the meters' radio-frequency radiation. Whatever the impetus, the highly vocal opposition has been effective. In Santa Cruz County, south of San Jose, the Board of Supervisors recently extended a year-long moratorium on installations. And officials in Marin County, north of San Francisco, approved a ban on the meters in the unincorporated, largely rural areas that are home to about a quarter of the population of the county.

❊ The *Herald Tribune* considered the health concerns aroused by the smart meters. These centre on a phenomenon known as "electromagnetic hypersensitivity," or EHS, whose complainants trace a variety of symptoms (dizziness, fatigue, headaches, sleeplessness, heart palpitations) to radiation

from cellphones, WiFi systems or smart meters. Noting that hypervigilance on health questions has long been typical of Bay Area residents, Ms Barringer wrote that the two most recent government reviews of available research found no link between health problems and common levels of electromagnetic radiation. "Both reports indicated that more research would be welcome," she wrote. "On that basis, opponents say the meters should not be installed until they are proved safe."

- As to privacy, Edison Electric Institute, the Washington-based association that represents some 70 per cent of the US electric power industry, has tried to allay concerns. David K Owens, the executive vice-president for business operations at EEI, said: "We've always gotten information about customers' usage and always kept it confidential." But those who believe their electricity consumption to be highly sensitive personal information are not easily reassured. A woman arrested for blocking the driveway of a dispatch centre for meter installation, near Santa Rosa, told Ms Barringer: "It's not all about saving money. It's about control." A more emphatic charge was levelled against smart meters at a January meeting of the North Bay Patriots, a local Tea Party affiliate. The devices are, according to one man present, "the sharp end of a very long spear pointed at your freedoms."
- The controversy holds some interest for the wire and cable industry. Jeff Smith, a spokesman for PG&E, said the utility was studying a hard-wire option for its electric meters.

A snail's pace but an eagle eye: update on robotic power-line inspection

Some time back, this column reported on a prototype of a robot that checks transmission lines for problems – a hazardous and time-consuming job for workers and an expensive one for utilities. Developed by the Electric Power Research Institute (EPRI), of Palo Alto, California, a non-profit utility consortium, the robot hangs from power lines and crawls a few miles a day, looking for flaws.

More precisely, according to Matthew L Wald of the *New York Times*, the robot rides on a transmission-line shield wire, which is a plain metal wire that hangs above the conductors to intercept lightning bolts.

The fuller information provided by the *Times*'s "Green" blogger suggests that Ti (for Transmission Inspection) may be on its way to shedding novelty status for a place in the energy industry's kit of indispensable aids. ("Move Over, WALL-E: Puttering Along Power Lines," 12th January).

Transatlantic Cable

As Mr Wald describes it, the robot is studded with sensors. One is a device that picks up the electrical disturbance produced from electrical arcs if electricity is jumping through the air. Another uses lidar (light detection and ranging) to establish the position of distant objects. The lidar checks for sufficient distance between the power lines and trees or the ground. An infrared sensor finds hot spots, which could indicate a bad splice. And, Mr Wald wrote: "[Ti] has a high-quality optical camera that would look at cables, towers and tower foundations for signs of wear and tear" – and even spot encroachments on the utility company's right-of-way.

Ti can work autonomously, analysing data from its sensors and sending a radio signal back when its computer brain discovers something amiss. Or, Mr Wald noted: "It can function as a remotely controlled probe, responding to commands and streaming data back to a utility control centre." At about 145 pounds and five feet long, Ti is still in prototype. But the *Times* noted that engineers in Lenox, Massachusetts, have been running it around a test track where it must negotiate its way around towers as well as climb cables at angles of up to 45 degrees.

❊ Mr Wald reported a "clever trick" that enables the prototype to tap into energy travelling through high-voltage lines without actually touching them: The alternating current in the conductors creates a magnetic field. The field interacts with the shield wire to produce electricity. Every night, the robot docks at a tower where it connects the shield wire to the tower, creating a circuit and a current flow. It charges up its battery and departs at dawn. (It works from dawn to dusk; it cannot see in the dark to do its work.) The robot is to be tested on a line that utilities plan to build through West Virginia, Virginia and Maryland. At 285 miles long, the Potomac Appalachian Transmission Highline, or PATH, would probably require three robots to ensure that every stretch is inspected twice a year. EPRI anticipates a future for Ti because rules imposed after the great blackout of the Eastern US in August 2003 stipulate more stringent monitoring of power lines. Today, that greater stringency often calls for close inspection from a helicopter. Tomorrow, it may provide work for robots.

Automotive

❊ The Obama administration on 26th January announced several proposals intended to boost sales of plug-in electric vehicles in the US, including a $7,500 point-of-sale rebate that would immediately reduce the price of the car.

Currently, the buyer of a plug-in or battery-powered car like the Chevrolet Volt or Nissan Leaf may qualify for a $7,500 tax credit in the following year. A related White House initiative is a $200-million grant programme for communities for electric vehicle infrastructure, such as charging stations. Speaking at a Greenfield, Indiana, plant on the same day, vice-president Joe Biden said that these and other proposals are in aid of the president's goal of reducing the country's dependence on foreign oil by putting a million plug-in or other advanced-technology cars on the road by 2015. Before awarding battery manufacturer Ener1 a $118.5-million Department of Energy grant, Mr Biden said: "We're going to have batteries that go 300 miles on a charge, with ten bucks of electricity instead of fifty bucks [of gasoline]."

The economy

The US economic recovery continues to gain strength despite a lagging labour market

The United States saw its economy accelerate in the last quarter of 2010, driven by rising exports and the biggest gain in consumer spending in more than four years. According to a Department of Commerce report released 28th January, gross domestic product (GDP) grew at an annual rate of 3.2% in the October-December period, up from 2.6% in the third quarter. That broad measure of all the goods and services produced in the country indicates that overall economic output in the US has matched its pre-recession peak.

With their modestly higher paychecks and somewhat improved returns on investments, Americans are buying again and cutting back on saving. And businesses have increased their spending on equipment and software. Economists are hoping that outlays of this kind – and for replenishing inventories, which ran low at the end of last year – will soon be followed by hiring or re-hiring of workers.

At the World Economic Forum in Davos, Switzerland, Treasury Secretary Timothy F Geithner acknowledged as much in a TV interview. "During the financial crisis, [American] companies cut deeply into the employment base with brutal force," he said – a situation "that is going to consign us to a tragically more moderate reduction in unemployment as the economy recovers."

But as things continue to improve, the job market will likewise improve, said Mr Geithner, whose perception of a want of confidence on the part of business people is shared by many economists. "Firms have the cash to hire," Augustine Faucher, the director of macroeconomics at Moody's Analytics Inc (San Francisco) told the *New York Times*.

The 2010 tax deal negotiated by President Barack Obama with opposition Republican lawmakers helped set up a self-sustaining expansion in 2011. Mr Obama has increased US publicly traded debt to a record $8.86 trillion to sustain the expansion. Republicans have told the president and Democratic legislators that they will require specific budget cuts as a condition of endorsing the rise in the debt limit.

Dorothy Fabian
USA Editor

New range of flame retardant cable filler

WEB Industries has released its new line of Zero Halogen – flame retardant (ZHFR) SUPERBULK® cable filler.

This innovative component material is used in the design and construction of next generation cables. ZHFR SUPERBULK® helps wire and cable manufacturers address compliance issues for cable applications in the power, energy, control, datacom and telecom industries as an alternative to legacy materials.

Industry leaders focused on innovation and emerging trends can benefit from incorporating ZHFR SUPERBULK® into new cables designed for highly-specialised markets such as environmental compliance and construction (LEED, REACH, RoHS); military and defence; shipboard; aerospace; mass transit; and energy.

ZHFR SUPERBULK® can be used alone or in combination with other materials and is designed to help meet increased standards for flame retardancy, elimination of halogens, low smoke density, low acid gas, and low fuel.

Unlike legacy cable designs which may contain halogens, Web's ZHFR SUPERBULK® cable fillers use innovative polypropylene chemistries based on intumescent char formers and low-smoke synergists that allow the polypropylene yarns to help isolate fuel sources when burned.

These new polypropylene yarns and tapes are safer, lighter, stronger, more water resistant and less expensive than alternative filler materials used in traditional cable designs. Because Web has complete control of the production process, ZHFR SUPERBULK® can be custom-tailored in areas such as fibrillation, diameter, density, tensile strength, toughness and elongation to meet customers' unique needs.

"With forward-thinking innovations such as ZHFR SUPERBULK®, Web will continue to lead the way in environmental stewardship and advancement of these types of flexible materials used in some of the wire and cable industry's most advanced products," says Donald Romine, Web Industries president and CEO.

For over 40 years, Web Industries has been a leader in providing contract manufacturing and development services for products involving flexible materials, including slitting, spooling, printing, laminating, speciality extrusion, assembly, packaging and complete supply chain management solutions. Web has a long history of applying expertise, innovative thinking and creative problem solving to help speed time to market and drive costs down in order to ensure its customers' product success.

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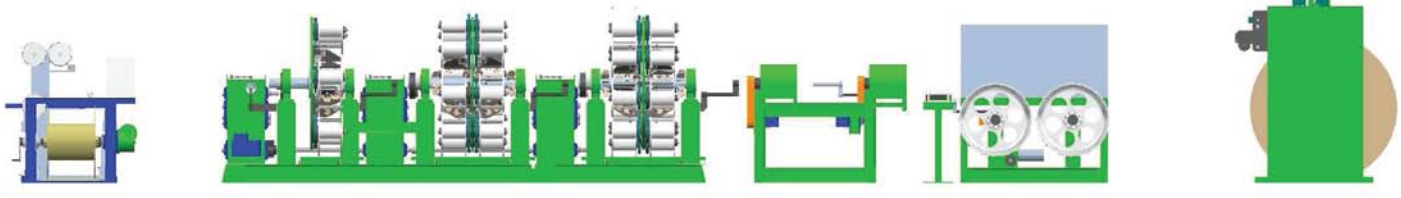
Wire Stranding Machine



Saving time and money

DAETWYLER Cables has added another time – and money saving solution to its portfolio of complete copper and fibre-optic technology solutions for data centres with the Break Out system (BO).

The BO System is based on very compact multiple cables (trunks) with 12, 24 and 48 mini fibre-optic cables all contained within a single outer sheath. The mini FO cables are pre-assembled with LC connectors on both sides.

Daetwyler supplies them with OM3 grade multimode fibres (G50/125µ) or OS2 grade single-mode fibres (E09/125µ), each of which is protected by aramide yarn and has its own sheath.

With a diameter of 1.8 millimetres each, even the BO multiple cables are very thin: the external diameter of trunks with 24 mini cables is only 1.1cm, that of trunks with 48 individual cables only 1.84cm. The latter can easily be terminated in a 1U height distribution panel.

▲ *Money saving solution from Daetwyler*

The pre-assembled Break Out cables with LC connectors on both sides are just as easy to handle as pre-assembled copper patch cables.

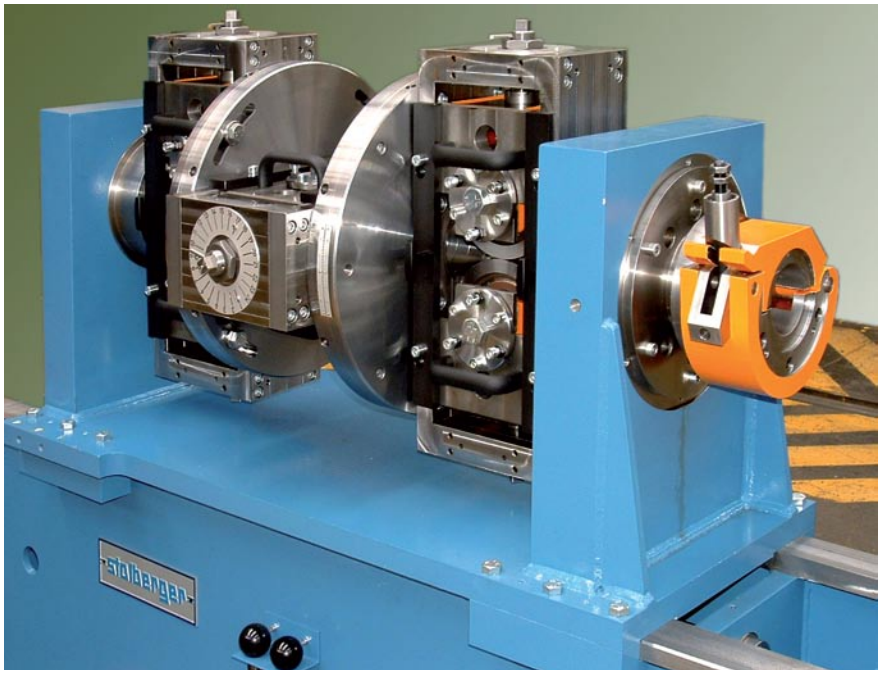
This means that BO System installations in data centres are speeded up considerably by comparison with other solutions, especially with on-site splicing. The BO multiple cables are also characterised by very small permissible bending radii.

The optical distribution boxes supplied by Daetwyler for the BO System are OV-A models with exchangeable front plates, pre-assembled couplers (24 LCD) and two rear cable entries which can be either straight or angled.

Because of the small diameter of the BO cable, the inputs and the strain relief in the distribution panel are provided by commercially available cable glands (M25). Cable dividers are entirely redundant in this FO cabling system.

Thanks to two cable inputs, multiple groupings are also possible in the distribution panels, for example 24x OS2 and 24x OM3 to 1U. Excess fibre lengths of 1.5 metres in the box make for easy replacement of connectors during servicing.

Daetwyler Cables – Switzerland
Fax: +41 41 875 19 86
Email: info.ch@daetwyler-cables.com
Website: www.daetwyler-cables.com



▲ *Ever-growing demand for Stolberger's equipment*

Calling on experience

CURRENT market analysis demonstrates that there is an ever-growing demand for compacted aluminium and copper conductors, in particular those of larger cross-sections of up to 1,000mm^2.

Compacting conductors while complying with international standards and meeting relevant quality specifications calls for an enhanced expertise in upgrading the related processes.

Stolberger KMB-Maschinenfabrik has developed and manufactured stable compactors for decades.

Referred to as idle roller compactors, these units are equipped with 2, 3 or 4 pairs of rollers to compact round conductors, whereas one or two pairs of rollers are used when producing straight and pre-spiralled sector-shaped conductors.

Combination-type compacting units equipped with up to four pairs of rollers can be used in producing round or straight sector-shaped conductors as well as pre-spiralled sector-shaped conductors.

Complete equipment is available for compacting round conductors up to 1,000 mm^2 and sector-shaped conductors for Milliken conductors up to 2,400mm^2.

The compacting rollers installed are hardened to guarantee an above-average useful life. Easy-to-operate features and fast handling govern the efficiency of these compactors.

Irrespective of this, requirements that are essential to the profitability of use typically include determining the particular suitable conductor design as well as the roller sections and stranding die dimensions required.

Stolberger's experience includes all the data necessary for compacting in conformity with international standards, such as:

- number and diameter of wires,
- compacting rollers of suitable sections, including those for other makes,
- stranding die inside diameter information, and
- all calculations assumed as a basis.

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▲ *Boost for data communication links from Fiberguide*

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The AGI Series offers the high bandwidth of single mode fibres with the convenient termination of step-index multimode fibres. The result is a fibre with good bandwidth that can be used with lower cost light emitting diodes, making it a popular choice for medium distance data communication links such as local area networks (LANs).

Fiberguide Industries is the only supplier of graded index silica fibres to offer premium coatings for reliable performance in extreme temperature conditions such as polyimide (-190ºC to +350ºC), aluminium (-269ºC to +400ºC) and gold (-269ºC to +700ºC). Fibres are also available in a variety of sizes to fit customer applications.

The AGI Series 50/125 is available with core diameters from 50µm ±3µm and clad diameters from 125µm ±1µm/-3µm. The AGI Series 62.5/125 has core diameters from 62.5µm ±3µm and clad diameters from 125µm +1µm/-3µm.

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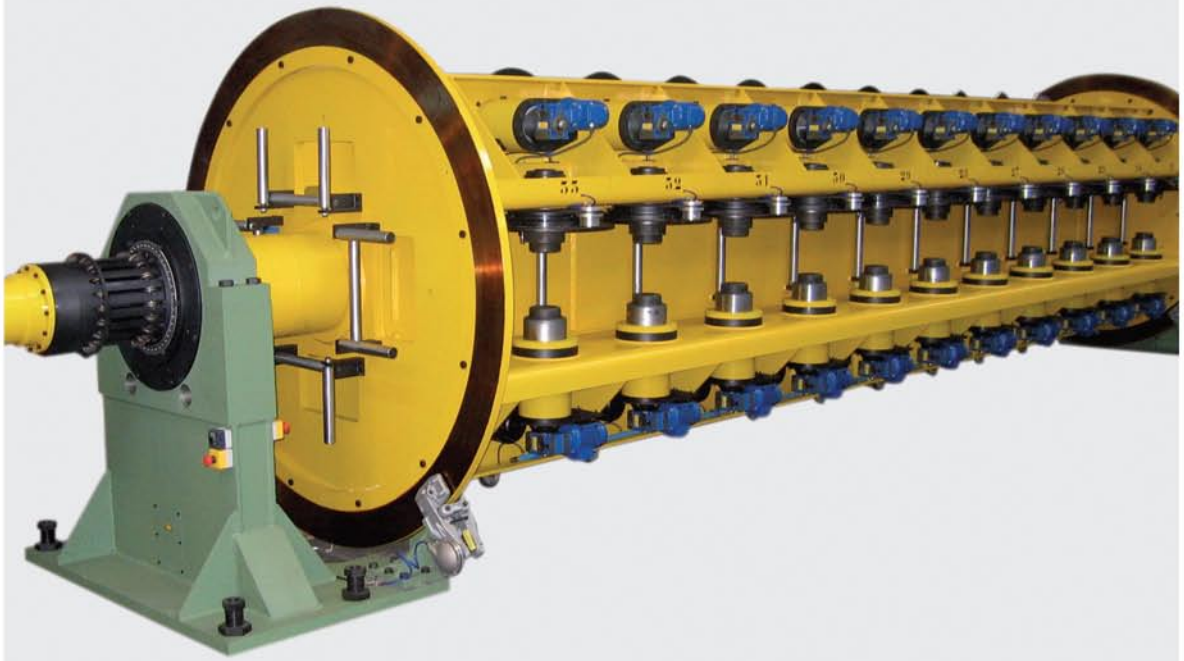
More than 60 years of experience combined with the use of the latest technologies allows Caballé to provide the most suitable equipment for each application maintaining its leadership position in the international market.



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Optical length and speed measurement

▲ *Non-contact length measurement from Zumbach*

IN highly automated production processes measurement of operational throughput delivers essential data to control process parameters or, as in the manufacturing of piece goods, an automatic start and end recognition mechanism allows autonomous length measurement.

When working with hot, elastic, highly sensitive or dough-like materials, it is impossible to use tactile sensors such as odometers or tacho rolls.

The accuracy of a mechanical sensor system is also reduced by slippage, which in practice can lead to measuring errors of 10% or more.

In both cases, non-contact optical metrology provides significant benefits. With the Speel 3000, Zumbach offers a gauge that can be used for applications that demand a high degree of accuracy at high velocities.

Speel 3000 is available for a measuring distance of 300mm and is said to achieve an accuracy of 0.05% or better.

The measured length is transmitted to subsequent electronics using an industry standard incremental interface. An alternative synchronous serial interface (SSI) is also available.

In addition, an electrical output signal compatible with common incremental encoders is available and can be directly connected to control systems, electrical counters or frequency inverters.

The main features of Speel 3000 include:

- Speed range up to 3,000m/min
- Detection of standstill
- Detection of direction
- Start and end recognition
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- Suits smooth and rough surfaces
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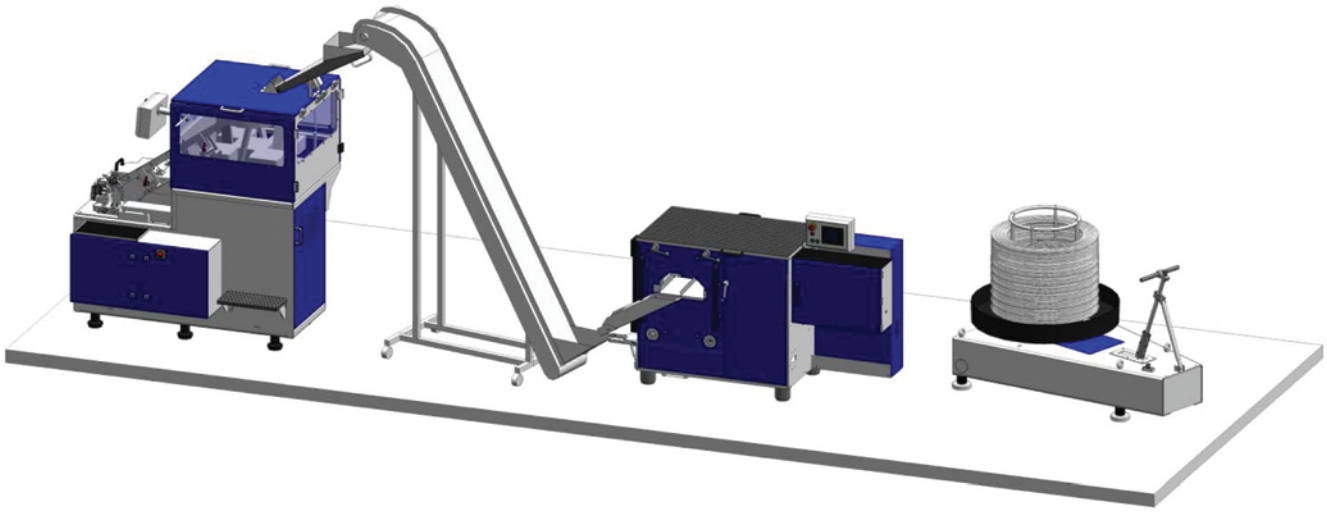

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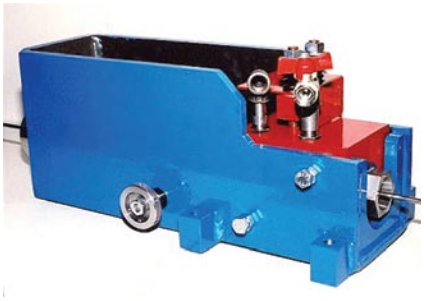
Spring wire improved ductility

Advertorial on behalf of Decalub

THE GP/PDH lubrication system from Decalub is used in demanding drawing applications, allowing high drawing speeds, with all carbon steel rods/wires, mechanically descaled or acid cleaned, bare or pre-coated, including spring wire and high-tensile rope wire.

The system has the unique ability to convert a solid lubricant into a liquefied solution and maintain its thermal stability at all drawing speeds (18m/sec for spring wire with improved wire ductility), eliminating the need for wet pre-coatings for all drawing applications from rod, including mechanically descaled 0.90 %C bare rod drawn directly without pre-coating chemicals.

The GP/PDH system performs a high-performance wire rod dry coating with completely fused lubricant deposited instantaneously, in five microseconds, operating at zero energy consumption,



▲ *GP/PDH wire lubrication system*

performing a high-density strongly adherent hard anti-friction (anti-wear) multi-layer coat with adjustable coating weight at will, completely eliminating the need for phosphate and borax wet pre-coating chemicals. The GP/PDH lubrication system prevents metal-to-metal contact at the wire-die interface, enabling frictionless drawing, and providing superior surface quality and improved wire ductility.

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You can now keep right up to date with all the latest in the wire and cable industry, simple by signing up to be our friend on Facebook.

We update the site weekly, giving you the latest news of all the happenings in the industry, from the serious company buy-outs and mergers to the more light-hearted features.

Tweet us on:

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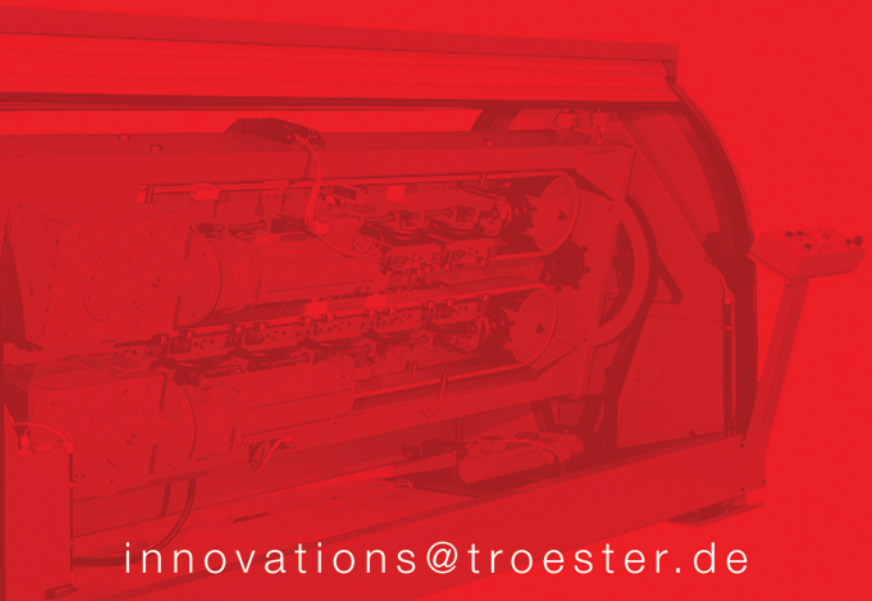
Want news and quick? Then sign up for your Twitter account and follow us. Get short, bullet-pointed news throughout the week from the leading source of information in the wire and cable industry.

We are ready.

In the future, electricity will be increasingly generated in environmentally compatible wind farms such as »Horns Rev« in Denmark or »alpha ventus« near the isle of Borkum. On its long journey to the consumer, the electricity transmission equipment must seamlessly fit into the concept of sustainable electricity generation.

TROESTER provides innovative cable and core coating solutions of a cutting-edge technological design aimed at efficiently supporting the sustainable and on-demand transmission of the clean energy through HV and EHV cables from anywhere in the world. Expertly protected against all environmental impacts.

TROESTER is ready for the future of energy production. The cable machines and systems are »made in Germany« to contribute to serving the needs of today's generation while giving future generations a chance of developing their own lifestyles. **www.troester.de**



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Sikora's new Laser 6000

SIKORA presents the new diameter gauges of the Laser Series 6000 for online diameter measurement during wire and cable production.

With an outstanding high measuring rate of 2,500 measurements per second, all measurements show an extremely high single value precision which are decisive in order to define the fluctuation range of diameter values of a product.

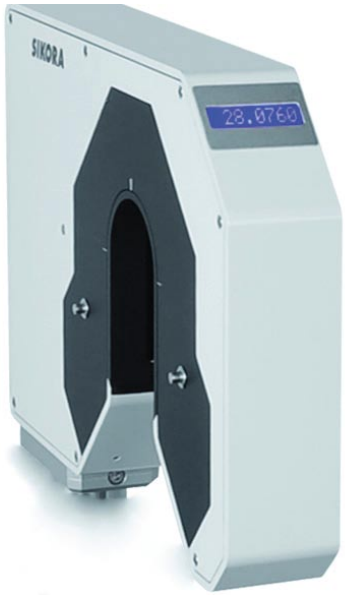
Only an instrument which itself has a significantly lower fluctuation range than the product to be measured is capable of providing a representative value. The Laser Series 6000 is able to take single measurements of the diameter with high precision and low fluctuation.

Therefore, the devices ensure an optimum line control and provide reliable statistical data. By means of an integrated measuring value display in the gauge head the operator gets the accurate diameter value at one glance.

The opening of the gauge head is directed to the bottom and is twice as big as the measuring range, which allows for an easy product feed through. Directly integrated in the gauge head is a pluggable universal interface module for all connections.

In this position it is optimally protected against water, dirt or mechanical influences during the production. There are no external plugs. As there are no moving parts, the gauge heads maintain their accuracy during the entire operation. Calibration procedures or maintenance are not necessary.

The product range of Sikora's Laser devices includes dual as well as triple axis gauge heads and covers diameter ranges from 0.05 to 500mm.



The Laser 6040 XY from Sikora, right

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Saves more than 60 % of energy compared to conventional bunchers, and features considerably reduced noise emission and heat generation. For all strand constructions and less scrap – enabled by the open system.

New PCB mounting Bulgin holders

▲ *New additions to the fuseholder range*

ELEKTRON Technology, owner of the Arcolectric, Bulgin and Sifam electronics manufacturing brands, has introduced the FX0442 and FX0443; two new vertical, PCB-mounting fuseholder designs in Bulgin's already extensive fuseholder range.

Accommodating 5 x 20mm fuses and rated at 10A, 250V ac with maximum power dissipation of 2.5W, the FX0442 and FX0443 are designed and manufactured for volume applications where PCB mounting offers a fast, economic method of integrating the fuse element into the circuit.

Both the FX0442 and FX0443 have straight PC spills with either hand-release or screwdriver/tool release caps.

The caps are bayonet-fitting for quick, reliable insertion and removal of the fuse.

Contact resistance of both fuseholders is <10mΩ and insulation resistance is rated at >10MΩ at 500V dc.

Qualified

Both fuseholders are qualified to shock-protection category PC2, meaning live parts are inaccessible with a standard test finger in accordance with IEC60529.

Using nylon and polyester flame retardant materials with flammability ratings to UL94V-0 at 85˚C they pass the glow wire test to EN60695-2-12.

Both fuseholders also have international approvals from VDE and UL covering both the USA and Canada.

Elektron Technology – UK
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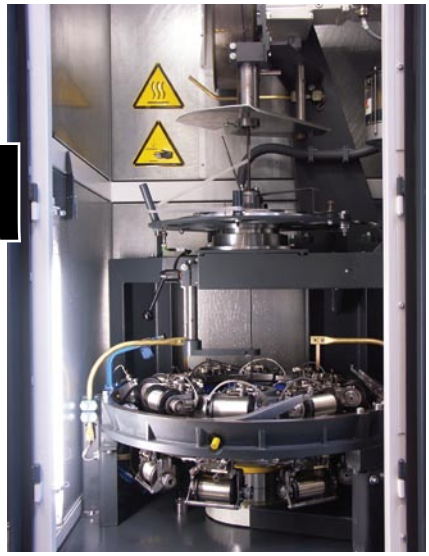
Braiding technology – versatile and future-oriented



▲ *Interior of a BMV braiding machine with integrated central taping device and automatic empty bobbin detection system (blue)*

Manufacturers need sophisticated production equipment and a reliable and professional technical assistance, especially in view of growing requirements on the technological properties of special cables.

Maschinenfabrik Niehoff offers both a wide range of modern cable manufacturing machinery and immediate customer service. Braiding technology is one example of the company's machinery.

Experience of existing braiding systems and suggestions from end-users were considered when developing the lever arm high speed rotary BMV braiding machines with automatic central lubrication system.

The machines are built in 12, 16 and 24 carrier lever arm versions and are used for many applications. The new models are equipped with energy optimised components and state-of-the-art energy-saving drives.

The spool carriers, made of precision machined high grade aluminium, are suitable for different braiding materials (round and flat), material dimensions and spool formats.

The new BMV braiders also feature a completely new and functionally optimised machine design and comply with the safety regulations of the machinery directive RL2006/42/EG. By means of a modular assembly system each BMV machine can be adjusted to the specific requirements of its user.

As an example of the range, the BMV 24 Z model can braid bare or plated copper wire, aluminium wire, stainless steel wire, artificial yarn and fibres. Single-wire diameter ranges from 0.05 to 0.3mm (40-28 AWG), with a maximum bobbin rpm of 110, and braiding pitch from 6 to 180mm (infinitely variable).

The central taping unit has a maximum rotational speed of 600rpm. It can use copper, aluminium/PE, plastics and textile taping materials, up to 30mm tape width (according to the material), with tape thickness from 0.04 to 0.17mm, and taping pitch from 5 to 100mm.

A quality control system controls all steps from the cable inlet via single and bundle-wire control to the take-up of the braided cable. Optionally, an automatic empty bobbin detection system can be integrated, which stops the machine before a braiding bobbin is completely empty, while minimising the residual wire on the braiding bobbin. This allows a BMV braider to work unattended and without operator intervention.

Operational safety can also be increased by a slide track temperature monitoring and control that varies the track lubrication frequency and quantity to avoid overheating and stops the braider when a limit temperature is exceeded. With an integrated central taping device, the braiding and the subsequent taping processes are completed in one step.

▲ *BMV 16 high speed braiding machine*

Various line configurations allow the efficient utilisation of the upstream multi-wire drawing line and a space saving line installation. The automatic and semi-automatic Niehoff rewinding machines System Hacoba of the DSA series process single and multi-wire spools onto braiding bobbins. These machine enable the BMV machines to work efficiently at their full potential because the package allows the bobbins to be processed at higher speeds with lower wire break rates.

The BMV braiders' design allows the processing of different materials, including copper braids, textile braids and steel wire braids, without extensive and time consuming setups and changeovers.

Typical applications of these braiders include the manufacture of data cables, control and coaxial cables. Stranded braids, hollow braids for battery cables and automotive hybrid drives cables (in which tapes must be inserted before and after braiding) can be processed, as well as mechanical reinforcements for pressure hoses and medical catheters.

The company states that braid manufacturers have been able to replace several old generation braiders with just one of the new generation (typical ratio of 2:1 or 3:1), reducing their manufacturing costs while increasing the quality of the end product.

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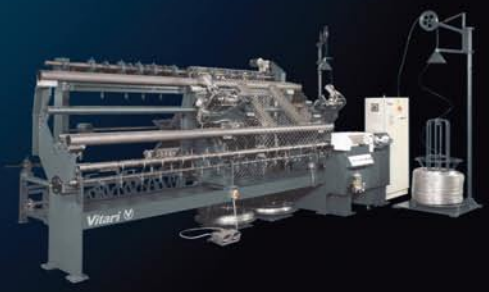
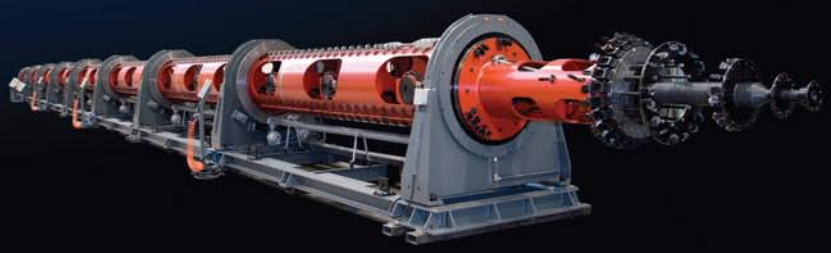


Chain link fence making machines with electronic speed variation

Automatic spooler



Tubular strander for copper, aluminium or steel wires

Controlled slip rod breakdown machine for shape trapezoidal wires

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CORTINOVIS MACHINERY
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Helping to meet the increase in demand

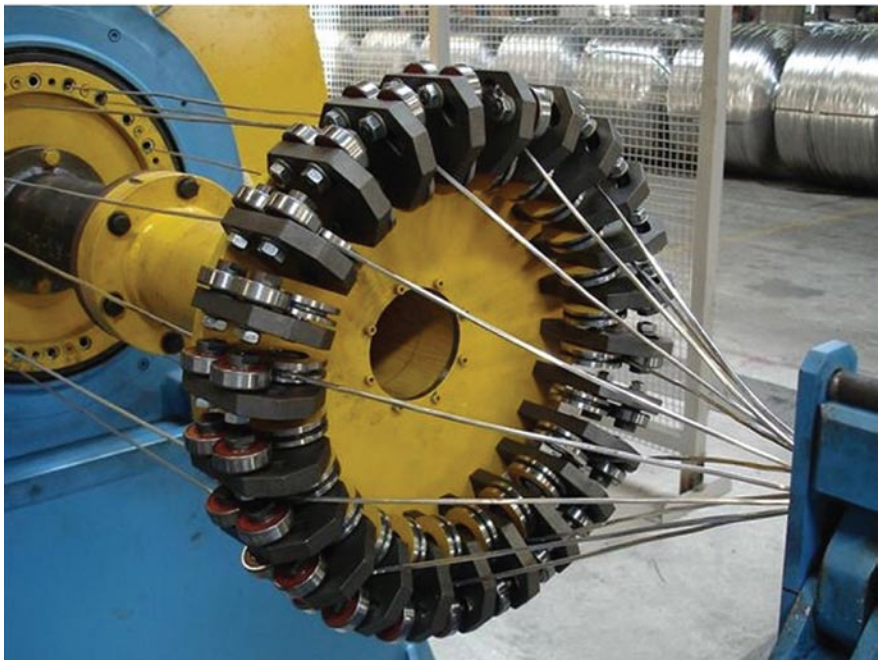
THE new rigid standing lines type "RFS 630-TZ" and "RFS 800-TZ" have been designed by Pourtier to cope with the increasing demand for overhead conductors using trapezoidal wires.

This new generation of conductors is used more and more to increase the transmission capacity of existing lines, thus avoiding costly and time consuming projects for completely new lines.

These conductors are using central core made of steel (ACSS/TW and ACSR/TW) or made of composite material (ACCC™). ACCC™ is the last innovative overhead conductor made of composite centre and soft aluminium wire with trapezoidal shape.

In order to handle properly this particular product, Pourtier rigid stranders gather several special features: a fine tension control, a straight and smooth passage for the trapezoidal wires all along the line to avoid any deformation of wires, the exclusive use of rollers – instead of eyelets – to avoid friction on the wires and large sized cage bearings for straight passage of wires.

The cages are equipped with the innovative "TZ" heads enabling guiding on the trap wires without friction up to the cabling block and guarantee the perfect position of trap wires in the conductor layers.



▲ *The innovative "TZ" heads on Pourtier's rigid strander*

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▲ *Full automation and the high work efficiency of the PTS-500 NC stud welding machine allow metal-working craft enterprises to save time and lower energy costs*

Soyer's new stud welding machine

HEINZ Soyer Bolzenschweißtechnik GmbH has introduced the new PTS-500 NC stud welding machine, which offers many interesting technical features for handicraft enterprises and industrial plants with small and medium scale batch production.

The PTS-500 NC with Teach-In operation allows weld studs and pins from 3-10mm in diameter and 40mm in length to be precisely and fully automatically welded in accordance with all known stud welding processes.

The X-Y working area reaches 500mm x 350mm.

The main advantages of this stud welding machine are:

- Easy teach-in operating mode via a joystick
- Short training period for new staff
- No need to have special Windows experience
- No prior knowledge of program languages required
- Programming through external PC possible
- Machine complies with the EU-guideline for machinery 2006/42/EC
- Very favourable price/performance ratio
- Machine is protected by utility model no. DE 20 2009 012 369.3

Heinz Soyer Bolzenschweißtechnik GmbH – Germany
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Email: export@soyer.de
Website: www.soyer.com

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Two new products from Well Gain

WELL Gain Cable Systems Ltd has added two products to its range – a multi-wire drawing machine and Electrolytic tinning plant – which have been added with the help of Kunshan Hongtai Machinery and Electric Equipment Ltd.

The multi-wire drawing machine, with continuous annealer, is an ideal solution for customers who are looking for efficiency, cost effectiveness and reliability in drawing and bunching wire strands.

With a maximum inlet wire diameter of 2mm, the machine is able to draw bare Cu, tinned Cu and silver plated Cu wires down to an outlet diameter of 0.15-0.4mm at max. line speed 32m/s. Both 8-wire and 16-wire machines are available.

The electrolytic tinning plant, complete with water treatment system, is a waste water free process of producing the best quality tin plated copper wires of wire dia. 1-2.6mm at max. line speed 13m/s. The tinned wires are suitable for further wire drawing and continuous annealing. To achieve the highest production efficiency, the tinning plant can work with an in-line rod breakdown machine.

Well Gain Cable Systems Ltd – Hong Kong
Fax: +852 2259 3385
Email: info@wellgaincable.com
Website: www.wellgaincable.com

Download it now to cut your costs

DRAKA Communications has introduced a free software utility, Draka DrumFit, that makes life easier for anyone in the fibre deployment process who needs to calculate cable lengths.

DrumFit, a free download from Draka's website, reinforces Draka's continuing focus on TCO (Total Cost of Operations) for fibre (or copper) infrastructure at all levels of the deployment process.

Draka DrumFit is an advanced cable cut optimiser utility that calculates the best way to cut multiple cable lengths from one or more cable drums or standard lengths.

This simple software tool can save an average of 50% of cable waste costs, adding up to considerable amounts for projects needing up to thousands of kilometres of fibre cable.

It will also save time for installers, cable layers and factories in their daily inventory management of large stocks of drums for fibre infrastructure projects.

▲ *DrumFit cable cut optimiser minimises losses and reduces the complexity of cable cuts*

"It takes only seconds for the Draka optimiser to produce a result," said Dick van den Dool, director DrakaXSNet Software Suite, Draka Communications. "With a possible 500 million combinations to find the optimal cutting choice from a stock of a hundred drums, this simple tool will add value to drum inventory management. It's the next best thing to manual calculation, which can take an inordinate length of time."

Draka Communications – Netherlands
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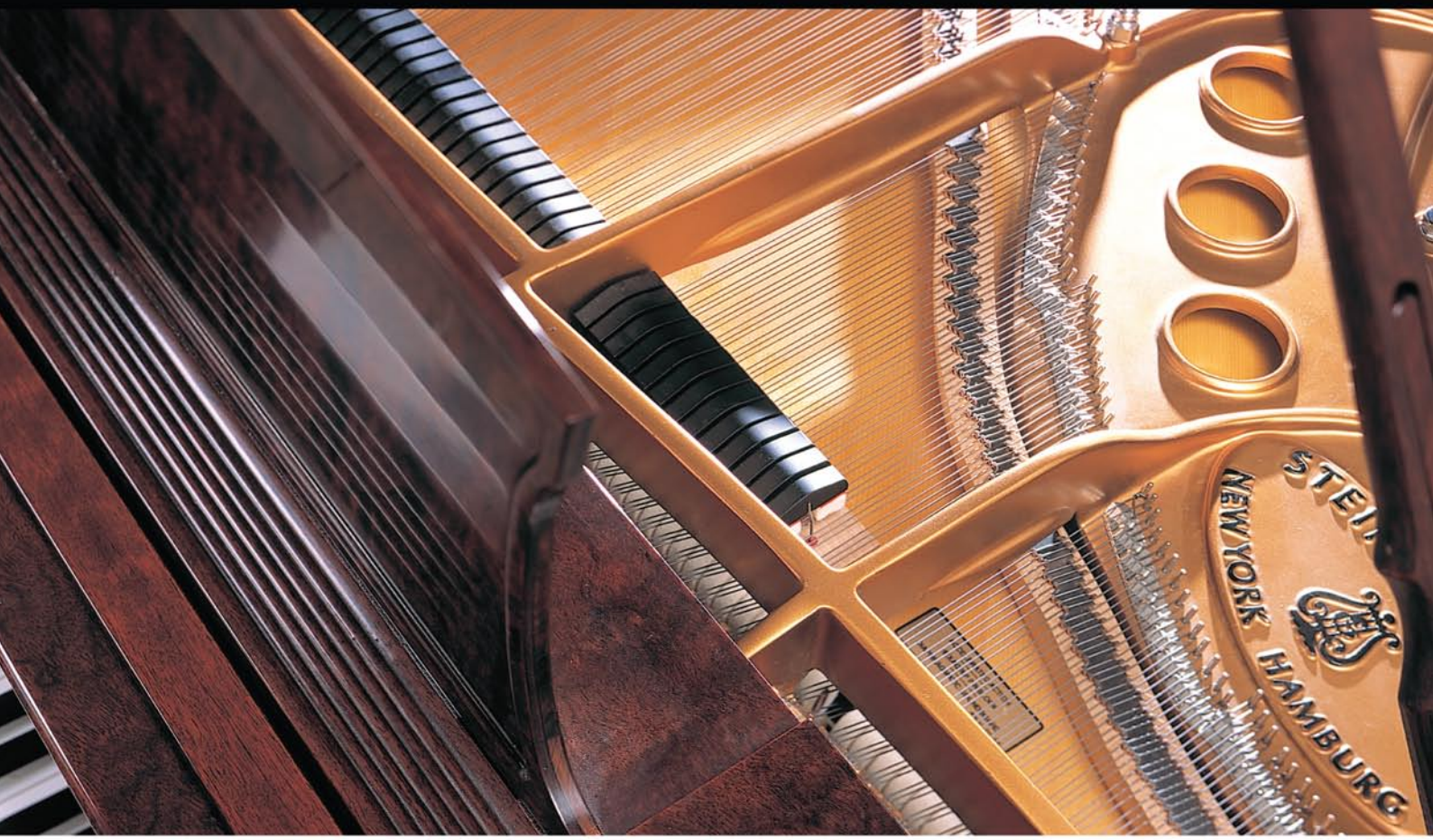
IN THIS ISSUE

Helping deliver essential data

New fuse holders from Elektron

PLAYING TO YOUR SUCCESS



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▲ *Central stranders from Sket*

MKZ 250 strander is one for the future

SKET'S central stranders are an essential part of efficient cable production.

More than 100 stranders of this type, supplied to customers around the world and in a wide range of machine arrangements and sizes, demonstrate the durability and effectiveness of the principle and calculable competitive advantages for users.

The Sket MKZ 700 is at the very top of the tree in terms of this unique technology when it comes to the production of stranded conductors.

On offer are practical stranding speeds of up to 500 rpm and linear throughput speeds of up to 180m/min and this, together with consistency in conductor quality guaranteed by controlled tension in the product, ensures not only the high output of the system but also significant savings in material costs.

In response to technological develop -ments in the cable industry Sket has recently introduced a range of machines suitable for larger stranding product volumes whilst maintaining all of the competitive advantages which the central strander otherwise offers.

With the MKZ 250, available as a single or twin machine, Sket has developed a machine version which is particularly suited to the needs of aluminium wire stranding and overhead conductor production.

A stranding product volume of 245dm^3, which is three times the volume of a 630mm DIN bobbin, special wire guides and a hybrid bobbin braking systems set the standards for this new version.

Sket Verseilmaschinenbau GmbH – Germany
Fax: + 49 391 4055 815
Email: info@sketvmb.de
Website: www.sketvmb.de

Instron's new tester

CEAST 9050 is Instron's newly developed Universal Pendulum Impact Tester for non-instrumented and semi-automatic instrumented testing at impact energies ranging from 0.5J to 50J.

The system's solid monolithic cast-iron frame supports all attachments required for testing. The frame design dampens vibrations, a feature which enhances measuring accuracy, as does the new, one-piece design of the hammers (patent pending), which can be installed quickly and safely without the use of a tool.

The self-identifying hammers are automatically recognised by the system, and the associated data (code, test standard, impact energy and velocity) is loaded from the integral data base.

The instrument comes equipped with a selection of easily interchangeable specimen adapters and is suitable for performing Charpy and Izod testing.

Measurement of the hammer angle takes

▲ *The new Instron CEAST 9050 Universal Pendulum Impact Tester. Image: Instron*

place with the help of a non-contacting and hence friction-free electromagnetic encoder providing a resolution of 0.05°.

A large, 6.5" touch screen display facilitates adjustment of test parameters and provides for clear on-screen presentation of measurement data (based on Windows CE™).

The integral PC connection enables management of the test system, as well as acquisition, storage and evaluation of measurement data, with the help of the Visual IMPACT software. The system also includes LAN and USB ports.

Instead of the manual operating units fitted as standard, the CEAST 9050 Pendulum Impact Tester can be equipped with a pneumatically operated hammer release and braking system and a motorised hammer repositioning system.

For instrumented measurement of the force-versus-time history during the impact event, strain-gauged hammers and powerful data acquisition systems are available. An optional cryobox enables testing at low temperatures down to -60°C. Both manual and motorised versions have safety enclosures.

Instron – UK
Fax: +44 1494 456814
Email: web@instron.com
Website: www.instron.co.uk

Making it easier for the end users

A GRAVIMETRIC blender design innovation that has reduced downtime and enhanced user-friendliness for plastics operations in the low throughput range is now available in a medium-capacity blender required by many injection moulders and extrusion processors.

The Maguire® WSB 260R4 has six hopper bins, including two large ones for natural resin and regrind and four minor-ingredient bins that are removable for fast colour and additive changes and easy cleanout.

While materials in the large bins are dispensed by means of slide gates like those in many other Maguire blenders, additive dispensing is carried out with vertical valves, which provide a high degree of accuracy when dosing minor ingredients.

The new blender accommodates process throughputs up to 400kg (900lb) per hour, more than double the maximum throughput for the next-largest Maguire blender equipped with removable hopper bins.

"The WSB 260R4 blender is ideal for processors who make frequent product or colour changes, since they can quickly empty and refill the removable bins or even keep pre-loaded duplicate bins on standby, reducing the time for colour changes to the few seconds it takes to replace one bin with another," said Frank Kavanagh, Maguire Products sales manager.

The lightweight removable bins are equipped with integral shutoffs to eliminate spillage and hinged lids for easy clean-out.

There is easy access to all material contact surfaces of the blender, hoppers, feeders, weigh chamber and mixing chamber, permitting rapid colour change without the use of tools.

▲ *The large hopper at top left in this photo of the Maguire® WSB 260R4 actually consists of two bins for natural resin and regrind. To the right of this hopper are four minor-ingredient bins for colours and additives*

Maguire Products – USA
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Get your news – quicker!

INTRAS has started using QR codes – on its own magazines and also for clients.

This issue of *EuroWire* and the March edition of *Wire and Cable ASIA* has the QR code displayed on the front cover and this will soon be rolled out across the rest of the group's wire and tube titles.

The QR (short for 'quick response') code is a special matrix barcode that can be read quickly by a camera phone, displaying text, contact information, and web pages.

"It's really exciting news for our readers and advertisers," said editor David Bell. "It opens up a whole range of new possibilities, using the very latest technology to give our readers instant access to information within our magazines, further promoting our advertisers' products and technology , all direct from the page."

The QR codes are more useful than barcodes in that they can store (and digitally present) much more data, including URL (uniform resource identification) and text – and don't require a chunky hand-held scanner, just a camera phone.

▲ *The March issue of Wire and Cable ASIA sporting the QR code in the top right hand corner*

The QR code is made up of black modules arranged in a square pattern on a white background, not much bigger than a large postage stamp.

"It takes less than a minute for someone with an i-Phone or Android phone to find and install a QR code reader," added David.

"Once they've done that, they can have instant access to text, product information, contact details, news of events and exhibitions, competitions, coupons, links with social networks and so on.

"They will be of great interest to our advertisers and will be extremely useful for our readers."

Worldwide reputation

AUGUST Herzog Maschinenfabrik has a worldwide reputation for supplying high quality braiding and winding equipment.

In the field of wire braiding Herzog is concentrating on niche and high end applications.

Typical end-products can be found in the high end cable and wire market with customised cables, electric fencing, cable/ wire harnesses or special earthing straps.

Other applications would be in the medical field, with typical products like stents, catheters and artificial heart valves.

In the offshore markets or for lifting applications Herzog provides equipment for producing synthetic fibre ropes for replacement of wire ropes.

Another part of the Herzog product range would be the fully automatic four head winding machines.

This range of automatic winders can be adapted to work with nearly any type of braider bobbin being from Herzog or any other supplier of braiding equipment. To complete the range, Herzog also offers pay-off creels for various drum sizes and types of wires.

The range of creels includes motorised, positive driven creels for drum sizes up to 630mm flange diameter and 700kg of weight.

▲ *Herzog – aiming for the high end applications*

August Herzog Maschinenfabrik GmbH & Co KG – Germany
Fax: +49 441 3008 100
Email: info@herzog-online.com
Website: www.herzog-online.com

Reliable with the highest accuracy

MEASURING precision combined with outstanding functionality and perfect design – these are the features of the new gauge heads of the Laser Series 6000.

This model range is more than a facelift of the successful 2000-series and achieves an even higher productivity.

From now on customers get a two-year warranty for a gauge head on the Laser Series 6000.

The applicable design of the Laser-devices, with small dimension and optional swivelling gauge head, includes a measuring value display directly at the gauge head for a further improvement. Moreover, there are no external plugs.

A universal interface module is directly integrated into the gauge head.

As a result the plugs as well as the cables are protected from any production influences. In addition, the gauge head opening of the Laser Series 6000 is twice as big as the measuring range. This wide opening as well as the big sight field allows for an easy cable feeding.

Regarding electronics the Sikora engineers once again raised the bar: the devices have a measuring rate of 2,500 measurements per second with high single value precision independent from the position of the product within the measuring field and ensures optimum line control and reliable statistical data.

The gauge heads do not include moving parts and maintain their accuracy during the entire operation time.

Calibration procedures or maintenance are not necessary. The measuring devices cover diameter ranges from 0.25 to 80mm.

In addition, Sikora offers further 2-axis diameter gauge heads for products from 0.05 to 500mm as well as 3-axis measuring devices for product diameters from 0.2 to 100mm.

Sikora AG – Germany
Fax: +49 421 489 0090
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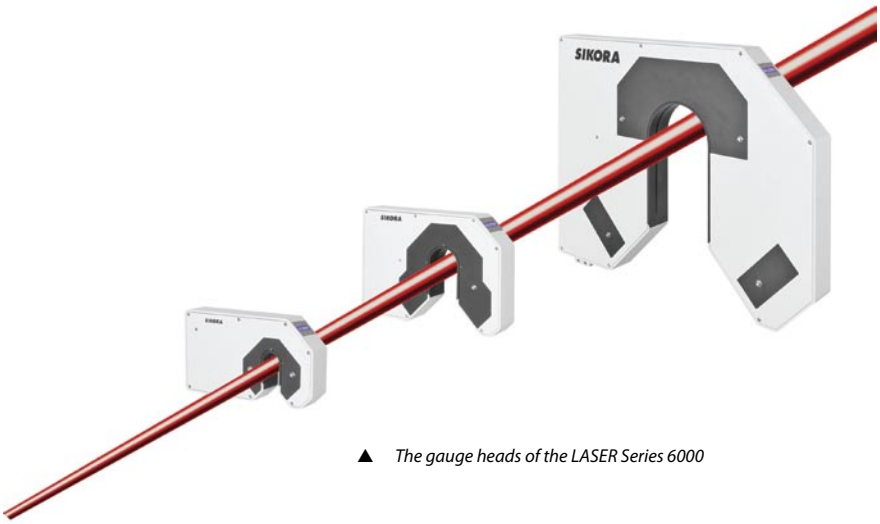

▲ *The gauge heads of the LASER Series 6000*

Reliable spark tester

Designed for diverse cable types, Sikora offers high frequency, DC and AC testers for reliable fault and bare wire detection.

All Spark testers include powerful signal processors.

Spark 2000 UL, a high frequency high voltage spark tester with a robust bead chain electrode precisely detects defects in the insulation during the production.

It is typically used for building wires, automotive wires and signal cables. The test voltage is continuously adjustable. Spark 2000 DC is a DC spark tester, especially developed for the testing of telephone wires, data cables and mini-coax cables with foam insulation.

The solid electrode and the electronic box of the Spark Testers form one integral unit. Optionally, the display and control device Remote 2000 can be fully integrated.

The successful spark tester range also includes models for specific applications such as the Spark 2000 BS, a high voltage AC test device for cables with bigger diameters up to 200mm.

▲ *Spark 2030 UL detects defects in the insulation*

All spark testers conform to approved test standards (AS, BS, CS, CENELEC, EN, UL, VDE) and safety regulations (as demanded by DIN/VDE 0800, IEC 479-1).

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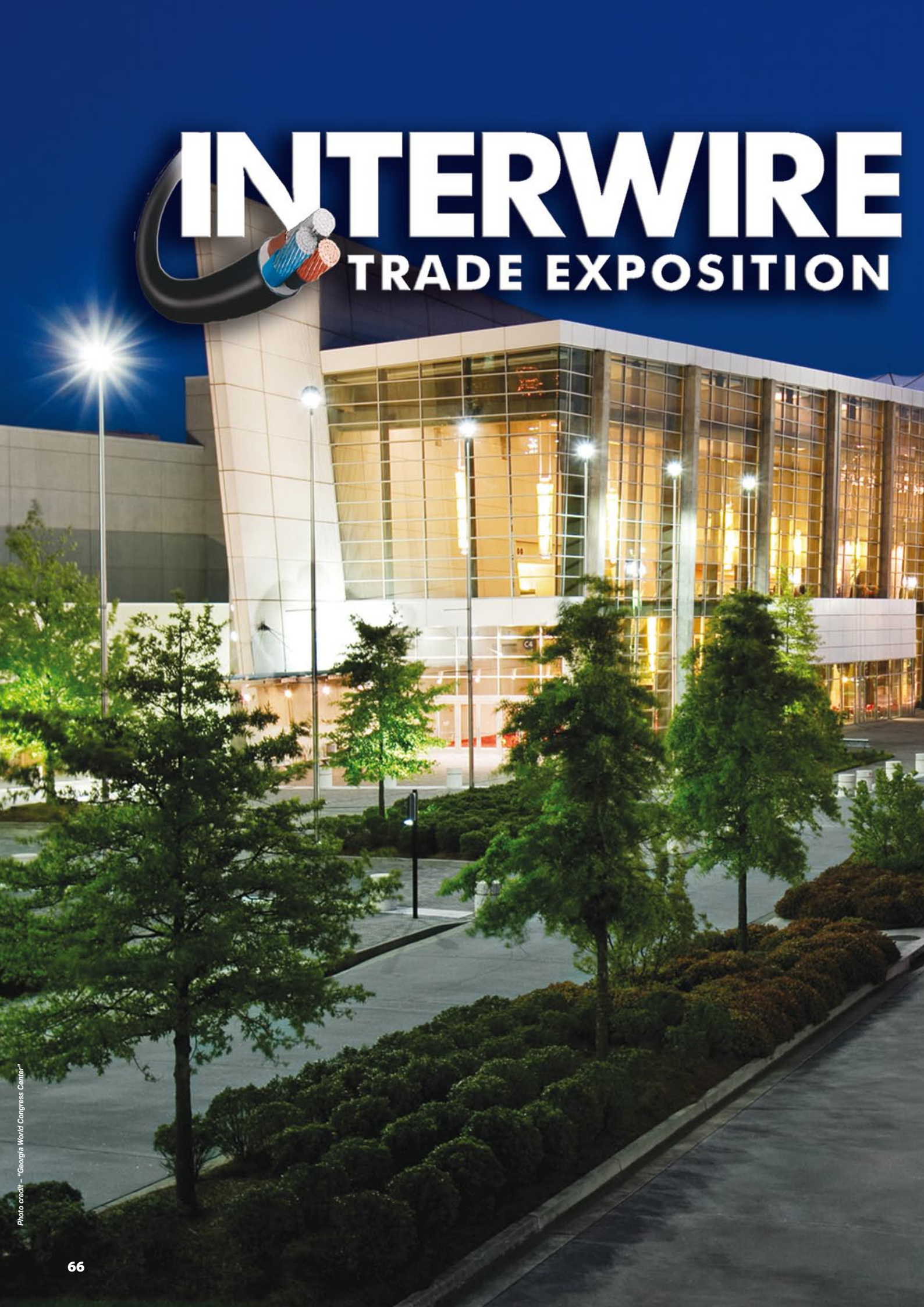

Photo credit – "Georgia World Congress Center"

Show Stopper

IT'S back to its roots for the 2011 Interwire at the Georgia World Congress Center – the city where it all originated some 30 years ago.

The Wire Association International show – incorporating the American Wire Producers Association Supply Chain Symposium – runs from 3rd-5th May.

Inside are some of the companies exhibiting at this year's show.

For full details of the Interwire programme, exhibitors and events as they become available, go to: www.wirenet.org/events/interwire

Photo credit – www.wirenet.org 'Interwire 2009'

INTERWIRE 2011 TRADE EXPOSITION

Alphabetical list of Exhibitors

Including International Fastener Exposition (IFE) 2011 Exhibitors, (Exhibitors list correct at time of going to press)

➤➤➤

MG630 Tailor for varying mesh geometry

The Schlatter group is a world leader in plant manufacturing for resistance welding systems and weaving machines for special applications. MG630 Tailor is the answer for changing market demands. Away from large lots, over to the highest flexibility and no change-over times. MG630 Tailor enables production of construction site suitable reinforcement meshes without intermediate storing, directly to the construction site.

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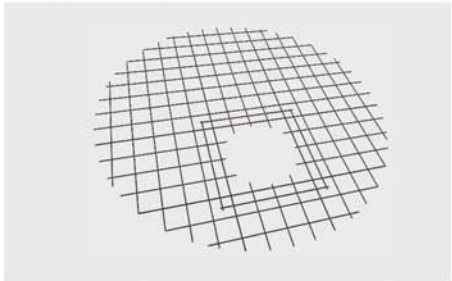

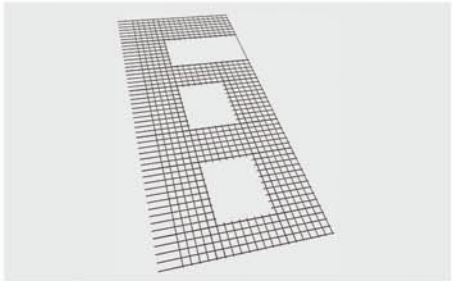

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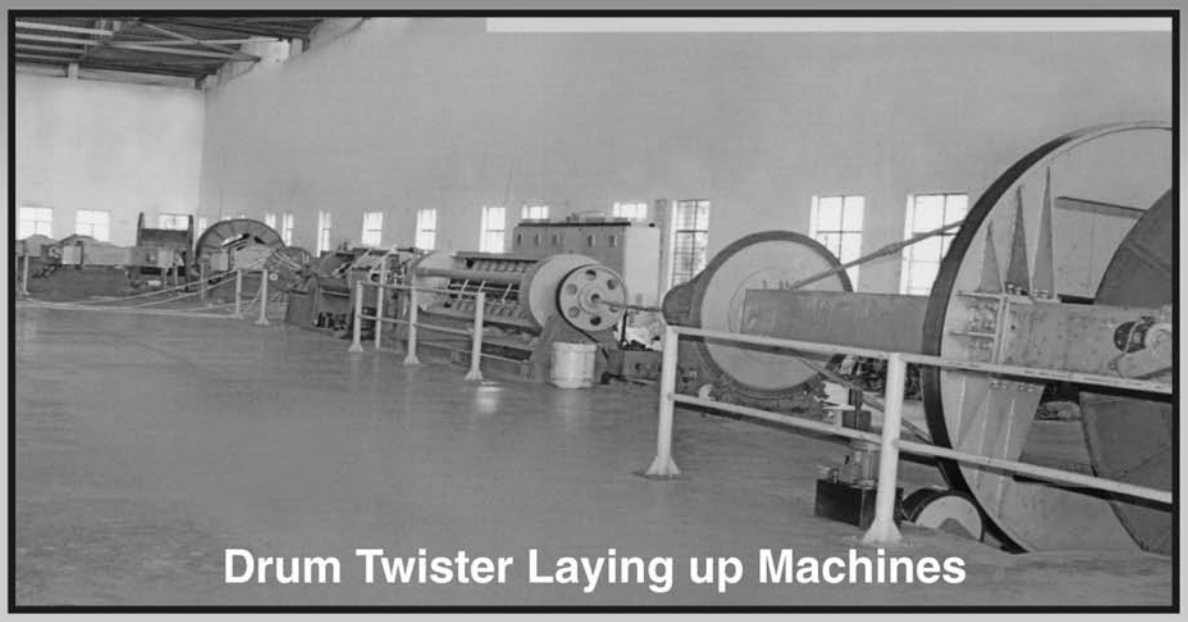

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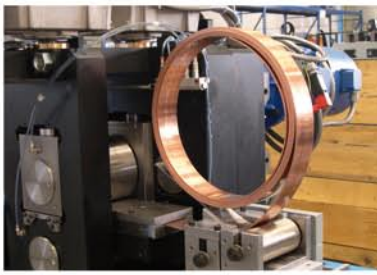
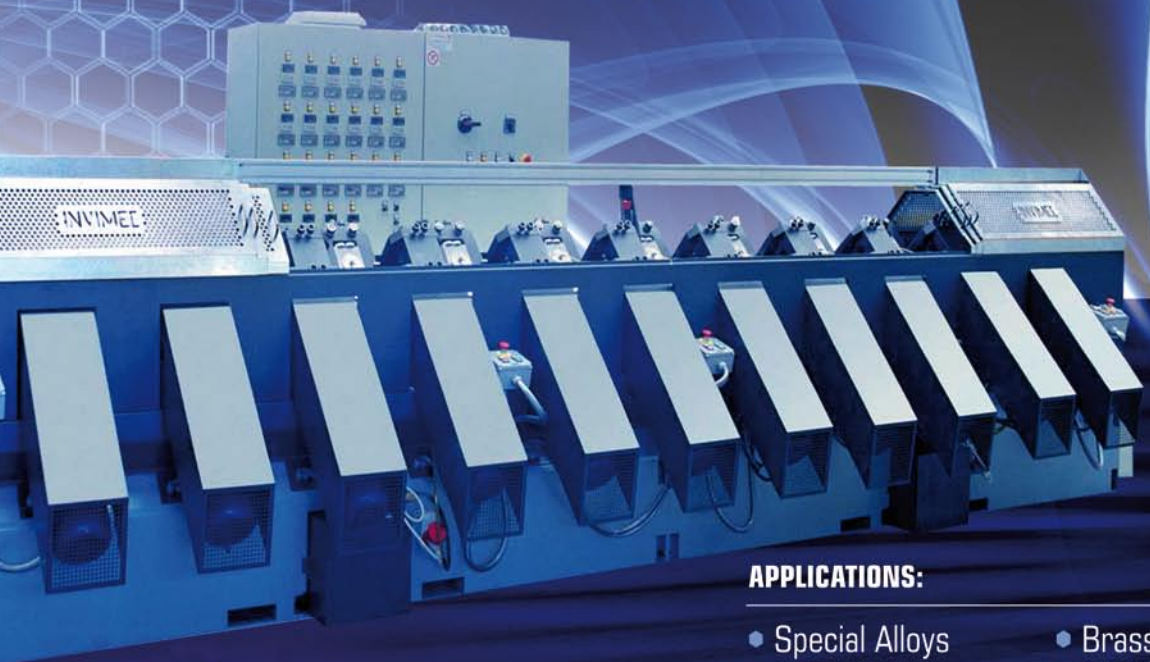
ROLLING MILLS FOR SPECIAL APPLICATIONS



INNOVATIVE TECHNOLOGY



APPLICATIONS:

- Special Alloys
- Copper
- Special Steels
- Brazing Alloys
- Precious metals
- Brass
- Welding wires
- Hard-to-draw materials
- Bimetallic and trimetallic
- Profiled strips

ADDITIONAL SERVICES:

- Spare rolls for all rolling mills
- Rolls repairing
- Custom designing

INVIMEC
Rolling Forming Machines

INVIMEC srl
Via della Cultura, 17
36050 Sovizzo (Vicenza) - Italy
Tel. +39 0444 376245 Fax +39 0444 536066

www.invimec.com

AIM Inc
Booth 1014

AIM will be presenting the newest innovation in wire bending: the "Synchro Bender".

Upgraded and updated 2D and 3D CNC wire bending solutions, single and double bending head machines with Fanuc robotics integration and complete automated systems.

▲ *AIM's AFM 3D8 S*

Completely automated work cell solutions that take wire from coil, form, weld and systematically arrange the finished parts.

In all instances, wire can be fed directly from a coil, straightened, bent and cut using a software package that provides flexibility and simplicity in programming and is offered in all "universal languages."

AIM Inc – USA
Fax: +1 630 458 0730
Email: info@aimmachines.com
Website: www.aimmachines.com

Amaral Automation
Booth 1840

Amaral Automation is the North American Distributor for PWM – a manufacturer of cold pressure welders and dies. Known for its robustness, the PWM line can handle fine wire (0.0031") 0.08mm to rod (1.131") 30mm.

Amaral is also the north American distributor for Subec, a manufacturer of guide rollers, straighteners, ceramics, wheels, sheaves, and other related items. Within the northeast the company also represents Bardac, B & H Tool Company, Maag Automatik, Powertec, RS Powdertech, Rosendahl, Teknikor, TSM Control Systems, Tulsa Power, W Gillies, Yield Management and Zumbach.

Supplying cross heads, melt pumps, screen changers, talc machines, turn key extrusion systems, blending, colour feeding and material handling, pay-off, take-up taping and other process equipment, contact and ink jet printers, braiders, broken strand or tape detectors, diameter and wall gauging, surface flaw, lump and neck down detection, length counting, drives, controls and motors, Amaral is the one-stop solution for wire manufacturing needs.

Amaral Automation – USA
Fax: +1 401 405 0757
Email: rick@amaralautomation.com
Website: www.amaralautomation.com

A Appiani Srl
Booth 412

A Appiani Srl, represented in North America by Lesmo Machinery America Inc, has a worldwide presence in the manufacturing of high quality and cost-competitive steel reels for the wire and cable industry.

Since 1962 the company has been making itself known on the international market by offering solutions according to either international recognised standards or to custumer's own specific requirements.

At Interwire, the company will demonstrate its engineering capabilities by exhibiting a comprehensive selection of its range of products, which includes:

- B-type spools for steel cord and saw-wire applications
- Structural reels for cable, rope and strands suitable for one-way/multiple shipping and internal process (BCS and BFA types)
- Pressed steel reels of type BCG for internal process and shipping of ferrous and non ferrous wire
- Composite steel-ABS reels for extrusion of fibre optics and telecom cables (P-types)
- Solid flange (BPE) and double flanged (BPS) processing reels, for wire and multi-wire drawing
- Double flanged processing reels for heavy duty (BTC type)
- Collapsible take-apart reels (hydraulic, mechanic, pneumatic) for coils (BSC type)
- Steel pallets for reels storing and coilers
- Reel handling equipments, reel lifters and tilters

Since the beginning, the company's mission has been to offer customers quality products at competitive prices, and it has been trying to reach this goal by investing in research and development and in technological advanced production in order to improve quality, optimise manufacturing time and costs and find new solutions that can improve the already existing products.

Over the past few years, A Appiani Srl has invested heavily in new machinery such as automatic welding units, presses, CNC lathes machine, state-of-the-art straightening and balancing units, reels tilters and handling systems to speed up the reel manufacturing cycle.

A Appiani Srl – Italy
Fax: +39 030 9382 425
Email: info@appiani.reels.it
Website: www.appiani.reels.it

Besel Basim San Tic Ltd Sti
Booth 2134

Turkish company Besel Basim San Tic Ltd will be displaying it pre-engineered process systems.

With 35 years' experience in the industry, the company has established itself as a leader in producing and converting technology.

Besel Basim San Tic Ltd – Turkey
Fax: +90 282 681 8539
Email: info@beselfoil.com
Website: www.beselfoil.com

Buehler Wuerz Kaltwalztechnik GmbH
Booth 740

Buehler Wuerz is a specialised machinery manufacturer in cold rolling mills for wire and strip. Steel application can be covered as well as non-ferrous alloys. The main focus of the business is the strip and wire industry, the precious metals industry

such as mints, and various special applications like PV ribbon for the solar industry.

Buehler Wuerz Kaltwalztechnik GmbH – Germany
Fax: +49 7231 6005 54
Email: info@buehler-wuerz.de
Website: www.buehler-wuerz.de

CM Caballé SA
Booth 218

With over 60 years of experience in the design and manufacture of rotating machinery for the production of copper LAN, telecommunication, fibre optics, data, control and power cables as well as steel ropes, CM Caballé provides the cable industry with a wide array of stranding, twinning, bunching and cabling machinery.

The firm is constantly developing new equipment to meet the ever-changing needs of the wire and cable industry.

The company's portfolio includes equipment for power cables (double twist stranders, rigid stranders, drum twisters, single twist stranders, bow skip stranders, tubular stranders, planetary stranders and SZ stranders); telecom and LAN cables (double twist pairing-quadding machines, single twist cabling lines, group twinners, drum twisters, shielding-jelly filling-sheathing lines, SZ stranders); steel ropes (double twist stranders, tubular stranders, planetary stranders, bow skip stranders); and ancillary equipment such as payoffs, take-ups, capstans, caterpillars, taping machines and binders.

At Interwire Caballé will show new developments, highlighting products that will include:

- upgraded rigid stranders and drum twisters for HV energy cables (Milliken conductors)
- an upgraded range of double twist stranders to manufacture compacted conductors of Cu and Al up to 400mm^2
- and a new design of tubular closers for reels up to 1,250mm for steel ropes

CM Caballé, SA – Spain
Fax: +34 93 399 00 08
Email: caballe@cmcaballe.es
Website: www.cmcaballe.es

Cemanco LC
Booth 1801

For over 20 years, Cemanco has provided quality wear parts and machinery to the wire and cable industries.

To reach and maintain top quality of the finished product during wet drawing of non-ferrous materials the choice of the right drawing tools is essential.

Cemanco ceramics in zirconium or aluminum oxide are manufactured to the highest standards regarding raw materials, density and surface finish with each finished part subjected to two separate levels of end control.

Customers can choose from over 2000 drawings for standard machines like Niehoff, SAMP, Herborn, Henrich or Syncro. As a specialist for ceramic wear parts the company also offers a wide selection of standard ceramics like

>>>

flanged eyelets, ceramic rods, tubes and bow guides in a variety of qualities and surface finishes.

▲ *A cable and wire straightener from Cemanco*

Pulleys and sheaves are available in a choice of materials ranging from aluminium or steel coated with ceramic or tungsten carbide to solid ceramic or composites with metal or plastic flanges and solid ceramic inserts as well as plastic materials.

In addition to an extensive inventory Cemanco offers customers assistance with individual solutions. Custom parts can be provided with short turn around times even in smaller quantities.

The company offers KMK spooling traverses that are known for their cost efficiency, longevity and precision. These mechanical rolling ring drives are easy to maintain and have been the bench mark for take-up traverses for many years.

Recently KMK added a dual – laser guided, self-adjusting traverse system that automatically optimises winding results for a variety of spool types.

The system has been designed as a cost effective step towards automation and rationalisation of the spooling process providing consistently high quality winding results.

Roller guides for wire and cable and wire straighteners complete Cemanco's product programme. Guides are available in many standard sizes from stock or as individual solutions, with standard hardened and chrome coated rollers or with special coatings like ceramic or tungsten carbide.

Straighteners come with standard quick opening levers and cover material diameters from 0.02" to 1.6", either with V-grooved rollers or custom radius grooved rollers.

Cemanco LC – USA
Fax: +1 954 970 3056
Email: info@cemanco.com
Website: www.cemanco.com

Clinton Instrument Booth 901

Clinton instrument Company will be demonstrating calibration methods for all types of spark test units, using new calibration equipment, currently under development.

The company will also be showing the FL-20A cable fault location unit for finding insulation defects in completed cables. Marldon airwipes for high speed wire lines will also be on display.

Clinton Instrument Company – USA
Fax: +1 860 669 3825
Email:
support@clintoninstrument.com
Website: www.clintoninstrument.com

Commission Brokers Inc Booth 705

Commission Brokers will be displaying pictures and brochures of available used equipment, as well as information relating to the company's appraisal, liquidation and consignment capabilities.

With over 40 years' experience of service, Commission Brokers specialises in non-ferrous wire and cable equipment, wire harness and assembly equipment, and braiding machinery from individual components to complete plants.

Commission Brokers Inc – USA
Fax: +1 401 943 3670
Email: marty137@aol.com
Website:
www.commissionbrokers.com

Condat Booth 1550

Condat wll be presenting its latest developments in surface technologies for metal forming, particularly for wire drawing and rolling operations:

- Vicafil: the range of surface coatings and lubricants for wire drawing
- Steelskin: a high tech lubricant, especially for advanced drawing applications
- Galvasmooth: charcoals for hot dip galvanising
- Condaclean: cleaners for all metal surfaces

Condat also offers lubricants that meet the most recent environmental and health and safety legislations, including for the reducing of dust in workshops, and REACH (Boron free) and biocides.

The show will also give the company the opportunity to launch the new range of high performance, Boraz-free surface coatings for low and high carbon steel (tyre cord, PC strands, spring wire etc), Vicafil TS7101 and Vicafil TS 7133.

▲ *The Condat dry powder lubricants range*

The company is also introducing the new wet drawing emulsion, Vicafl SL3400 for the growing saw wire market.

This offers high tool life and very good surface quality for very fine diameters and high steel grades.

Condat – France
Fax: +33 478 07 3800
Email: info@condat-lubricants.com
Website: www.condat-lubricants.com

Daloo Booth 1502

Successfully launched by the Gauder Group in 2008, Daloo, a wire and cable machinery manufacturer based in China, forges itself an international reputation for the delivery of low cost equipment based on European experience.

Exhibiting for the second time at Interwire, Daloo offers the best quality-price ratio machinery for extrusion lines, screening/armouring lines and rigid stranding lines.

▲ *Daloo KM630-12 rigid strander*

The range includes rigid cage stranders, taping lines, rewinding lines, payoffs & take-ups as well as pulling caterpillars and is regularly extended to other cable machines.

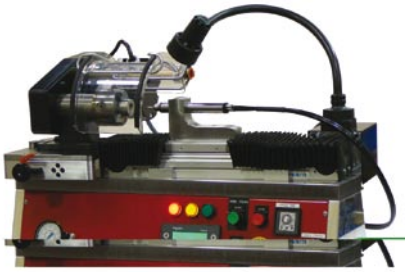
Daloo – China
Fax: +86 519 8548 3557
Email: sales@daloo-machines.com
Website: www.daloo-machines.com

Die Quip Booth 717

On Booth 717 visitors will see Die Quip's MGF-200 Die Saver, one of the exciting new lines of die finishing machines for tungsten carbide wire drawing dies. The line consists of three models capable of grinding or polishing dies in either manual or automatic cycles to meet any die shop's requirements. All models feature easy to use controls, and a lower cost to make it easier to refinish dies in-house.

The die working machines are designed to produce tooling in-house to improve material delivery times, reduce tooling costs and provide productivity improvements by increasing die life through better design.

Die Quip strives to provide more than just a machine. It has the most extensive training programmes to teach operators how to run the machines, which tooling to choose and the different methods to make dies. This is done with on-site training programmes, detailed manuals and an exclusive die making handbook.



▲ *The MGF-200 from Die Quip*

Die Quip's extensive line of hand and powered cutters for wire will be on display along with Krenn's new KTC line of hard wire and chain cutters. They feature wedge shaped blades, electro-hydraulic power and guard for cutting spring grade rod and drawn wire with less blade wear compared to shear cutters.

Die Quip – USA
Fax: +1 412 835 6474
Email: diequip@diequip.com
Website: www.diequip.com

Enkotec A/S Booth 1824

Enkotec will be exhibiting its TA01 thread rolling machine, which has been specially designed for making screw shank or annular nail profiles with a working area of Ø1.8-4.2mm/ 0.071"-0.165" x 32-105mm/1¼"-4" nail length and a profile height of 27-75mm/1.06"-3".

▲ *Enkotec's TA01 thread rolling machine*

Like the high-speed Enkotec rotary nail machines, the TA01 is a super-efficient machine offering real competitive advantages and capable of running inline in a nail manufacturing line or as a standalone machine. It includes numerous innovative features:

- Accurate insertion principle with a specially designed nail injector. The precise nail insertion results in a very high and uniform profiling quality and very long tooling life
- High production speed of up to 2,500 nails per minute, without affecting the production stability, no matter whether the profile chosen is screw shank or annular
- Touch-screen user interface allowing to choose the nail type and to start, stop, initialise, adjust and monitor the machine
- Fast tooling changeovers of only approximately 30 minutes
- Low noise level thanks to covers over the process zone and around the feeder section, and to the fact that nails are constantly engaged
- Energy efficiency owing to low air consumption and low electricity costs. Efficient integrated cooling system
- Exhaust ventilation option making it possible to efficiently exhaust dust

Enkotec A/S – Denmark
Fax: +45 8652 4199
Email: sales@enkotec.dk
Website: www.enkotec.com

Euroalpha Booth 1314

Euroalpha is a high-tech, dynamic and innovative company producing precision and reliable machines for drawing and stranding of non-ferrous wires (copper – aluminium – aluminium alloys – copper clad aluminium). Wire and cable manufacturers are welcome to the booth to get information about the wide range of Euroalpha equipment, including:

- rod breakdown lines (for 1 to 4 wires)
- single and twin-wire intermediate drawing lines
- multi-wire lines (from 4 to 48 wires)
- heavy-duty drawing lines for trolley wires
- tubular stranders
- bunching machines.

Custom equipment can be developed with short time-to-market for meeting special requirements of customers.

All Euroalpha machines are expressly thought and designed for bringing a few fundamental advantages to wire and cable manufacturers, which means:

- reduced capital investments for setting up plants
- high productivity and quality of finished products from plants
- ease of use and maintenance of plants
- limited operational expenses for running plants.

2011 will see the company pay special attention on this exclusive equipment:

- R1 Compact Limited-Slip Rod Breakdown Machine: less than 5mt length to meet the most severe space requirements, combined with the superior performance of the Euroalpha limited-slip technology
- D3-M Limited-Slip Multiwire Drawing Machine: the first multi-wire drawing machine ever designed with drawing capstans individually motor-driven
- Consistent savings on energy consumption, almost negligible maintenance, extreme operational flexibility, reduced wire breaks, low noise level, and other important benefits of the Euroalpha limited-slip technology are now available on multiwire drawing machines as well
- B630-F Four-Twist Bunching Machine: patented revolutionary equipment which provides almost double productivity compared to the conventional double-twist bunchers

Euroalpha – Italy
Fax: +39 0424 72780
Email: info@euroalpha.it
Website: www.euroalpha.it

Fastener Engineers Booth 214

Rockford Manufacturing Group, Fastener Engineers and Lewis Machine are leaders in the wire industry. The in-line wire processing equipment is being used by many manufacturing processes including fastener production, nail making, wire bending, concrete products, steel bar processing, welded wire products, screw machine parts and wire straightening and cutting. RMG provides integrated systems for the processing of hot-rolled rod into descaled and drawn wire that is regularly used in a variety of production machines and processes to reduce material cost. Lewis Machine straighten and cut equipment celebrates its centenary this year. The company is in search of the oldest Lewis Machine still in production to commemorate the milestone. Please contact Kirk Prosser at kprosser@rmgflem.com

The RMG and straight and cut machines have introduced many revolutionary concepts including VF AC drives, 3 die arbors and the patented 'clutchless' cutting technology. RMG is the only OEM for Fastener Engineers, Lewis Machine and G C Patterson equipment and the best source for tooling, spare parts and technical service needs.

Fastener Engineers – USA
Fax: +1 815 624 7254
Email: rmgfelm@rmgfelm.com
Website: www.rmgfelm.com

SERENITY IN PRODUCTION...

For High Competing Power And Profitable Production, CORRECT DECISION

- Innovative Technology
- High Production Speed
- Lower Production Cost
- Easy Usage
- Maximized Standard Equipment
- Less Maintenance Requirement

MANUFACTURING:

Double Twist Stranding Lines
Single Twist Stranding Lines
Rigid Stranding Lines
Drum Twisting Lines
Skip Stranding Lines
Planetary Stranding Lines and Taping Lines

Expo Cable Wire 2011
CNR Expo Center/Turkey
7-9 April 2011 Hall: 6-7

wire Russia
Wire Russia
23-26 May 2011

CABLE STRANDING TECHNOLOGY
Production Systems Engineering Solutions

PRATECH

Phone : +90 216 420 12 50 - 51 info@pratech.com.tr www.pratech.com.tr

FIB Belgium sa
Booth 1850

FIB Belgium designs and supplies heat treatment lines for the production of steel wires.

It particularly specialises in lines for high carbon wires (cable, steelcord, bead wire), in galvanising and galfan coating lines in the field of high and low carbon, in bell furnaces for annealing or spheroidising of wires under nitrogen or hydrogen and in furnaces for stainless steel and spring wires (oil tempering lines).

The company is also increasing its presence in India, obtaining several significant orders from well-known companies in the wire industry.

FIB Belgium sa – Belgium
Fax: +32 2376 3711
Email: info@fib.be
Website: www.fib.be

Flymca SL
Booth 952

Flymca is a well known and experienced Spanish rotating machinery manufacturer building equipment for the wire and cable industry such as tubular, skip, rigid, planetary stranders as well as bow cablers, drum twisting lines and all ancillary equipment present in complete lines for the production of electrical cables and steel ropes.

The company also builds complete lines for the production of CTC transposed cables.

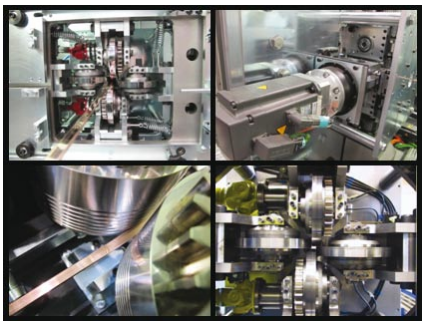
Sister company Flyro is involved in used machinery. If required by the customer, mixed solutions can be proposed with lines composed of Flyro used equipment and Flymca's new machines.

Flymca SL – Spain
Fax: +34 942 559 865
Email: flymca@flymca.com
Website: www.flymca.com

Fuhr GmbH & Co KG
Booth 1170

Having kicked-off the new year with all-time record sales that ensure full delivery books until mid-2012, the future looks brighter than ever for the German manufacturer of wire rolling machines. In order to cope with current and future demand of its state-of-the-art wire processing technology, FUHR has significantly invested into new infrastructure and increased its personnel on the production side.

Along with a number of new projects for Chinese, Japanese and Korean customers, FUHR also received a major order from a US American manufacturer for the production of flat, rectangular and special profiles



▲ *State-of the-art wire processing technology from Fuhr*

made of stainless steels, as well as from its European branch for processing copper wire into PV ribbon (interconnect wire and bus bar).

Apart from the export business, FUHR also managed to secure its highest order ever from a German manufacturer of flat and rectangular stainless steel profile wires.

This recent development in the field of copper wire (ie PV ribbon and magnet wire) and stainless steel wire (eg filter screens) and high-carbon steel wire (eg piston rings, flexible pipe armouring) rolling machines gives a good impression of the future of the wire processing industry.

FUHR GmbH & Co KG – Germany
Fax: +49 5234 8498
Email: info@fuhr-wire.com
Website: www.fuhr-wire.com

Gauder Group Inc
Booth 858

Providing an excellent range second hand and used machinery, Gauder Group's Pourtier and Setic brand names provide high quality machines (bunchers, stranders and cablers), made in Europe to the highest standards in design and manufacturing.

Gauder Group Inc covers the North American market for all group products, developing accordingly its aftersales and spare parts services including high technology bows – as well as the exclusive 'GreenBow' – and accessories for all brands of rotating machines.

Gauder Group, Inc – USA
Fax: +1 336 856 8117
Email: ggi@gaudergroup.com
Website: www.gaudergroup.com

Gavlick Machinery Corp Booth 864

Established in 1957, Gavlick Machinery supplies used machinery for the ferrous and non-ferrous industry worldwide.

The company specialises in appraisals, liquidations, buying and selling single machines and complete plants in bar, rod and wire processing; wire drawing; multi-pass; bullblocks; wire flattening mills; stranders; cablers; straight and cut; fence; nails; rope; spring coiling; shaped and flat; weaving and welded mesh.

Gavlick Machinery Corp – USA
Fax: +1 860 589 0863
Email: sales@gavlick.com
Website: www.gavlick.com

H Folke Sandelin AB Booth joint 740

H Folke Sandelin AB supplies continuous lead extrusion equipment and expertise for trouble free lead sheathing of cables.

The latest design lead extruder is horizontal, floor-standing, easy to install and maintain, fully automatic and extremely reliable with its state-of-the-art air control system, enabling continuous operation for weeks with little or no variation in temperatures and wall thickness/concentricity.

The lead wall thickness can be kept to a minimum with corresponding savings in lead. A range of die blocks are available to cover an extensive diameter range of 6mm-225mm (over lead), and a range of melting pots are available for 10, 18 and 35 tonne capacities.

Additional equipment includes the cable repair and recovery system, CRRS, which has the possibility of:

Removing individual layers, such as, the outer jacket, lead sheath or triple layer XLPE insulation, without causing any damage to the subsequent layer below.

That enables the outer jacket, lead sheath or triple layer XLPE to be re-applied and the cable repaired. Even if the cable is just going to be scrapped, the metal price differences for insulated or un-insulated cables are very large and the equipment would have a very short pay-back period, if the metals are scrapped in their "bright" form.

H Folke Sandelin AB (HFSAB) is able to supply second hand fully refurbished lead extruders to very high standards, and provides a full and extensive after sales service, know how, fully trained and experienced technician support and spare parts.

H Folke Sandelin AB – Sweden
Fax: +46 141 203639
Email: hfsab@hfsab.com
Website: www.hfsab.com

High Performance Conductors Inc Booth 540

High Performance Conductors Inc specialises in high-performance and high-temperature conductor applications: silver and nickel-plated copper and high strength copper alloy conductors, in single end, bobbin wound, flat wire, stranded, and rope-lay constructions.

Also, Tensile Flex® alloy, environmentally friendly RoHS-compliant HPC 80EF® and HPC 35EF®, and CS 95® alloys, CT 37, 162 cadmium copper, lightweight/tight tolerance constructions. New stainless steel medical wire and thermo couple alloys, micro-diameter, hybrid, polyimide, thermoplastics and fluoropolymers medical tubing and tinsel wire.

High Performance Conductors Inc – USA
Fax: +1 864 472 2727
Email: info@iwghpc.com
Website: www.iwghpc.com

Ideal-Werk C&E Jungeblodt GmbH & Co KG Booth 912

Ideal is an international equipment design and manufacturing company headquartered in Germany, and having been in business for 87 years, specialises in the manufacture of resistance welding equipment.

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▲ *The green line clean from Ideal-Weld*

Manufacturing locations include Lippstadt, Germany, and Pietermaritzburg, South Africa, with a wholly-owned sales and service operation in Rockford, Illinois, USA. The equipment services many industries, including construction, appliances, steel and wire mills, cables manufacturers, steel floor grating, automotive, POP displays and the fencing industry.

Products include:
Butt Welders: A comprehensive range of resistance, flash and dual force butt welders, for both ferrous and non-ferrous wire, covering a diameter range of 0.1mm (0.0039")-18mm (0.709"). The machines come with various options and levels of automation to suit customer demand.

Industrial Mesh Welders: The fully automated mesh welders are found in many industries, manufacturing products such as poultry cages, dish washer baskets, oven racks, pop displays, wire shelving, welded wire fencing and wire cable trays. The selection ranges from fully automatic high production machines, to quick set-up short-run machines.

Reinforcing Mesh Welders: These are manufactured under the Clifford brand name, known worldwide as a quality supplier of state-of-the-art mesh welding machine for the construction industry. Reinforcing mesh welders can be supplied up to 4,000mm (13ft) in width for the production of heavy engineering mesh, with wire diameters up to 16mm (0.63") using pre-cut bars for both the crosswire and linewires, or light gauge standard reinforcing panels, made on high speed welders with linewires and crosswires being pulled from coils up to 10,000lb in size. These fully automated reinforcing mesh welding lines can be equipped with automated turning and stacking, bundle tying and bundle stacking systems.

Multi-axis Robotic Welders: Whether the user wants to weld complex wire forms, spot weld on sheet metal, or automatically sort and weld earth studs in an electrical cabinet, the range of robotic jig welding machines are able to perform these functions and many more.

These machines are offered with as few as two programmable axes up to 8 axes. The welding of nuts, studs, sheet metal and wire, which can all be welded on the same machine, takes place on one jig station, while the operator loads a second jig for the next part to be welded.

Other Equipment: This includes automatic steel floor grating welders, wire rolling lines, wire straightening and cutting machines, band saw welders and a full line of sheet metal coil joining equipment, including laser welding and cutting.

Ideal-Werk, C&E Jungeblodt GmbH + Co KG – Germany
Fax: +49 2941 2061 69
Email: gerlitzki@ideal-werk.com
Website: www.ideal-werk.com

Ideal Welding Systems LP – USA
Fax: +1 815 874 4015
Email: cwhite@idealweld.com
Website: www.ideal-werk.com

Lämneå Bruk AB
Booth 1860

Lämneå Bruk AB specialises in the design and manufacture of machines for the ferrous and stainless steel wire industry and is a reliable supplier of pay-offs, mechanical de-scaling equipment, drawing machines and take-up units.

For the solid welding wire industry the company supplies complete lines including pay-offs, cleaning equipment, drawing machines, copper coating and take ups.

For tubular wire or flux core wire, it supplies strip rewind lines, strip pay offs, forming - filling – closing machines, drawing machines and take-ups. It also supplies high speed rewinding lines including precision layer and drum packer (No Twist Coiler) for both solid and tubular wire.

▲ *Lämneå Bruk AB specialises in the design and manufacture of machines for the ferrous and stainless steel wire industry*

For the low/high carbon and stainless steel wire industry Lämneå Bruk has rotating and/or over head pay off systems, mechanical cleaning units (for carbon wire), drawing machines and take ups. The take up systems range from down coilers with controlled filling systems to automatic spoolers.

Lämneå Bruk also makes pay offs and take up systems for heat and surface treatment of high and low carbon wires as well as stainless steel wires, supplying take up coilers with live block or dead block depending on the requirements of the process.

Lämneå Bruk AB – Sweden
Fax: +46 122 232 99
Email: info@lamnea.se
Website: www.lamnea.se

LaserLinc
Booth 1064

LaserLinc manufactures highly-accurate and highly-adaptable non-contact laser and ultrasonic systems to measure OD, ID, wall thickness, eccentricity, and concentricity for the wire, cable, and fibre industries.

High-speed three-axis laser gauging for OD, ovality, and flaw detection, plus features such as FFT and SRL prediction helps reduce scrap, save material, increase production efficiency, and improve quality.

▲ *Triton331-high-speed scanner provides excellent flaw detection*

The company has just introduced an intelligent gauge-interface for stand-alone operation or communication with PLCs. The standard gauges operate via Total Vu™ software-a PC-based interface that gives sophisticated, yet operator-friendly measurement/ data processing. Total Vu gives a picture of the products made, in real-time, with run and trend charts, graphical cross-section display, and measurements in configurable, easy-to-read panels. Features include in-process tolerance checking, defect detection, SPC, feed-back control, data logging, recipes, and configurable reporting.

LaserLinc systems are available in a variety of configurations and sizes, with laser scan micrometers of one, two, and three axes, plus the ultra-sonic wall thickness measurement device, the UltraGauge+. Scanners cover product diameters from 0.035mm (0.0014") to 120mm (4.7"), and feature compact models and the highest measurement rates available.

Split transmitter/receiver models offer flexibility and precision for multi-strand applications, and the three-axis Triton series provides accurate ovality measurement regardless of product orientation. With the UltraGauge+, the user can measure wall thickness at up to eight positions with over 2,000 measurements per second.

All LaserLinc micrometers and the UltraGauge+ have a four-year warranty, parts and labour. In virtually all cases, a temporary replacement will be shipped overnight if a micrometer needs warranty repair.

LaserLinc – USA
Fax: +1 937 318 2445
Email: info@laserlinc.com
Website: www.laserlinc.com

Lewis Machine Booth 2114

Rockford Manufacturing Group, Fastener Engineers and Lewis Machine are innovative leaders in the wire industry.

The in-line wire processing equipment is being used by many manufacturing processes including fastener production, nail making, wire bending, concrete products, steel bar processing, welded wire products, screw machine parts and wire straightening and cutting.

RMG provides integrated systems for the processing of hot-rolled rod into descaled and drawn wire that is regularly used in a variety of production machines and processes to reduce material cost.

▲ *The vertical taping line from Lukas*

Lewis Machine straighten and cut equipment celebrates its centenary this year.

The company is in search of the oldest Lewis Machine still in production to commemorate the milestone. Please contact Kirk Prosser at kprosser@rmgflem.com

The RMG and straight and cut machines have introduced many revolutionary concepts including VF AC drives, 3 die arbors and the patented 'clutchless' cutting technology.

RMG is the only OEM for Fastener Engineers, Lewis Machine and G C Patterson equipment and the best source for tooling, spare parts and technical service needs.

Lewis Machine – USA
Fax: +1 815 624 7254
Email: rmgflem@rmgflem.com
Website: www.rmgflem.com

Lukas Anlagenbau GmbH Booth 423

Lukas, a supplier of machinery for the wire and cable industry, is recognised for its high quality and precision products.

At Interwire it will be exhibiting a vertical taping line. Suitable for all types of tape, including PTFE, Kapton, Mica, Polyester, Fleece, laminated tapes and metal tapes, the high speed and precise taping is enabled by a closed loop tape tension control, and there is very precise speed sychronisation between the capstan and the taping heads.

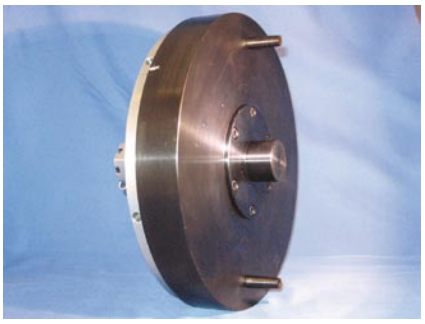
▲ *A vertical taping line from Lukas Anlagenbau*

Depending on the application, the line can be equipped with a cooling unit for the taping area, an in-line sintering oven or equipment for quality control.

Lukas Anlagenbau GmbH – Germany
Fax: +49 9651 930 299
Email:
lukas.voh@lukas-anlagenbau.de
Website: www.lukas-anlagenbau.de

Magnetic Technologies Ltd Booth 112

Magnetic is a maker of stock and custom permanent magnet brakes and accessories for stranders, bunchers, twinners and payoffs in English and metric dimensions. The company is now offering large pancake brakes designed as a drop-in replacement for



▲ *Large pancake brakes*

the spindle and rope brake assembly common to many cablers.

By offering constant torque in every bay, the new design promises to greatly improve product quality and productivity. Torque is adjustable up to 90 lb-in.

The magnetic brake assembly is impervious to oils and dust as well as changes due to temperature, and humidity that can cause slippage on rope type brake designs. The new magnetic torque brake uses no electricity and, because it is magnetic, has no wearing parts.

The company offers a variety of brakes for pay-offs and take ups. The brakes are infinitely adjustable to give extremely accurate tension control and come in numerous sizes to fit customers' spools and reels.

Torque is developed magnetically and will remain the same year after year. Torque range is 0.11 inch ounces through 140 inch pounds. Single to multi-spool pay-off stands are also available. Advantages include adjustability, portability, no electricity, and a minimum of floor space. Every brake or clutch is carefully engineered to give exceptional long life, for even the most demanding production standards. They are designed to be easily mounted and serviced or modified, should the need arise.

Magnetic Technologies Ltd – USA
Fax: +1 508 987 2875
Email: info@magnetictech.com
Website: www.magnetictech.com

Maillefer SA Booth 906

Maillefer will present its portfolio of extrusion systems for energy cable, fibre optic cable, telecom cable and tube manufacturing systems. Visitors can expect to see a series of continued improvements and services for the production of medium, high and extra-high voltage cables. New technology and innovations have pushed the kV envelope in the 500 figures, with higher speed capabilities, more compact layouts, and improved quality control.

When fibre optic cables made their debut in the late 1970s, Maillefer was present with equipment for the leading players at the time. Today, Maillefer provides high-end manufacturing solutions for every stage of the fibre optic cable process.

Tight buffering, secondary coating, SZ stranding and jacketing lines are available for producing FTTx cable with low fibre counts and short lengths. Technology like the compression caterpillar with tension feedback serves to keep accurate control of excess fibre length.

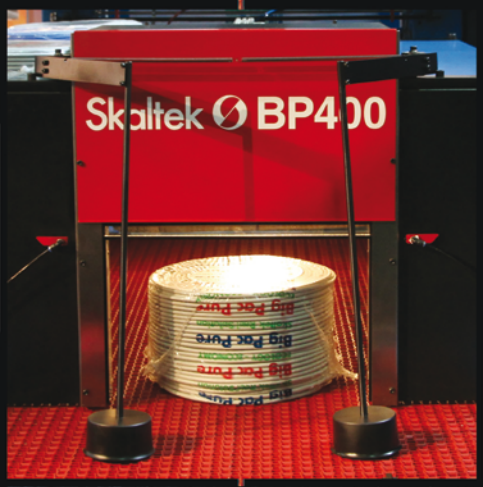
▲ *Extrusion technology from Maillefer*

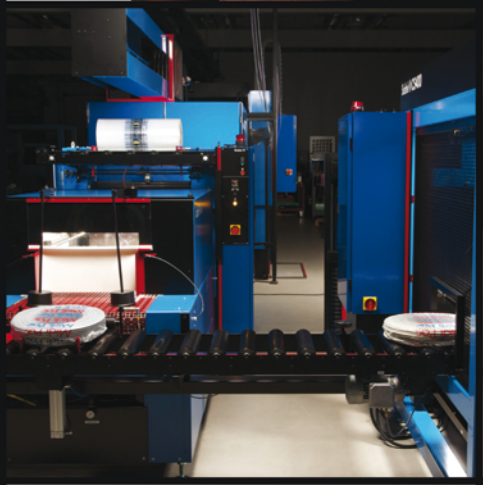
Coax and LAN cable manufacturing continues to evolve towards higher frequencies and smaller packages. The microcoax TEL 00 line is designed to produce insulated wires as thin as a human hair. The small extrusion line produces both solid and foam-skin as well as PE and FEP insulated wires.

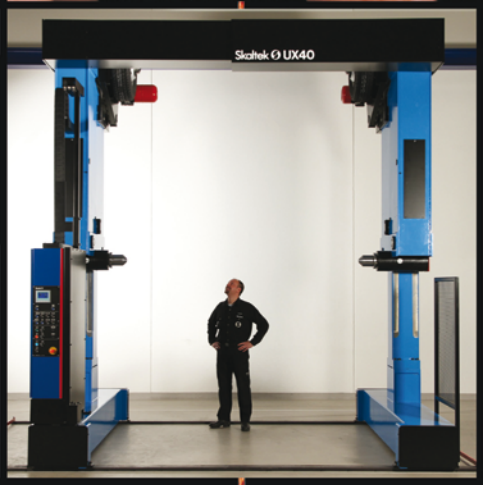
Improved cooling is a key feature of the latest MXC extruders. The processing window is ever larger, thanks to third generation axial air cooling. The cooling capacity has grown by over 50% in order to process materials like EDPM and EPR, areas otherwise covered by liquid cooled machines. The new MXC developments are available on several of the company's principal machines.

Maillefer SA – Switzerland
Fax: +41 21 691 2143
Email: info@maillefer.net
Website:
www.mailleferextrusion.com

QUALITY | SECURITY







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e-mail: mailto@skaltek.com

www.skaltek.com

Micro Products Co Booth 624

Visit Micro-Weld booth (no 624) at Interwire 2011 Show in Atlanta (GA, USA, 3rd-5th May 2011) and its booth (booth no. to be released later) at wire Russia 2011 (Moscow, Russia, 23rd-26th May, 2011)

▲ *A Micro-Weld welder*

This is an ideal opportunity to learn more about electric resistance butt and flash welders designed and manufactured by Micro Products Company, of USA.

Micro-Weld welders are used all over the world by wire and cable industry for continuous processing of wire, rod or cable in the most efficient and cost-effective manner possible. Over 50 models are offered for both ferrous and non-ferrous applications for a wide range of wire diameters.

Some of these models will be on display at the shows. A variety of accessories are available to make welding operations fit users' needs.

Also available are ceramic fusion welders. These welders weld within ceramic sleeves for containment and perfect welds without burrs on stranded conductors.

Micro-Weld features include heavy duty, long-lasting transformers, manual or pneumatic operation and self-aligning welding dies for consistent high quality welds. The unique design makes them tough, dependable and easy to operate.

Sample weld evaluation is offered as a valuable service free of charge to test the stock/material and evaluate the weldability and strength of wire samples.

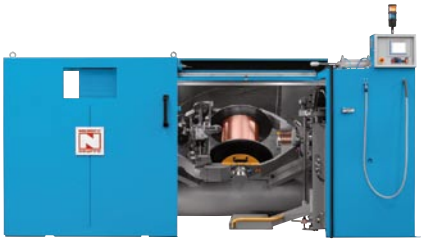
Micro Products Co – USA
Fax: +1 630 787 9360
Email: info@micro-weld.com
Website: www.micro-weld.com

Niehoff and NENA Booth 740

Niehoff Gruppe and its subsidiary Niehoff Endex (NENA), will present the following equipment:

- A MMH50.8.F35 + RM121 Fine Multiwire Line
- A D631 double twist buncher with NBAT Niehoff Automatic Traverse System & EDP801 Multiwire payoff
- A BMV16 high speed braiding machine
- Niehoff's spare parts and support concept

All machines are driven by Class IE2 energy-efficient AC motors with electronic control, meet the current safety regulations of the machinery directive RL 2006/42/EG and feature a completely new and functionally optimised machine design. Niehoff's partner companies like Steuler, HFSAB and Bühler-Würz will also be present during the show.



▲ *MMH50 / RM121 Fine Multiwire Drawing Line*

The multiwire drawing machine MMH50, with its integrated continuous annealer RM121, is designed to draw simultaneously eight wires with a final diameter of up to 0.05mm (44 AWG) which can be processed to superfine multiwire bundles.

The machine is part of the worldwide top-selling MMH range of multiwire drawing machines, whose largest is capable of drawing up to 48 wires.

The quality of the wires made on them exceeds the most demanding specifications and processing requirements. Along with multiwire drawing machines for copper wire, Niehoff offers 8 and 16-wire drawing machines for aluminium and aluminium alloy wires.

The D631 single-bow double twist bunching machine can manufacture bunches with a cross section of 0.09mm² to 6.0mm² (27½-9½ AWG) and a freely adjustable lay length from 6mm to 100mm. The machine on display is equipped with the automatic "Niehoff Bunching Automatic Traverse" (NBAT) device which detects spool flanges and controls the traverse width of spools by means of opto-electronic sensors.

▲ *D631 double twist buncher*

As a result, the spools are filled perfectly and the bunched wire can be paid off tangle-free and without wire damages even at very high speeds.

When equipped with the new energy-saving ECO-bow, energy consumption is reduced by more than 60 per cent compared to the two-bow conventional bunching machines under the same operating conditions.

The 16-carrier lever arm rotary high speed braiding machine BMV16 can process bare or coated copper wire, aluminium wire and stainless steel wire with a single-wire diameter ranging from 0.05 to 0.3mm (40-28 AWG) and artificial yarn and fibres.

The BMV machines can be combined with different kinds of taping devices.

An integrated automatic empty bobbin detection system stops the machine before a braiding bobbin is completely empty thus keeping the residual wire on the braiding spool to a minimum.

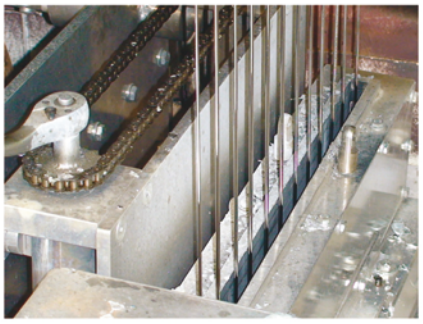
The applications of the BMV machines include the manufacture of data, control and coaxial cables, hollow braids for battery cables, stranded braids, and mechanical reinforcements for pressure hoses and medical catheters.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Fax: +49 9122 977 155
Email: info@niehoff.de
Website: www.niehoff.de

Niehoff Endex North America Inc – USA
Fax: +1 856 467 0584
Email: sales@niehoffendex.com
Website: www.niehoff-usa.com

INTERNATIONALLY RECOGNISED LEADERS IN GALVANISED WIRE TECHNOLOGY

QUANTUM™ EMW™ WIPING PROCESS

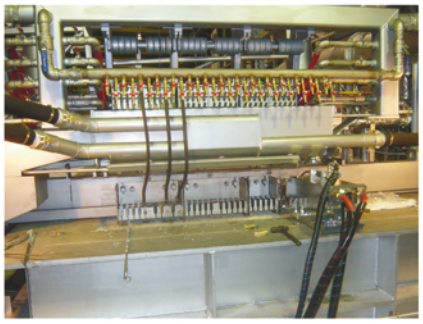


Cost and quality are the two most important aspects in today's highly competitive wire manufacturing environment. By installing Quantum EMW on existing galvanising lines, or designing EMW into a new line, there is usually a 25% saving on Zinc and Zinc Alumimum costs. At the cutting edge of technology, EMW is the most advanced wiping system available producing perfectly concentric galvanised wire. Easy to operate, safe and environmentally friendly there are over 40 EMW systems worldwide, with the majority installed in large wire mills in China and Japan.

QUANTUM™ LCM™ 800

PWT's in-depth knowledge of the wire manufacturing process has led to the development of state of the art lubricant conditioning technology. The LCM 800 is designed to guard against excessive die wear and maintain wire quality. Used lube has always been discarded but by reprocessing it the LCM 800 reduces operational costs. By emptying the die box and adding into the receiving hopper up to 60% of the lubricant can typically be re-used. The process is simple, safe, requires minimal operation and helps protect the environment.

QUANTUM™ PROJECT MANAGEMENT



PWT are internationally recognised as the leaders in process control of galvanised wire. In all aspects of galvanising technology, with particular mention to their unique Single-Dip Zinc Aluminum coating process, the expertise of our Project Management Division will work alongside you making sure a first class job is produced, on time, first time. Our affiliation with world wide equipment suppliers guarantees quality products at competitive prices - all fully warranted with prompt after sales technical support. From pay off to take up, PWT are the partners of choice in the field of galvanised wire making.

PWT Limited • Unit 5 Number 1 Highbrook Drive • East Tamaki 2161 • New Zealand
PO Box 18 409 Glen Innes 1743 • PH:+64 9 271 5529 Fax: +64 9 271 5574

www.quantum-emw.com

Pan Chemicals Italian Pavilion Booth 1314

Pan Chemicals is totally dedicated to wire drawing industry and, in particular, the ferrous and alloy wire market with its main products being wire drawing lubricants and coatings.

Ecology and environmental safety have always been foremost in the company's aim to the development of new products.

The application of the new European Rule REACH has given a further push toward the development of new products which are completely safe for the operators and the environment.

The most evident consequence related to the wire industry is the elimination of Borax in the formulation of the drawing lubricants and the coatings. Most of the sodium lubricants and most of the coatings contain a significant quantity of Borax and many drawing processes are based on the Borax coating.

Pan's research and development has been focused on these two issues and through experimentation and close cooperation with key accounts, it has developed, approved and commercialised many new products to comply with the REACH normative.

▲ *Series PANLUBE S 1500 sodium new generation lubricants*

There is a new range of lubricants now available – Series PANLUBE S 1500 sodium new generation lubricants. These products are free of Borax, nitrates, nitrites, phosphates, carbonates and chlorides and they are 100 per cent safe and environmentally friendly.

They are suitable for
- High carbon steel wire
- Steel cord wire
- Bead wire
- Spring wire
- Roping wire
- PC wire (final dies)
- Very high speed for low carbon wire

The granulated powder light yellow, is completely soluble in water. With this same philosophy in mind, Pan has also designed new pre-coatings such as the PANCOVER 4700 Series to meet the most stringent demands for drawing carbon and stainless steel wires.

Pan Chemicals – Italy
Fax: +39 035 977288
Email: info@panchemical.com
Website: www.panchemical.com

Pourtier Gauder Group Booth 858

▲ *Pourtier Drum Twister line for power cable DTPC 1600 ... 5000*

Pourtier, part of the Gauder Group, develops comprehensive solutions to produce high quality Milliken conductors for high voltage and extra-high voltage power cable (AC) and conductors for DC cables (round compacted and trapezoidal wires).

Pourtier sas – France
Fax: +33 1 64 26 61 10
Email: pourtier@gaudergroup.com
Website: www.gaudergroup.com

Pressure Welding Machines Booth 1840

British company PWM (Pressure Welding Machines) will showcase two best-selling portable cold welders at Interwire 2011, as well as the EP500 rod welder, and a selection of manual machines.

▲ *PWM's trolley mounted HP100 air/hydraulic welder*

The PWM range will be featured at the show by Amaral Automation Associates (booth 1840), exclusive distributor of PWM cold welding equipment, spares and dies in the US and Canada. The trolley-mounted HP100 air/hydraulic cold welder can be wheeled to the work area to save downtime. Energy efficient and easy to operate, the HP100 provides strong, reliable welds on copper/aluminium wire from 1.00mm to 5.00mm (0.039" to 0.197") diameter.

The M101 manual cold welder is a strong, low maintenance model that can be bench or trolley-mounted, and will weld wire sizes from 1.00mm to 3.60mm (0.040" to 0.141") copper and 1.00mm to 5.00mm (0.040" to 0.197") EC aluminium. PWM will also exhibit its powerful electro/pneumatic EP500 rod welder, which provides a cost effective way to weld large rod sections.

This energy efficient machine, which has a capacity of 5.00mm to 12.50mm (0.197" to 0.492") copper and 5.00mm to 15.00mm (0.590") aluminium, is simple to operate and maintain, reducing down-time and operator training.

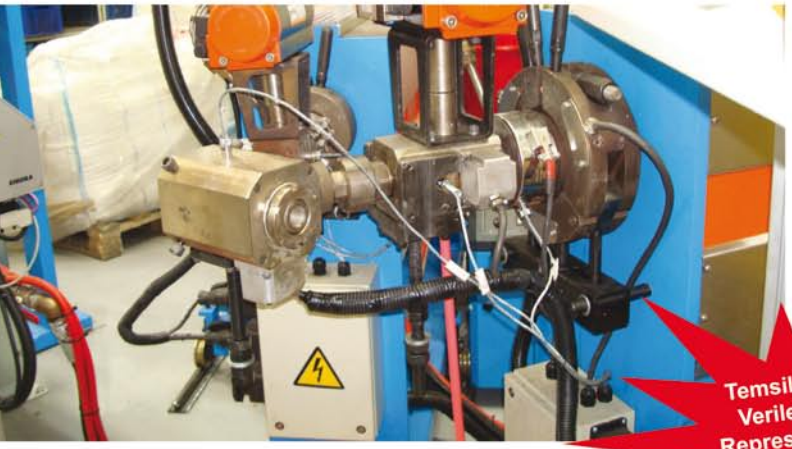
Manual hand-held machines, ideal for welding fine wire in confined spaces, and durable bench-mounted models will also be on show.

PWM's comprehensive range includes manual and powered cold welders, with capacities up to 25mm (0.984") copper and 30.00mm (1.181") aluminium. PWM dies are hand made in PWM's own UK workshops, to standard or custom designs, using quality tool steel.

PWM – UK
Fax: +44 1233 820591
Email: pwm@btinternet.com
Website: www.pwmlfd.co.uk

Kablo üretim hatlarinda en uygun cözümler

Appropriate Solutions in Cable Production



Temsilcilikler Verilecektir
Representation will be given

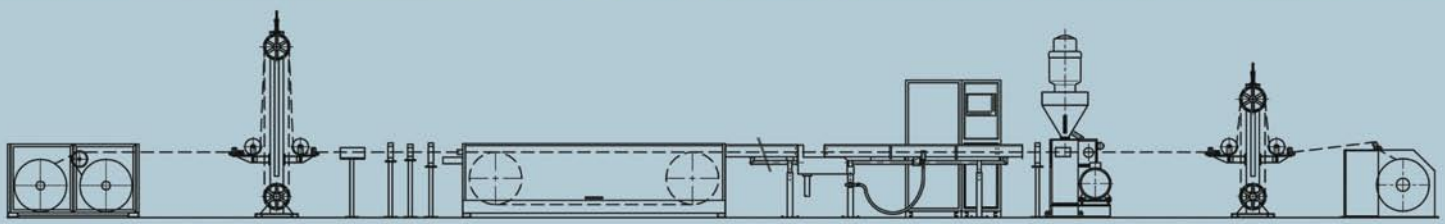
PRODUCT PORTFOLIO

from 20mm up to 150mm Extrusion Lines
from 1+6+12+18+24/315mm up to 630mm Rigid Strander Lines
from 315mm up to 1600mm Bunching Twister Lines
from ø1000mm up to ø2500mm Drum Twister Lines
from ø400mm up to ø1250mm Planetary Strander Lines
Coiling Lines
Rewinding Lines
Armouring Lines
Pay-offs & Take-ups
Crossheads
Taping Machines
Accumulator & Dancer
whole equipment needed in the production of cable.

WE MADE ALL YOUR NEED...

TURNKEY PROJECTS

PLANNING
DESIGNING
ASSEMBLING
START-UP
GUARANTEE
SPARE PARTS
CONSULTING
SERVICE



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www.aymakmakine.com **info@aymakmakine.com**

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DRUM TWISTER MACHINE (DTW)

VERY LARGE DRUMS SUITABLE FOR *MILLIKEN* CONDUCTORS

To buy from O.M. LESMO means:

100 % made & designed in Italy, high productivity, assistance all over the world, cable technology and know-how.

Not Only Leader in Double Twist Machine

Discover our Wire & Cable products at www.omlesmo.com

Qinhuangdao Yanda-Guohai Booth 215

Qinhuangdao Yanda-Guohai manufactures stainless steel wire and knitted wire mesh, exporting most of the annual capacity of 6,000 tonnes overseas.

The wires are available for weaving, braiding and welding and can be used in the automobile and electronics industries. The most popular common alloy is the 300 and 200 series.

Qinhuangdao Yanda-Guohai Stainless Steel Co Ltd – China
Fax: +86 335 8501 152
Email: renaliu@yandaguohai.com
Website: www.yandaguohai.com

Queins & Co GmbH Booth 1506

Queins & Co GmbH, Germany, has upgraded its FLR type rigid strander, one of the most versatile and sophisticated rigid stranders on the market. These machines are designed to produce copper and aluminium as well as aluminium alloy conductors. They can be equipped with compacting heads to manufacture round conductors, straight and pre-twisted sector conductors.

▲ *The Queins fast loading rigid strander*

They also now have newly designed pneumatically actuated calliper brakes per bobbin, for constant tension from full to empty bobbins, also for thin wire diameters, noiseless operation and free of maintenance.

With the practical semi-automatic side loading system (alternatively also 'top-loading'), the loading procedure guarantees the minimum possible down time of the line.

The new 2,500mm double disc capstan reaches 200kN pulling force and the renewed design of the portal type pay-off and take-up handle reels with a weight of up to 20 tons and 2,500mm. Heavier designs are available on request.

Preformers can be installed behind the cages for easier operation with aluminium alloy wires.

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Such a machine can be laid out to armour with steel in one step of up to 61 armouring wires, working in tandem and with preformer.

Queins & Co GmbH – Germany
Fax: +49 2472 3014
Email: info@queins.com
Website: www.queins.com

RAD-CON Inc Booth 234

Annealing specialists RAD-CON can be found at Booth 234. RAD-CON's main product is 100 per cent hydrogen bell-type annealing equipment, along with the necessary process expertise to set up the plant.

Headquartered in the USA since its founding 44 years ago, RAD-CON operates on a global basis, helping industries increase BAF capacities of high quality annealed wire and wire rod.

RAD-CON has very specific expertise in the area of spheroidize annealing and cold heading quality wire production for the fastener and bearing industries. The company's experience also encompasses ferrous and non-ferrous applications in the agricultural, electrical, construction, spring, industrial and communications industries.

RAD-CON Inc – USA
Fax: +1 216 221 1135
Email: sales@rad-con.com
Website: www.rad-con.com

Ravni Technologies Booth 2060

Ravni Technologies will display its wide range of machines for the wire and tube industries at Interwire 2011. The wire straightening and cutting machines represent the most important part of its turnover with the full range covering the diameters 0.8 up to 18mm. One range is designed for reinforcing wire and the other one for ferrous or non-ferrous round wire or profiles.

The production programme is completed with autonomous chamfering machines or combined with the straightening/cutting machines.

▲ *Entire production process from Ravni*

Ravni Technologies is also well known for its mesh bending machines. This bender can be delivered as an independent machine with manual feeding but is usually synchronised with a welding machine. (Welding machines are not in Ravni's production programme.)

Ravni Technologies supplies machines worldwide and technicians are trained to get users up and running and they will train staff in the simple and easy use of the machine.

Ravni Technologies – France
Fax: +33 477 905 865
Email: info@ravni.com
Website: www.ravni.com

RG Attachments Booth 2032

RG Attachments Ltd, the Leicester, UK-based manufacturer of tape formers, now has a new catalogue showing its full range of tape formers.

This catalogue is freely available upon request. Since Düsseldorf 2010, the company now has a number of dealers around the world supplying its tape formers.

A list of these is available on the RG Attachments' website.

▼ *The RG tape former*

The RG tape former is used by cable manufacturers to longitudinally form a variety of insulating material around cable cores before entering the final jacketing stage.

RG Attachments Ltd – UK
Fax: +44 116 261 2403
Email: info@tapeformers.com
Website: www.tapeformers.com

Rockford Manufacturing Group Inc Booth 2114

Rockford Manufacturing Group, Fastener Engineers and Lewis Machine are innovative leaders in the wire industry.

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Please contact Kirk Prosser at kprosser@rmgflem.com

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RMG is the only OEM for Fastener Engineers, Lewis Machine and G C Patterson equipment and the best source for tooling, spare parts and technical service needs.

Rockford Manufacturing Group Inc – USA
Fax: +1 815 624 7254
Email: rmgfelm@rmgfelm.com
Website: www.rmgfelm.com

Rosendahl Maschinen Nextrom OY Booth 432

Rosendahl, a technology leader in coaxial/highly foamed products, will present key developments including recent advancements in the welding and corrugation equipment for both CU & AL products.

Moreover, recent developments in metal forming for power and oil exploration cables will be another highlight at its booth.

The Rosendahl team is looking forward to discussing advancements in the Flouro-Datacom process, automotive and low voltage applications, including the patented Rocomat quick colour change systems.

▲ *A range of products from Rosendahl and Nextrom*

Nextrom, the premium supplier of manufacturing solutions for fibre and cable producers, will present its new developments in optical fibre and fibre optic cable manufacturing. Nextrom's product management will be on-hand to introduce various topics including new developments in the break-through technology to produce dry optical fibre loose tube cables while maintaining low post-shrinkage characteristics.

In the area of fibre manufacturing, Nextrom presents achievements in the productivity of the draw process for single-mode fibre production. Further improvements to previously introduced VAD preform manufacturing; special fibre production and high speed UV-coating technology are also available for review.

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Fax: +43 3113 5100 51
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Website: www.rosendahlaustria.com

Nextrom OY – Finland
Fax: +358 9 5025 3003
Email: info@nextrom.com
Website: www.nextrom.com

Roteq Machinery Inc Booth 1924

Continuous evaluation of the product and the process leads to better manufacturing solutions. Auditing those changes leads to the potential for further enhancements and this endless cycle of events keeps the installed equipment productive.

Roteq's presentation details many of the changes using rotating equipment

▲ *The range of products from Roteq*

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with emphasis on rotating equipment used for stranding, cabling and the strip armouring process.

Specific features include flat and round submersible pump cable production; single twist stranding as a competitive alternative to the traditional rigid strander up to 61 wire strand constructions or 1,000kcm and an analysis of cabling options for different conductor section including double twist, bow, single twist and drum/universal stranders and cablers.

Roteq Machinery Inc – Canada
Fax: +1 905 660 8898
Email: info@roteqmachinery.com
Website: www.roteqmachinery.com

Sampsistemi
Booth 1328

SAMP USA will be exhibiting some of its latest technologies and developments.

▲ *The PT3000 from Sampsistemi*

It is the innovative and forward-looking approach to addressing the needs of its customers that has sustained Sampsistemi through both the successful and tumultuous market conditions over many years.

To keep pace with demand and to be close to global customers, Sampsistemi is enlarging its manufacturing and service activity in Shanghai, China, mainly for its bunching machines and bunching payoffs.

This allows the facilities and resources in Italy to focus on the production development of new solutions for wire machinery and extrusion lines.

The goal is to streamline the process for an even more efficient system with expedited delivery.

This year, SAMP USA will display machinery from each manufacturing entity. A double-twist bunching machine, including electrics tailored specifically for the US customer base, will be in full operation with a dynamic payoff.

Also on display will be a static portal payoff/take-up for use in high-voltage extrusion and rewind applications.

SAMP USA Inc – USA
Fax: +1 301 223 8542
Email: info@sampinc.com
Website: www.sampsistemi.com

Setic, Gauder Group
Booth 858

▲ *Setic Double Twist Strander/Cabler TA 1600 RN-4M*

Setic, part of the Gauder Group sas, offers complete solutions to produce high quality LAN cables with enhanced performances in one step or two steps according to product mix, as well as double twist bunchers/stranders for the PC and automotive industry.

Setic sas – France
Fax: +33 4 77 71 10 85
Email: setic@gaudergroup.com
Website: www.gaudergroup.com

Sikora
Booth 512

Sikora, a manufacturer and worldwide vendor of measuring and control technology for the wire and cable industry, will present a variety of innovative technology.

Among the highlights on the Sikora booth will be the second generation of the successful Laser diameter gauges.

The new Laser Series 6000 includes a number of technological innovations, including a measuring rate of 2.5kHz. Sikora will also introduce professional equipment for reliable diameter measurement and lump detection of optical fibres in the drawing tower.

▲ *The gauge heads of the Laser Series 6000 measure the cable diameter with utmost accuracy*

Another attraction is the Centerview 8000, which features 8-point-eccentricity and ovality measurement, patent pending cloud diagram and several improvements regarding precision and long-life-cycle.

Also expected to generate a great deal of interest is the Length 6000 for non-contact online measurement of produced lengths of cables.

Sikora AG – Germany
Fax: +49 421 48900 90
Email: sales@sikora.net
Website: www.sikora.net

Sinoleader Industries Group Co Ltd
Booth 2117-A

Sinoleader supplies various cable and plastic equipments and other related materials, including Cu/Al rod continuous casting line drawing machines, twister, laying-up, metal tube corrugating machine, lead extruder, and sheathing lines.

▼ *Sinoleader's continuous lead sheathing extruder*

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PUURS, BELGIUM 32.3.860.9191



High Performance Conductors
A SUBSIDIARY OF IWG

VISIT US AT INTERWIRE 2011 • BOOTH 540

The company also supplies high quality galvanised steel wire, galvanised stranded steel wire, galvanised steel tape and Al/steel composite tape.

Sinoleader Industries Group Co Ltd – China
Fax: +86 21 5425 9031
Email: info@sinoleader.com
Website: www.sinoleader.com

SPX Precision Components Booth 749

SPX Precision Components Fenn Division will exhibit at Interwire 2011 in Atlanta, Georgia.

Established over 100 years ago Fenn Division is a global supplier of Metal Forming Machinery and its solid reputation is built on decades of engineering and machine building experience.

The extensive product line is used in both the ferrous and non-ferrous industries and includes rolling mills, complete wire flattening and shaping lines, power and non-driven turks heads, single and double capstans, drawbenches, swaging machines, swager feed units and Torin® CNC camless spring coilers.

Recently completed projects include wire flattening lines used to produce PV strip in the manufacture of solar panels.

SPX Precision Components – USA
Fax: +1 860 667 4667
Email: precision.fenn@spx.com
Website: www.spxprecision.com

Sweed Machinery Booth TBA

Let's face it, times are tough; and tough times call for a new way of thinking. The buzz of zero landfill is growing, but with the current state of the economy, it's difficult to afford capital equipment that can help achieve a company's recycling goals.

As a result, Sweed looked for an option that would allow companies to recycle their scrap wire and get the best value for their processed scrap material while using an affordable chopper that was stout enough to handle a harsh environment and process ruthless wire and cable.

Thus the Sweed Scrap Chopper Model 525 was born. In the past, companies producing massive volumes of wire scrap had to process the material with larger, more expensive choppers (to prepare the material for recycling); smaller choppers simply could not withstand the brutal beating that occurs when chopping wire.

The New Model 525 Wire Chopper is an industrious machine that simply eats wads of scrap wire and spits out compactable results.

With a dual-driven feedworks, the Model 525 can easily pull in multiple pieces of scrap wire with knots, twists, an occasional tangled nest and even despool off-spec wire from a reel.

In addition to designing a brute chopper, Sweed also had safety in mind; due to the unruly nature of scrap wire, Sweed engineers designed the "Safety Face" kill switch feature.

The entire face of the chopper (around the infeed funnel) is armed and ready should the user need to stop the chopper.

The 525 uses 3-phase/460 volt electric, has a 3 HP motor, and processes wire at 84 FPM, providing a cut length of 2¼".

Sweed Machinery – USA
Fax: +1 541 855 1165
Email: sweed@sweed.com
Website: www.sweed.com

Thermcraft Inc Booth 120

Thermcraft Incorporated has a wide range of standard products which include ceramic heaters, vacuum formed ceramic fibre heaters, control systems as well as industrial ovens and furnaces.

In addition to the custom ovens and furnaces it also offers the new eXPRESS-Line split tube and solid tube furnaces with optional control systems which are available in ten working days.

Thermcraft Incorporated is also a recognised leader in custom heat treating, industrial and laboratory ovens and furnaces.

Thermcraft also offers a newly designed liquid quenchant fluidised bed. Thermcraft is the first heat treating equipment manufacturer in the world to develop a cooling process markedly different from conventional air, molten lead or fluidised sand patenting.

The process is non-toxic, energy friendly and yields a level of wire cooling control never before seen on an industrial level.

Thermcraft Inc – USA
Fax: +1 336 784 0634
Email: info@thermcraftinc.com
Website: www.thermcraftinc.com

Traxit International Booth 758

Traxit International is at the forefront of product innovation and has been providing the wire drawing industry with a complete range of lubricants to suit all types of wire for all applications, since 1881.

Currently one of the largest manufacturers of drawing lubricants, coatings and emulsions, Traxit operates from its manufacturing bases in Germany, China and the United States.

The lubricants are of the highest quality and are constantly updated to ensure maximum environmental and health friendliness.

Additionally it is always striving to improve the performance of lubricants to bring maximum advantage to customers.

The company is already able to offer a full range of dry drawing lubricant products completely free of Borax and all boron compounds.

These innovative and superior products offer the following improvements over some of the traditional boron containing products:

- Longer die life
- Higher drawing speeds
- Reduced wire breaks
- Reduced drawing temperatures

- Sodium based lubricants with less moisture pick up

Traxit International GmbH – Germany
Fax: +49 236 919 101
Email: info@traxit.com
Website: www.traxit.com

Troester GmbH & Co KG Booth 1750

Troester GmbH & Co KG is a supplier of machines and complete lines for the cable manufacturing and rubber processing industry, comprising CV lines for XLPE and rubber cables, silane lines, sheathing and insulation lines.

▼ *PX Extruders*

At Interwire it will present a variety of information and new developments in the field of:

- Continuous vulcanisation lines for XLPE and rubber cables (CCV and VCV lines)
- Conductor postheating in the CV-tube splice box
- Sag Control TRISAG for CCV lines
- Twinrot System for production of high voltage cables on CCV lines

Troester GmbH & Co KG – Germany
Fax: +49 511 864028
Email: info@troester.de
Website: www.troester.de

Tulsa Power Inc/ Reel-O-Matic Inc Booth 850

Tulsa Power Inc and Reel-O-Matic Inc, with a combined total of almost 100 years of manufacturing, are wire and cable handling equipment manufacturers.

Both companies manufacture and design a wide range of material-handling equipment.

The range includes payoffs, take-ups, accumulators, cabling lines, linear measurers, caterpullers, coilers, rewind/test lines, twinner/quadders, concentric and eccentric taping lines, spiral striping machines and control upgrades, as well as the design and development of customised handling equipment for manufacturers and distributors of wire and cable, wire rope, pipe, hose and tubing.

Tulsa Power Inc – USA
Fax: +1 918 584 3421
Email: sales@tulsapower.com
Website: www.tulsapower.com

Reel-O-Matic Inc – USA
Fax: +1 405 672 7200
Email: sales@reelomatic.com
Website: www.reelomatic.com

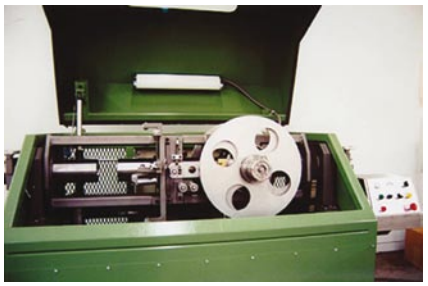
Weber & Scher Mfg Co Inc Booth 1050

Weber & Scher has specialised for more than 65 years in providing equipment and technology specifically to the wire and cable industry on a worldwide basis.

At Interwire it will be displaying a fully operational corrugated metal tape shielding/armouring line.

Further information and literature will also be available covering the complete range of products offered in the Weber & Scher production programme.

The programme includes metal tape handling and ultrasonic splicing equipment. This is in addition to longitudinal forming equipment for smooth and corrugated metal tape; core wrap tape handling, applicating and binding equipment; Kevlar serving equipment; cable core pressure filling and flooding equipment for optical fibre cables and copper telephone cables; metal tape overlap seam bonding systems; multi-position tension controlled supply equipment, high speed rewind/repair equipment, vertical and horizontal cable accumulators, belt wrap type capstans, linear belt caterpillar capstans, concentric and eccentric taping heads, and cable pay-offs/take ups.



▲ *The taping head from Weber & Scher*

Detailed information and video presentations will be available covering the unique Inductoweld and Gatweld continuous seam welded sheathing systems for coaxial cables, RF cables, optical fibre cables and power cables.

The Inductoweld system features the use of high frequency induction welding technology while the Gatweld system uses a TIG (GTAW) welding process to produce longitudinally seam welded metal tape sheath constructions.

Corrugating systems are available for imparting either a helical or annular corrugation in the inner and outer conductors of RF coaxial cables in tandem with the welding operation.

Weber & Scher Mfg Co Inc – USA
Fax: +1 908 236 7001
Email: webscher@webscher.com
Website: www.webscher.com

Witels Albert USA Ltd Booth 711

Witels-Albert USA will be presenting both new and field-proven solutions from its range of straightener, roll, guide, feed and pre-former products. With 'commitment to excellence' as its motto, the company will turn the spotlight onto engineering solutions for straightening applications.

▲ *ER 5 Series*

Visitors to the booth can also see the new products in action.

Witels Albert USA Ltd – USA
Fax: +410 228 1813
Email: info@witels-albert-usa.com
Website: www.witels-albert-usa.com

Zeus Techno Inc Booth 1956

Korea's Zeus Techno will be exhibiting the RT-20T bolt threaded rolling machine.

▼ *The RT-20T from Zeus*

Key characteristics include:
- high speed bolt threading and precise thread rolling
- high efficiency of dies internal cooling system for long life of the tool
- fast set-up and easy maintenance.

Zeus Techno Inc – Korea
Fax: +82 53 585 7180
Email: webmaster@zeus-techno.com
Website: www.zeus-techno.com

Zumbach Electronics Corporation Booth 1540

Zumbach has an extensive range of measurement and control systems for wire insulating and jacketing, wire drawing and rod mill applications, all of which are proven measurement solutions. The company will be presenting the all new Speel 3000, a new length and speed measuring gauge, as well as SIMAC – surface quality inspection system.

▲ *The all new Speel 3000*

Other equipment on display will be the ODAC® laser diameter scanners; Wallmaster ultrasonic wall thickness measurement and control system; ODEX® laser/magnetic non-contact concentricity gauge; Zumbach/Wst pre-heaters and temperature sensors; Profilemaster® non-contact profile measurement systems, based on laser contouring and CCD camera vision and processing.

A complete line of Windows based software packages for many different functions, such as data logging, remote viewing, and multi-part measurement will also be exhibited.

Zumbach Electronic AG – Switzerland
Fax: +41 32 356 0430
Email: sales@zumbach.ch
Website: www.zumbach.com

Come and see us
at Booth # 1806 at **INTERWIRE 2011 ...**

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wire Russia 2011

The wire and cable industry takes it show on the road to what is considered to be the biggest and best attended industry show in Russia at the end of May.

Firms from Europe, Asia and America will descend on Moscow at wire Russia from 23r-26th May at the ZAO Expocentr Krasnaya Presnya, in what has been described as one of the most sophisticated and elegant capital cities in the world.

Moscow is one of the major political, economical, scientific and educational centres, and home to a forward-thinking, fast-paced economy.

Browse through the following pages to find out who is exhibiting at this year's show, and visit www.wire-russia.com for more details.

Alphabetical list of Exhibitors

(Exhibitors list correct at time of going to press – March 2011)

Company	Country
A Appiani Srl	Italy
Aachener Maschinenbau GmbH	Germany
ACIMAF - Italian Wire Machinery Manufacturers Association	Italy
Anbao (Qinhuangdao) Wire & Mesh Co Ltd	China
Anhui Herrman Machinery & Technology Co Ltd	China
AstroPlast Kunststofftechnik GmbH & Co KG	Germany
Bongard Trading GmbH & Co KG	Germany
Borealis AG	Austria
Boxy SpA	Italy
Bühler Würz Kaltwalztechnik GmbH	Germany
BWE Ltd	UK
C M Caballé SA	Spain
Carl Bechem GmbH	Germany
COMAPAC Wire Machinery Srl	Italy
Cometo di Tocchetti Enrico & C Snc	Italy
Compomec Oy Cable Machinery	Finland
Condat Lubrifiants	France
Condor Compounds GmbH	Germany
Conductix Wampfler (Delachaux Group)	France
Continuus-Properzi SpA	Italy
Cortinovis Machinery SpA Eurolls Group	Italy
COSTA machinery GmbH	Germany
CPA Wire Technologies GmbH	Austria
Daloo Machinery Co Ltd	China
Davis-Standard LLC	USA
Deyang Dongfang Zhuoyue Electrotechnical Equipment Co Ltd	China
Domeks Makine LTD STI	Turkey
Dongguan Zhangli Machine Fitting Co Ltd	China
Dow Wire & Cable c/o Dow Europe GmbH	Switzerland
Dunst GmbH Maschinen für die Kabel- u Drahtindustrie	Austria
Ebner Industrieofenbau GmbH	Austria
Eder Engineering GmbH	Austria
EJP Maschinen GmbH	Germany
Erocarb SA	Switzerland
Esteves-Dwd Polska Sp z oo	Poland
Euroalpha Srl	Italy
Eurolls SpA - Eurolls Group	Italy
EuroWire Magazine	UK
EVG Entwicklungs- und Verwertungs-Gesellschaft mbH	Austria
Fib Belgium sa	Belgium
Flymca SL	Spain
Flyro Used Cable Equipment	Spain
H Folke Sandelin	Sweden
Fort Wayne Wire Die Inc	USA
Fortuna Federn GmbH	Austria
Frekans Makina San Ve Tic AS	Turkey
Fuhr GmbH & Co KG	Germany
Gauder SA	Belgium
GCR Eurodraw SpA	Italy
GER SA	Belgium
Gimax Srl	Italy
GMP Slovakia sro	Slovakia
Haefely Test AG	Switzerland
Heinze & Streng GmbH	Germany
Henrich Maschinenfabrik GmbH	Germany
Hipotronics Inc	USA
HMP Heinrich Müller Maschinenfabrik GmbH	Germany
Holifa Fröhling GmbH & Co KG	Germany
IFP Srl Industria Filo Patentato	Italy
Ingramatic SpA	Italy
Inhol BV - PTL	Netherlands
International Wire & Machinery Association	UK
Isovolta AG	Austria
Istituto nazionale per il Commercio Estero - ICE	Italy
IWCEA France c/o CONDUCTIX Delachaux	France
Jiangsu Handing Machinery Co Ltd	China
Kabmak Mühendislik Ve Makina Sanayi Ticaret Ltd Sti	Turkey
Friedr Krollmann GmbH & Co KG	Germany
Lubrimetal SpA	Italy

Alphabetical list of Exhibitors

(Exhibitors list correct at time of going to press – March 2011)

Lubrizol Advanced Materials Europe ..... Belgium
Fr und H Lüling GmbH
& Co KG Stahldrahtwerk ..... Germany
M + E Macchine + Engineering Srl ..... Italy
MEP Macchine Elettroniche Piegatrici SpA ..... Italy
MAG Maschinen und Apparatebau AG ..... Austria
Maillefer SA ..... Switzerland
Mali GmbH ..... Austria
Mario Frigerio SpA - MFL Group ..... Italy
Medek & Schörner GmbH ..... Austria
Menam Stainless Wire Public Co Ltd ..... Thailand
Micro Products Co ..... USA
Nevatia Steel & Alloys Pvt Ltd ..... India
Newtech Srl ..... Italy
Maschinenfabrik Niehoff GmbH & Co KG ..... Germany
Nota Zaklad Mechaniki Precyzyjnej ..... Poland
OM Lesmo SpA Eurodraw Energy ..... Italy
OCN SpA ..... Italy
Otomec Srl ..... Italy
Pan Chemicals SpA ..... Italy
Pengg Austria GmbH ..... Austria
Pourtier sas Gauder Group ..... France
PPRR-Metal Lda ..... Portugal
Pratech Mühendislik ve Makine
San Tic Ltd Pty ..... Turkey
Promostar Srl ..... Italy
Proplast GmbH ..... Austria
Proton Otomasyon Elektrik Makina
Taahhüt San ve Tic Ltd Sti ..... Turkey
PS Costruzioni Meccaniche Srl ..... Italy
Queins & Co GmbH ..... Germany
Raajratna Metal Industries Ltd ..... India
Ralc Italia Srl ..... Italy
Rautomead Limited ..... UK
Roblon A/S ..... Denmark
Rosendahl Maschinen GmbH ..... Austria
Saarstahl-Export GmbH ..... Germany
Sacma Limbiate SpA ..... Italy
SAMP SpA Sampsistemi Division ..... Italy
SAS Engineering and Planning SrL ..... Italy
Schlatter Industries AG ..... Switzerland
Rolf Schlicht GmbH ..... Germany
Setic sas Gauder Group ..... France
Sheng Chyean Enterprise Co Ltd ..... Taiwan
Shenyang Tianrong
Cable Materials Co Ltd ..... China
Sikora AG ..... Germany
SKET Verseilmaschinenbau GmbH ..... Germany
Southwire Company ..... USA
Spajic doo ..... Serbia
August Strecker GmbH & Co KG
Elektro Schweissmaschinen-Fabrik ..... Germany
Suhil Co Ltd ..... South Korea
Supermac Industries (India) Ltd ..... India
Technodiament Ltd ..... Poland
Teijin Aramid BV ..... Netherlands
Teurema - Eurolls Group
Tecnica Europea de Maquinaria SL ..... Spain
Threesixty Extrusion Technology Ltd ..... UK
TKT Tecnovo Koner Tecnosider SpA ..... Italy
Trafco Srl ..... Italy
Traxit International GmbH ..... Germany
Troester GmbH & Co KG ..... Germany
Tulsa Power Inc ..... USA
Upcast Oy ..... Finland
VDKM - Verband der Draht-
und Kabelmaschinenhersteller eV ..... Germany
Vitari SpA - Eurolls Group ..... Italy
VÖDKM / AWCMA Verband Österreichischer
Draht- und Kabelmaschinen-Hersteller ..... Austria
Voestalpine Austria Draht GmbH ..... Austria
WCISA - Wire and Cable Industry
Suppliers Association ..... USA
WTM Srl ..... Italy
Welding Wire Machineries Srl ..... Italy
Windak AP ..... Australia
Wire & Cable ASIA magazine ..... UK
WKÖ-Wirtschaftskammer Österreich
Aussenwirtschaft Österreich (AWO) ..... Austria
Zumbach Electronic AG ..... Switzerland

Daloo

Located in China, Daloo manufactures low cost machinery for extrusion lines, screening/armouring lines and rigid stranding lines, basing its knowledge on European experience.

▲ *Daloo KM630-12 rigid strander*

The range includes rigid cage stranders, taping lines, rewinding lines, pay-offs and take-ups as well as pulling caterpillars and is regularly extended to other cable machines.

Exhibiting for the first time in Moscow, the company was successfully launched by the Gauder Group in 2008.

Daloo – China
Fax: +86 519 8548 3557
Email: sales@daloo-machines.com
Website: www.daloo-machines.com

Eder Engineering

With a strong back in the Russian markets for the last 55 years, Austria's Eder Engineering will again be exhibiting at wire Russia on the Austrian pavilion in hall 3.

The Russian market has always welcomed Eder's advanced drawing die-tools, and particularly the die-tool working machines.

Eder are supporting the Russian wire and cable producing industry with high quality automatic equipment to compensate for the increasing lack of skills available in the die workshops.

Single machines for upgrading of an already existing infrastructure, completely equipped die reconditioning workshops, but also complete die-tool production lines in state-of-the-art technology and all kinds of die-tools are continuously supplied to regular customers from Moscow down to Siberia.

Eder will also exhibit and demonstrate some of their latest die working machines and die workshop ancillary devices and various precision drawing tools, made from diamond, PCD and tungsten carbide materials.

Eder Engineering GmbH – Austria
Fax: +43 1367 494 949
Email: office@eder-eng.com
Website: www.eder-eng.com

Gauder Group Inc

Besides manufacturing new machines under the Pourtier and Setic brand names, the Gauder Group has also earned a leadership position providing fast and cost-effective solutions to the cable and steel industries with its Gauder second-hand machines.

More than 1,000 machines are stored on 25,000m² premises in Belgium, ready for immediate delivery. To enable customers to prepare their visit, a totally new website is available at www.gauderonline.com

Gauder Group, Inc – Belgium
Fax: +1 336 856 8117
Email: ggi@gaudergroup.com
Website: www.gaudergroup.com

GER SA

GER SA Belgium is specialised in the sale of new and second-hand machinery for wire and cable, for the ferrous and non-ferrous industry since 1980.

The company sells single machines and complete plants for steel rod and wire, non-ferrous wire, steel ropes and electrical insulated cables.

A large stock of machinery immediately available guarantees quick help and in case the customer doesn't find the equipment he is looking for in the listing, GER will search for the machine.

▲ *Let the specialists find the machines you are after*

Among them there are rod breakdown machines, fine and intermediate single or multi-wire drawing machines, bunchers, cage- and tubular stranders, laying-up machines, armouring machines, drum twisters, extrusion equipment, spoolers, coilers and take-ups.

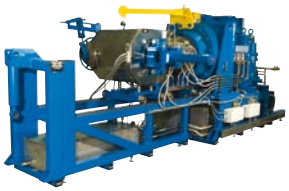
Worldwide exports and selling the machinery in the 'as is condition' or, upon request, reconditioned and modernised make GER a strong partner for the industry. The sales department can also send an estimate for complete, ready-to-use production units.

GER is also ideally placed to offer brand new electrical control systems, using state-of-the-art drives and components. Test-runs of the machines before shipment as well as installation and commissioning of the machines at the customer's plant and at the same time training for the operators complete the service.

GER SA – Belgium
Fax: +32 87 26 02 01
Email: ger@ger.be
Website: www.ger.be

H Folke Sandelin AB

H Folke Sandelin AB's latest design lead extruder is horizontal, floor-standing, easy to install and maintain, fully automatic and extremely reliable with its state-of-the-art air control system, enabling continuous operation for weeks with little or no variation in temperatures and wall thickness/concentricity.



▲ *H Folke Sandelin AB's latest design lead extruder*

The lead wall thickness can be kept to a minimum with corresponding savings in lead. A range of die blocks are available to cover an extensive diameter range of 6mm-225mm (over lead), and a range of melting pots are available for 10, 18 and 35 tonne capacities. Additional equipment includes the cable repair and recovery system, CRRS, which has the possibility of removing individual layers, such as, the outer jacket, lead sheath or triple layer XLPE insulation, without causing any damage to the subsequent layer below. That enables the outer jacket, lead sheath or triple layer XLPE to be re applied and the cable repaired. Even if the cable is just going to be scrapped, the metal price differences for insulated or un-insulated cables are very large and the equipment would have a very short pay-back period, if the metals are scrapped in their "bright" form.

H Folke Sandelin AB (HFSAB) are able to supply second hand fully refurbished Lead Extruders to very high standards, and provide a full and extensive after sales service.

H Folke Sandelin AB – Sweden
Fax: +46 141 203639
Email: hfsab@hfsab.com
Website: www.hfsab.com

Micro Products Co

Visit Micro-Weld booth (no. 624) at Interwire 2011 Show in Atlanta (GA, USA, 3rd-5th May 2011) and its booth (booth no to be released later) at Wire Russia 2011 (Moscow, Russia, 23rd-26th May, 2011).

This is an ideal opportunity to learn more about electric resistance butt and flash welders designed and manufactured by Micro Products Company of USA.

Micro-Weld welders are used all over the world by wire and cable industry for continuous processing of wire, rod or cable in the most efficient and cost-effective manner possible.

Over 50 models are offered for both ferrous and non-ferrous applications for a wide range of wire diameters.

Some of these models will be on display at the shows. A variety of accessories are available to make welding operations fit users' needs.

Also available are ceramic fusion welders. These welders weld within ceramic sleeves for containment and perfect welds without burrs on stranded conductors.

Micro-Weld features include heavy duty long-lasting transformers, manual or pneumatic operation and self-aligning welding dies for consistent high quality welds. The unique design makes them tough, dependable and easy to operate.

Sample weld evaluation is offered as a valuable service free of charge to test the stock/material and evaluate the weldability and strength of wire samples.

Micro Products Co – USA
Fax: +1 630 787 9360
Email: info@micro-weld.com
Website: www.micro-weld.com

Maschinenfabrik Niehoff

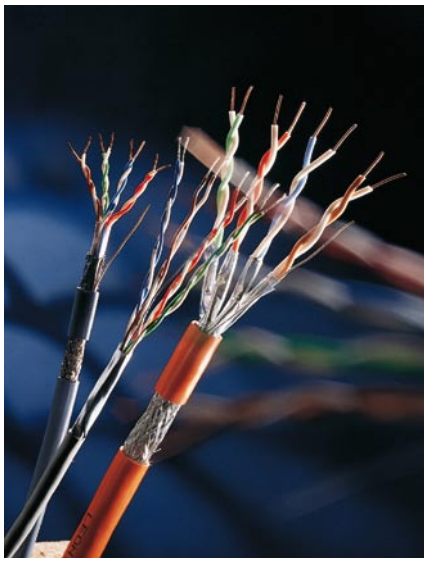
At wire Russia 2011 Maschinenfabrik Niehoff and Niehoff of Russia, Niehoff's Moscow based branch office, are presenting the following exhibits:

- a D 401 double twist bunching machine with ARH 250 wire pay-offs
- a DSI 631 double twist stranding machine with ARD 630-D double twist backtwist pay-off
- a BMV 24 Z rotary braiding machine with central taping device
- the Niehoff Spare Parts & Support concept.

All machines are driven by Class IE2 energy-efficient AC motors with electronic control, and feature a completely new and functionally optimised machine design.

The D 401 single-bow double twist bunching machine is the smallest of its series, which now is comprised of six models in various dimensions. It is designed for strands of 0.013 to 2.5mm² (36-13 AWG) cross section with continuous lay length and enables the production of strands with 7 x 0.05mm (7 x 44 AWG) construction.

The D 401 will be on display combined with ARH 250 tangential single-wire pay-offs with motor-driven spool. Its standard equipment includes the automatic "Niehoff Bunching Automatic Traverse" (NBAT) device which detects spool flanges and controls the traverse width of spools by means of opto-electronic sensors.



▲ *LAN cable which can be manufactured on a DSI stranding line*

As a result, the spools are filled perfectly and the bunches can be paid off tangle-free and without wire damages even at very high speeds. ➢➢➢

By means of the new energy-saving ECO-bow energy consumption is reduced by more than 60% compared to the two-bow conventional bunching machines under the same operating conditions.

The double twist stranding machine DSI 631 and the larger DSI 1001 model are developed to combine insulated conductors into pairs or quads or to strand conductor pairs into LAN cables and other special cables of best quality with or without backtwist. Depending on line configuration, up to three foils can be applied on the cable.

The DSI 631 is used for a wide conductor cross-section range and a maximum strand diameter of 8mm.

The lay length can be freely adjusted within a very narrow tolerance band. The DSI 631 can be combined with other systems like a double twist backtwist pay-off ARD 630 D.

The 24-carrier lever arm rotary high speed braiding machine BMV 24 can process bare or coated copper wire, aluminium wire and stainless steel wire with a single-wire diameter ranging from 0.05 to 0.3mm (40-28 AWG), and artificial yarn and fibres.

The BMV machines can be combined with different kinds of taping devices. An automatic empty bobbin detection system can be integrated which stops the machine before a braiding bobbin is completely empty but keeps the residual wire on the braiding spool to a minimum.

The applications of the BMV machines include the manufacture of data, control and coaxial cables, hollow braids for battery cables, stranded braids, and mechanical reinforcements for pressure hoses and medical catheters.

Niehoff worldwide offers its customers machinery inspection and evaluation services by professional service specialists who speak customers languages and are always available.

Niehoff After Sales is exibiting its new concept which provides each customer with reliable and economic supply of Niehoff quality wear and spare parts, and with an immediate and professional service for each Niehoff machine or line – regardless of its age.

Maschinenfabrik Niehoff GmbH & Co KG – Germany
Fax: +49 9122 977 155
Email: info@niehoff.de
Website: www.niehoff.de

Branch of Maschinenfabrik Niehoff GmbH & Co KG – Russia
Fax: +7 499 929 5539
Email: info@niehoff.de
Website: www.niehoff.de

Pan Chemical

Pan Chemical is totally dedicated to wire drawing industry and, in particular, the ferrous and alloy wire market with its main products being wire drawing lubricants and coatings.

Ecology and environmental safety have always been foremost in the company's aim to the development of new products.

The application of the new European Rule REACH has given a further push toward the development of new products which are completely safe for the operators and the environment.

The most evident consequence related to the wire industry is the elimination of Borax in the formulation of the drawing lubricants and the coatings. Most of the sodium lubricants and most of the coatings contain a significant quantity of Borax and many drawing processes are based on the Borax coating.

Pan's research and development has been focused on these two issues and through experimentation and close cooperation with key accounts, it has developed, approved and commercialised many new products to comply with the REACH normative.

There is a new range of lubricants now available – Series PANLUBE S 1500 sodium

new generation lubricants. These products are free of Borax, nitrates, nitrites, phosphates, carbonates and chlorides and they are 100 per cent safe and environmentally friendly.

▲ *The PANCOVER 4700 Series*

They are suitable for:
- High carbon steel wire
- Steel cord wire
- Bead wire
- Spring wire
- Roping wire
- PC wire (final dies)
- Very high speed for low carbon wire

The light yellow granulated powder is completely soluble in water.

With this same philosophy in mind, Pan has also designed the new pre-coatings such as the PANCOVER 4700 Series to meet the most stringent demands for drawing carbon and stainless steel wires.

Pan Chemical – Italy
Fax: +39 035 977288
Email: info@panchemical.com
Website: www.panchemical.com

Pourtier, Gauder Group

Pourtier, part of the Gauder Group, develops comprehensive solutions to produce high quality Milliken conductors for high voltage and extra-high voltage power cable (AC) and conductors for DC cables (round compacted and trapezoidal wires).

▲ *Pourtier Drum Twister line for power cable DTPC 1600 ... 5000*

Maillefer's Moscow office and Pourtier will once again exhibit together combining their experience in order to offer value-added solutions to the CIS countries.

POURTIER s a s – France
Fax: +33 1 64 26 61 10
Email: pourtier@gaudergroup.com
Website: www.gaudergroup.com

Rosendahl Maschinen GmbH and Nextrom OY

Rosendahl offers first class products and turn key solutions in the fields of extrusion, SZ stranding, fibre optic cable as well as forming, welding and corrugation.

At wire Russia, Rosendahl and Nextrom will present the latest advancements and technology highlights, including the latest developments for the production of energy, coax, fibre optic and telecom cables.

▲ *A range of products from Rosendahl and Nextrom*

A special highlight will be the new and enlarged Crosshead Series for cables with a core diameter from 0.03 to 110mm.

Solutions for the fibre and cable optic market are being presented by Nextrom, who will be giving special focus on preform manufacturing technologies based on VAD, OVD, FCVD, fibre draw technologies for telecom and specialty fibres and high speed colouring and ribbon lines.

Additionally, Nextrom will present latest products for fibre optical.

Rosendahl Maschinen GmbH – Austria
Fax: +43 3113 5100 59
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Website: www.rosendahlaustria.com

Nextrom Oy – Finland
Fax: +358 9 5025 3003
Email: info@nextrom.com
Website: www.nextrom.com

SAMP SpA

Sampsistemi, a division of SAMP SpA and part of the multinational Maccaferri Industrial Group, will showcase its most interesting and innovative machines for the wire and cable manufacturing industry.

The company's range of manufacturing solutions includes rod break-down machines and multi-wire drawing lines, specifically developed to help save up to 20% of energy costs thanks to a complete CNC control

▲ *Sampsistemi's European headquarters, manufacturing facility and technology centre in Bentivoglio, Italy*

process and direct drive torque motors with direct shaft-to-hub connection for high flexural strength.

Sampsistemi has also introduced a new generation of MHV power cable insulation lines, featuring its Powerpack™ extruder drives, fully integrated packages fitted with efficient torque servo motors and completely integrated motor-speed reducer combinations.

Double twist bunching machines to strand copper wires and lay up insulated conductors will also be showcased, along with drawing technology featuring zero-maintenance, plug-in machines for drawing copper, aluminium and relative alloys.

SAMP SpA – Italy
Fax: +39 051 37 08 60
Email: r.tarantino@sampspa.com
Website: www.sampsistemi.com

Setic, Gauder Group

Setic, part of the Gauder Group sas, offers complete solutions to produce high quality LAN cables with enhanced performances in one step or two steps according to product mix, as well as double twist bunchers/ stranders for the PC and automotive industry.

▲ *SETIC Double Twist Strander/Cabler TA 1600 RN-4M*

Maillefer's Moscow office and Setic will once again exhibit together combining their experience in order to offer value-added solutions to the CIS countries.

SETIC sas – France
Fax: +33 4 77 71 10 85
Email: setic@gaudergroup.com
Website: www.gaudergroup.com

Sikora AG

Sikora AG, a manufacturer and worldwide vendor of measuring and control technology for the wire and cable industry, will present cutting edge technology at wire Russia 2011.

A highlight on the Sikora stand will be the new X-Ray 6000 series for the measurement of wall thickness, eccentricity, diameter and ovality at insulating and jacketing lines.

The X-Ray 6000 includes XLL-X-ray tubes (eXtra-Long-Life tubes) and provides a selectable measuring rate of 1 to 3Hz (optional 10,100Hz).

Sikora will also showcase sophisticated equipment for optical fibre measurement in the drawing tower.

The Fiber Laser 6003 measures the diameter of optical fibres with an accuracy of ±0.05 micrometres while providing information on the ovality, fibre position, spinning and vibration frequency as well as amplitude.

▲ *The Fiber Laser 6003 measures the diameter of bare and coated fibres*

Other highlights on the Sikora stand will be the Length 6000 for non-contact online measurement of produced lengths of cables, and the second generation of the successful diameter Laser gauge heads.

The new Laser Series 6000 includes a number of technological innovations, including a measuring rate of 2.5kHz.

Sikora AG – Germany
Fax: +49 421 48900 90
Email: sales@sikora.net
Website: www.sikora.net

Trafco Srl

Trafco's highly specialised technicians can recondition any kind of cable plant, rendering it like new and guaranteeing its functionality and productivity, according to all international standard security regulations.

The company's cable machinery, which includes both brand new and second-hand reconditioned equipment, includes wire drawing lines, extrusion lines, double twisters, stranding lines, drum twisters, manual and automatic coiling lines, rewinding lines, drawing dies laboratory, and a complete range of drawing dies and accessories.

Trafco's team, which is composed of highly experienced engineers and technicians specialising in the field of cable manufacturing, can supply know-how and engineering in all kinds of cables production, technical and economical feasibility studies, and complete turnkey jobs for cable factories.

Trafco Srl – Italy
Fax: +39 0124 48700
Email: info@trafcomachinery.com
Website: www.trafcomachinery.com

Traxit International

Traxit International is at the forefront of product innovation and has been providing the wire drawing industry with a complete range of lubricants to suit all types of wire for all applications, since 1881.

Currently one of the largest manufacturers of drawing lubricants, coatings and emulsions, Traxit operates from its manufacturing bases in Germany, China and the United States.

The lubricants are of the highest quality and are constantly updated to ensure maximum environmental and health friendliness.

Additionally it is always striving to improve the performance of lubricants to bring maximum advantage to customers.

The company is already able to offer a full range of dry drawing lubricant products completely free of Borax and all boron compounds.

These innovative and superior products offer the following improvements over some of the traditional boron containing products:

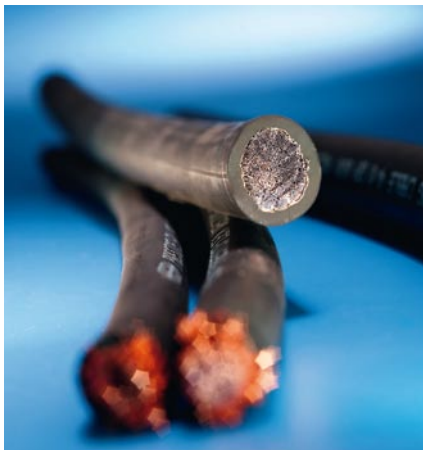
- Longer die life
- Higher drawing speeds
- Reduced wire breaks
- Reduced drawing temperatures
- Sodium based lubricants with less moisture pick up

Traxit International GmbH – Germany
Fax: +49 236 919 101
Email: info@traxit.com
Website: www.traxit.com

Troester GmbH & Co KG

Troester is a leading supplier of machines and complete lines for the cable manufacturing and rubber processing industry, comprising CV Lines for XLPE and rubber cables, silane lines, sheathing and insulation lines.

At wire Russia, Troester will present a variety of information and new developments in the



▲ *Troester – a leading supplier for cable manufacturing*

field of continuous vulcanisation lines for XLPE and rubber cables, CCV and VCV lines, conductor postheating in the CV-tube splice box, Sag control TRISAG for CCV lines and the Twinrot system for production of high voltage cables on CCV lines.

Troester GmbH & Co KG – Germany
Fax: +49 511 864028
Email: info@troester.de
Website: www.troester.de

Zumbach Electronic AG

Zumbach Electronic will be showing its broad range of measurement and control systems for wire insulating and jacketing, wire drawing and other applications in the wire and cable industry.

These include:

- Speel 3000 – true length and speed measurement, even down to zero
- ODAC – laser diameter scanners (single, dual and triple axis)
- UMAC wallmaster - ultrasonic wall thickness measurement and control system
- ODEX – combined laser/magnetic non-contact concentricity gauge and diameter measuring system
- DVW – oscillating device with ODAC laser diameter gauge for sector cable measurement and similar applications
- USYS – high-end multi-sensor data acquisition, processing and display units
- Profilemaster – non-contact profile measurement systems, based on laser contouring and CCD camera vision and processing
- SIMAC – quality surface inspection system based on machine vision technology
- A complete line of Windows-based software packages for many different functions, such as data logging, remote viewing, multi-part measurement

Zumbach Electronic AG – Switzerland
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Email: sales@zumbach.ch
Website: www.zumbach.com

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Photo courtesy of PWM Ltd

Cutting & welding

While precision is a byword in every department of a state-of-the-art wire making facility, it may have special force in the specialities under review here. Certifiably accurate cutting – clean, straight, to length – is so critical that anything less renders the product unacceptable; or, for a more poignant word, unsaleable.

So, too, with welding. Electric arc welding joins an electrode and a base material to create a melt pool at the welding point. If that point is missed, by however slight a margin, so have the promised benefits of low capital and running costs been missed.

That these are virtually negligible worries in the wire and cable industry is due in no small part to equipment and services of the kind available from the companies profiled in this section of EuroWire.

Professional welding machines

CEA SpA designs and manufactures professional welding machines, including a large variety of resistance welding equipment, a full range of arc welding power sources, and plasma cutting machines.

▲ *N12 butt welder*

The company, family-owned since its foundation in 1950, works together with its worldwide distributor network and service centres in over 70 countries in order to achieve end users' complete satisfaction.

Among CEA's range of resistance welding equipment, the main products for welding wire are the TR9, N3, N12 and SQ121 butt welders, especially designed for wire drawing mills for joining steel, brass, aluminium and copper rods, and recommended for non-heavy duty applications.

The N3, TR9 and N12 models are supplied as standard with annealing function and four wheel trolley, while the SQ121, equipped with an electronic welding control, can be also provided upon request with annealing function.

Jaws opening and closing is by means of foot pedals (TR9 only) or by manual levers (N3, N12 and SQ121).

▲ *TR9 butt welder*

Upon request, all models can be supplied with a grinding wheel, while lighted magnifying glass is available for N3 only.

SRT and SQ/A butt welders, air operated with completely automatic cycle, allow high productivity and are suitable for welding wire manufactured goods.

SRT11 is particularly recommended for mass production up to 6 or 7mm diameter wires.

SRT and SQ/A can be supplied with pulse facility control to obtain reduced burr, good looking and slightly expanded joints.

SQ/AS models are suitable for flash butt welding solid material, pipes, profiles and hollow sections by obtaining high quality joints, and are suitable for mass production with fully automatic controls aiding speed and efficiency.

CEA SpA – Italy
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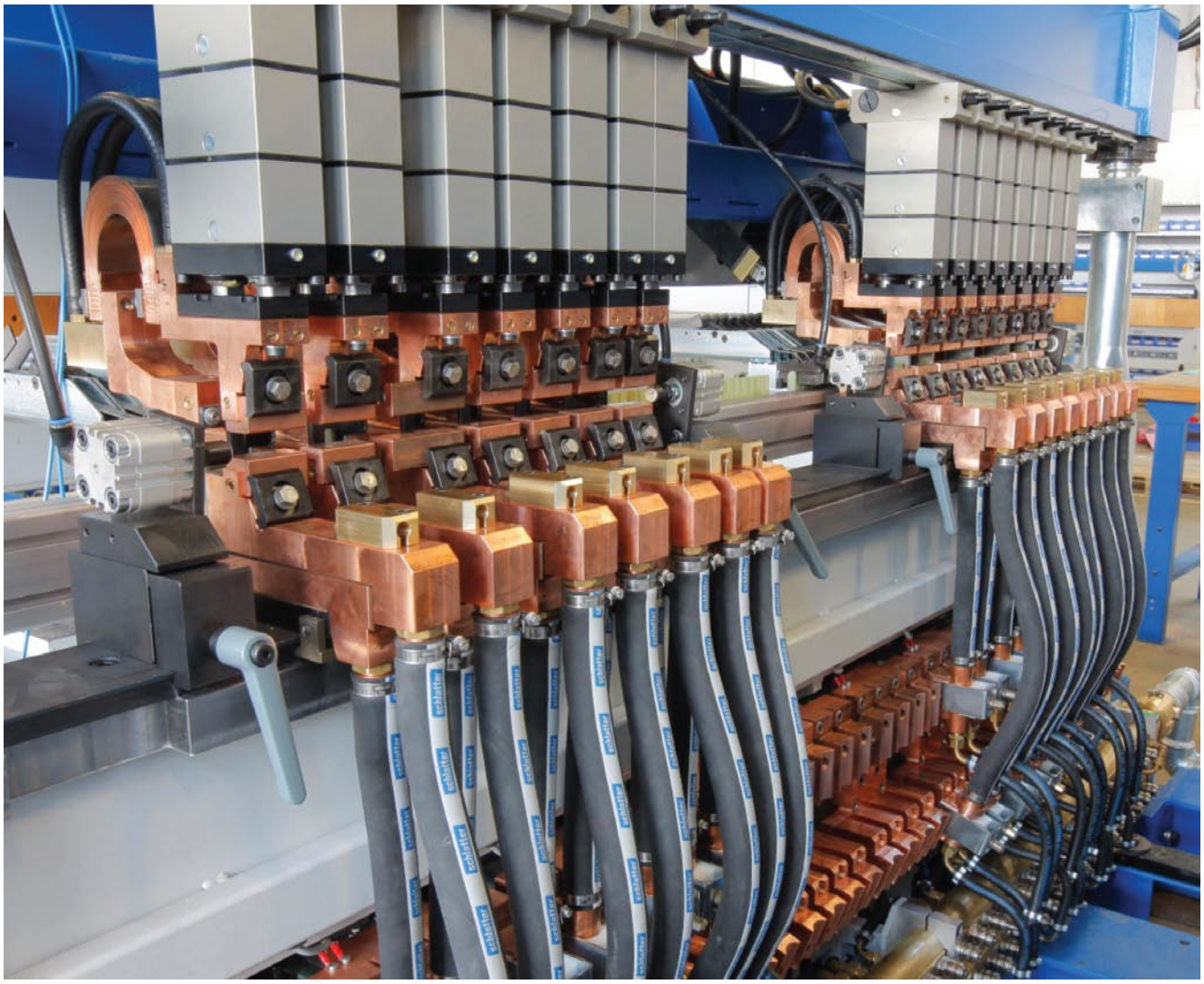
Email: export@ceaweld.com
Website: www.ceaweld.com

▲ *SRT11 butt welder*

New economic solutions of Schlatter



▲ *An economic way of producing higher quality mesh from Schlatter*

The global industrial wire mesh market is demanding an economic way to produce higher quality mesh today. Tighter geometric tolerances and flatness requirements have caused Schlatter to develop new technologies. To minimise change over times, Schlatter has developed a new jig system. With this new system a line wire change over can be accomplished in minutes. The new design with minimal lateral play allows customers to achieve all relevant tolerances applied in the wire industry.

The overall maintenance cost has also been significantly reduced by using the new welding press. Single-acting non-polluted air can get into the welding press. The stroke of the welding presses can be adjusted according to the wire diameter by rising and lowering the welding beam. This means that the consumption of compressed air is as little as necessary. All existing Schlatter MG 900 mesh welders can be upgraded with this new generation of welding presses. The quality requirement of the mesh market calls for flat mesh, and the company designed a new single welding group with a width of under 50mm (2") suitable to weld large wire diameters in narrow spacing. The working range may start at 20mm or even less.

For customers looking for the highest mesh flatness quality, Schlatter now offers MF welding technology for its MG 900 mesh welder platform. The modular design lets the user select the minimum number of MF inverters to keep the overall capital investment low. Additional inverters can be installed at a later date if the wire mesh product range widens.

The modular principle allows the customers to start with a low, cost-effective, simple yet expandable system. The wide range of extra modules and options guarantees upgrades up to an automatic production system with minimum need for personnel.

Schlatter Industries AG – Switzerland
Email: info@schlattergroup.com
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Website: www.schlattergroup.com

CNC wire forming and welding

It was over 25 years ago that Whitelegg Machines of Crawley, UK, pioneered the development of fully automatic CNC wire forming and welding machines. Today the company still leads the way with innovative equipment which is used around the world.

The latest Whitelegg CFM 12mm wire forming machine is able to bend and weld wire from 3mm to 12mm using the latest 2D technology and embodies accuracy, reliability and precision.

Machine models range from the CFM 400, 600, 800 and 1000, depending on the products being made; there is a 2D machine for anyone making flat components – from rings for lampshades to display stands, shopping trolleys, wire baskets and shelves for cookers and freezers.

Three roller wire feed wheels give extra grip and greater wire control making bend generation easier and resulting in flatter, more consistent parts throughout the production run.

The touch screen icon based software and simple functionality allows for ease of use by the operator. A USB port on the command console allows for any software updates and programs to be uploaded. The machine has the latest automatic butt welding feature, making the production process faster and more cost effective. A parallel burr-free cut reduces the need for secondary operations and improves butt weld strength and clean finish.

The welding electrodes are adjustable, giving a big advantage when welding a large variety of products. Set up times and tooling changes are quick and easy to implement.

To complement the CFM range, Whitelegg offers the dedicated CFR ring former and welder. Incorporating all the advanced attributes of the CFM, the three machines in the range cover wire diameters of 2-8mm, with finished ring diameters between 50 and 1,000mm.

Whitelegg Machines Ltd – UK
Fax: +44 1293 538910
Email: info@whitelegg.com
Website: www.whitelegg.com

Suitable for a variety of materials

Yorkshire, UK-based Rymer Engineering offers easy to operate electric resistance wire butt welding machines.

Suitable for a variety of materials, the machines can weld wide from 0.3mm to 9.5mm in diameter and are adapt- able for round, flats and shaped.

Portable and easy to handle, Rymer's EH series of welding machines are supplied on a wheeled trolley.

The welding range includes: EH1 0.9-6mm, EH2 2-8mm, EH3 3.5-9.5mm and the EHC non-ferrous 0.9-6mm.

The SG range includes: SG1 0.3-1mm, SG 0.5-2mm, SG3 non-ferrous 0.5-3mm flat strip model.

Rymer Engineering – UK
Email: admin@rymerengineering.info
Website: www.rymereng.co.uk

Microwlder™
Model EH

Model SG

▲ *The models EH and SG series from Rymer Engineering*

Welding in the coil radius - innovations

August Strecker is a manufacturer of buttwelding machines which are exported into more than 110 countries worldwide. The greater portion of these welders work according to the resistance pressure buttwelding principle. The range includes conventional electric buttwelders for wires or stranded conductors of all kinds, but also flash buttwelders, spotwelders and coldpressure buttwelders for non-ferrous wires. An example from the wide production programme are buttwelding machines joining the ends of hanging wire coils, meaning that the welding axis is vertical. The material to be welded is often hot-rolled ribbed concrete reinforcement steel, but also other material qualities, even high-carbon and alloyed steels, can be connected in this method.

▲ *An SS model with vertical running welding axis*

The demand for such machines increased about 15 years ago as possibilities for process optimisation and ways to relieve the operator of demanding physical labour were sought. Especially with the main dimensions of hot-rolled ribbed concrete steel WR18mm/WR16mm/WR14mm/WR12mm, it is difficult to pull the wire ends to be connected far enough out of the line so they can be positioned horizontally for joining in a conventional welder. Additionally, the large wire loop resulting from welding must then be forcibly pushed back, which frequently presents great problems – often the loop jams and continuous operation is interrupted.

Strecker reacted with machines configured vertically, which allow the welding head to be positioned very close to the wire ends to be welded. This brought a great improvement to the entire work process. The machines are designed so that the wire ends do not need to be straightened for welding, but instead the wires can be hydraulically clamped into the clamping device in the radius of the coil.

Soon these vertical welding machines were available in various configurations to support the most diverse on-site conditions in factories, meeting each customer's individual needs.

Depending on the requirements of the steel quality, various annealing options are available, including programmable microprocessor control of the welding and annealing processes, or adjustable infrared pyrometers.

For a number of years, only resistance pressure buttwelders could be employed for this application of vertical welding. Many companies considered these welders an improvement compared to the horizontal welding machines used previously. However, there was much discussion about ways to optimise the process. In October 2009, a significant leap forward in development was made at Strecker: now there are also dual upset buttwelding machines with automatic flash removal, the "SS", configured vertically.

The advantages of the vertical SS welding machine are clear:

- Excellent welding quality through the dual upset process, nearly all the heated, molten material is pressed out of the joint so a weld with extremely high tensile strength is created
- The automatic flash removal integrated into the process provides welds of exactly the same diameter as the original material. This is an enormous step forward considering that earlier, using conventional welding machines, the welding flash had to be removed through time-intensive manual work. Automatic flash removal means not only enormous time savings, but also simplification of the operator's work. Additionally, there is no risk of wire breaks due to excessive de-burring, ie reduction of the cross section at the welded joint
- Exactly reproducible, same-diameter welded joints of the highest quality even with difficult materials form a solid, reliable foundation for further manufacturing processes and contribute to quality assurance
- The machine offers simple, user-friendly operation even for personnel without special qualifications. This fact coupled with the relief from manual labour for the operator makes it possible to staff this position with just one man, allowing for a reduction in production personnel capacity

Machines from the "SS" series for vertical welding are also available in various configurations. Whether mounted swivelably on an additional pillar at the horizontal pay off, or whether motor-driven on flanged wheels – every option is available to ideally fit the welding machine to the most diverse on-site requirements of the end customer.

At the same time, Strecker utilised this developmental step forward in the "SS" series with the advantages of dual upsetting and automatic de-burring to completely modernise these machines. Equipped with modern technology such as a new electro-hydraulic controller, parameter and programme monitoring via a large control panel on the front of the machine as well as modern hydraulics without complicated piping, these machines also now display a compact, space-saving, robust design.

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Cleaner, greener welding

Cold pressure welding has many benefits. Compared with electrical welding, the process is quick, clean, 'green' and cost effective and creates a reliable, permanent weld stronger than the parent material without sacrificing electrical integrity.

British company PWM, which has been at the forefront of cold pressure welding technology for over 30 years, has developed a comprehensive range of robust, reliable machines and dies suitable for a variety of applications.

PWM dies, which can be standard or custom made to suit round or profile wire and rod, are precision engineered in the company's own workshops, ensuring total quality control and accountability.

PWM's most recent introduction is an upgraded version of its powerful electro-hydraulic P1500 rod welder, launched at wire 2010.

▲ *The new P1500*

The new P1500 has an improved hydraulic operating system that provides a quieter, smoother weld operation. The machine also incor- porates a new user-friendly operator keypad. Power consumption is limited to the hydraulic pump motor, making the P1500 very energy efficient and economical to operate.

The P1500 weld cycle takes only minutes and the machine has a capacity of 15mm to 25mm diameter copper and 15mm to 30mm aluminium.

The PWM range includes two smaller rod welders, the P1000 (6mm to 20mm) and the EP500 (5mm to 15mm) as well as manual hand-held and bench-mounted machines, and trolley-mounted machines (manual and powered) for wire sizes from 0.1mm up to 6.5mm. Cold welding can be used to bond most non-ferrous metals, as well as various alloys. The process can also be used to join dissimilar materials, for example, aluminium to copper, and materials of different sizes.

PWM's UK-based specialist team is always happy to provide advice and support on cold welding techniques and applications and the company's worldwide network of experienced agents offers international wire and cable manufacturers a fast and efficient service.

PWM's full range of cold welding machines and dies can be viewed at www.pwmltd.co.uk

PWM Ltd – UK
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Loose tube FTTx buffer tube mid-span access – a test method comparison

By Denise L Matthews, Draka Communications, Claremont, NC

Abstract

This paper provides a comparison of test procedures and fibre attenuation results between the two different mid-span test methods that have been defined in the fibre optic cable industry.

The two standards differ in terms of temperature extremes, soak times and number of cycles. There are two customer specifications using these different methods with different tube lengths and attenuation acceptance criteria.

One specification, defined by Rural Utilities Service (RUS), requires at least five temperature cycles and 20ft of expressed buffer tubes. The other specification is contained in Telcordia's GR-20 requirements for outside plant cables and references the FOTP-244 draft for the test method.

The GR-20 specification requires 14ft of expressed buffer tubes and the draft FOTP-244 requires two cycles with different soak times. The attenuation requirements for these two customer specifications are also different.

The purpose of this paper is to evaluate the differences in fibre attenuation when testing the same cables to each of these two test specifications.

This will be accomplished by the evaluation of data from testing of Draka cables as well as other manufacturers' cables.

These differences will be evaluated with respect to the number of cycles, temperature soak times and buffer tube length.

The resulting data will show how each variable in the test affects the results of the cable performance.

1 Introduction

In recent years, it has become common to store several feet of expressed tubes in splice cases or pedestals in FTTx applications using loose tube cable. At a mid-span access point, the cable sheath is removed and the tubes are unstranded from the central strength member and stored in a closure/pedestal. Depending on the application, some tubes will be opened for splicing to either drop cables or distribution cables, while other tubes will be left unopened. Unopened tubes are referred to as expressed tubes.

These tubes are no longer coupled to the central member of the cable core and will typically shrink when exposed to cold temperature extremes. Shrinkage of the buffer tubes may result in macro-bending attenuation increases.

The magnitude of the increase is a function of the tube size, amount of buffer tube shrinkage and bend sensitivity of the fibre. The amount of buffer tube shrinkage can vary, depending on material type and processing conditions.

These mechanisms have been described in detail in previous papers including references[5] and[6] in the references section of this paper.

To simulate this phenomenon in a test laboratory, two different mid-span test methods have been defined in the industry. One test method is specified in the Rural Utilities Service (RUS) 7 CRF Part 1755.902 (PE-90) Federal Register page 20569 section (15).

The other test method is the TIA/FOTP-244 draft which is currently referenced by Telcordia Technologies Generic Requirements GR-20-CORE issue 3 section 6.5.11. The RUS method was defined prior to the creation of FOTP-244.

2 Test method comparison

As stated in the introduction, there are two test methods currently in process of being published and implemented, the PE-90 method and the draft FOTP-244 method.

Both of these methods reference the FOTP-3 test method, which defines baseline measurement, cycle definition and chamber ramp rate. The two test methods are outlined below.

PE-90

The PE-90 mid-span test method requires five, or more, complete cycles with temperature extremes of –40˚C and 70˚C.

▼ **Table 1**: *PE-90 and FOTP-244 mid-span test methods*

Test method	Cycle 1		Cycle 2		Cycle 3		Cycle 4		Cycle 5	
	Soak Time (hours)		Soak Time (hours)		Soak Time (hours)		Soak Time (hours)		Soak Time (hours)	
	-40˚C	70˚C	-40˚C	70˚C	-40˚C	70ºC	-40˚C	70˚C	-40˚C	70˚C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Junction where optical measurements are required by the specifications										

Attenuation requirements at 1,550nm	PE-90	GR-20
Expressed tube length	20ft	14ft
Maximum attenuation increase at last temperature extremes	0.1 dB	-
Average attenuation increase at last temperature extremes	0.05 dB	0.15 dB
Maximum attenuation increase at final 23˚C temperature	0.05 dB	-
Average attenuation increase at final 23˚C temperature	-	0.15 dB

▲ **Table 2**: *PE-90 and GR-20 mid-span test attenuation requirements comparison*

Maximum attenuation increase (dB) at 1,550nm and –40°C				
PE-90 Cycle	**Cable 1**	**Cable 2**	**Cable 3**	**Cable 4**
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
20-ft PE-90 final cycle maximum	1.25	0.02	0.575	1.01
14-ft FOTP-244 maximum	0.59	0.01	0.311	0.31

▲ **Table 3**: *20 ft PE-90 & 14 ft draft FOTP-244 midspan test comparison at –40˚C*

Soak times of three hours are required for all temperature extremes and for the final 23˚C temperature. All test fibres are to be measured at room temperature at the 1,550nm wavelength prior to temperature cycling. This is the reference measurement.

The test fibres are then measured at the 1,550nm wavelength in the last cycle at the temperature extremes and at the final 23˚C temperature. Attenuation increases are calculated and evaluated against an upper specification limit.

The tubes, cable and assemblies are also to be inspected at the final room temperature for any visual damage.

FOTP-244

The FOTP-244 test method requires two complete cycles and a final 23˚C temperature soak. It requires 14 hours of soak for the first 70˚C temperature extreme. This extended soak time is intended to help release shrink-back stresses that may have been locked into the tubes during processing. All other soak times are required to be a minimum of one hour.

All test fibres are measured at room temperature at the wavelength of 1,550nm before temperature cycling. This is the reference measurement.

The test fibre attenuations are then measured at the 1,550nm wavelength at the last temperature cycle extremes and the end of the test, at room temperature.

The tubes, cable and assemblies are also to be inspected at the final room temperature for any visual damage.

A comparison of the two test methods is outlined in *Table1*.

During the course of the testing it was found that the only significant attenuation increases occurred at the –40˚C temperature extremes.

Attenuation increases at 70˚C and at the final 23˚C were not significant. For this reason, the attenuation increases that are presented in this paper are all measured at the –40˚C temperature extremes.

Multiple fibres were tested in each cable sample. The average attenuation increase was calculated and the maximum individual measurement was identified.

These are the values reported in this paper. Each cable sample was inspected for cable damage at the completion of the mid-span test. There was no physical damage found on any of the cable samples.

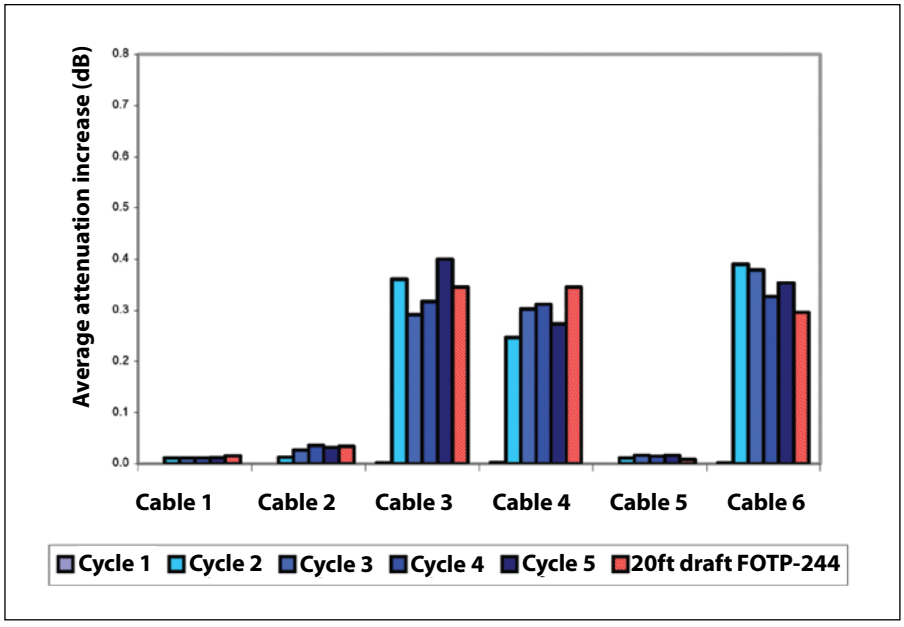
3 Acceptance criteria comparison

There are also two sets of acceptance criteria that are associated with these two test methods. These two specifications are through the PE-90 document and the GR-20 document. Each specification is outlined below.

The PE-90 specification and acceptance criteria is as follows:

a) Mid-span opening for installation of loose tube single mode optical cable in pedestal shall be 6.096m (20ft)
b) No greater than 0.1 dB attenuation increase (at 1,550nm) on any individual fibre and no greater than 0.05 dB attenuation increase average (at 1,550nm) on all of the fibres, during the last cycle at –40˚C and 70˚C
c) No greater than 0.05 dB attenuation increase (at 1,550nm) on any individual fibre at the final 23˚C temperature

▼ **Figure 1**: *20-ft PE-90 and 20-ft draft FOTP-244 midspan test comparison – average attenuation increase*



The GR-20 specification is as follows:

a) Loose tubes stored in a pedestal or closure shall be capable of having a minimum of 14ft of expressed buffer tube stored in a pedestal or closure.
b) No greater than 0.15 dB average attenuation increase at 1,550nm on all fibres, during and after the last cycle.

Table 2 is an outline of these tests.

4 PE-90 as compared to GR-20 and FOTP-244 test results

4.1 20-ft PE-90 compared to 14-ft FOTP-244 tube exposure

The current specifications outlined in sections 2 and 3 have multiple differences between them, as noted. This section compares methods defined in the PE-90 and GR-20 (referencing FOTP-244) documents by comparing the resulting attenuation loss using identical segments of cables from multiple cable manufacturers.

Table 3 is a comparison of results generated from testing identical cable samples to the 20-ft PE-90 method to the 14-ft FOTP-244 method. Four cable samples from two different cable manufactures were tested to both the five cycle PE 90 test method and the two cycle FOTP-244 test method.

As can be seen in *Table 3*, the 20-ft PE-90 test consistently has higher maximum attenuation changes at –40˚C than the Telcordia GR-20/FOTP-244 14-ft test. The magnitude of this attenuation increase is seen to be in the range of two times higher for the PE-90 method and specification. As will be shown in the next section, the main contributor to this attenuation loss difference is the expressed tube length.

4.2 PE-90 as compared to FOTP-244 method

In order to better understand the difference between the test methods of PE-90 and FOTP-244, a 20-ft mid-span test was completed on six different cables, to each test method. The six cables that were tested came from three different cable manufacturers.

The 20-ft PE-90 test method and 20-ft FOTP-244 method generally result in similar fibre attenuation changes, as can be seen in *Figures 1* and *2*.

Figure 1 shows the average attenuation increases and *Figure 2* shows the maximum attenuation increases. Out of the six cables tested, four resulted in greater attenuation loss with the FOTP test method over the fifth cycle PE-90 method. While there is variation in the results using the two methods, when applying the RUS limit of 0.1 dB maximum and 0.05 dB average, the cable types generally result in either passing or failing results regardless of the method.

5 The effect of the number of cycles

5.1 Cycles and maximum attenuation peaks

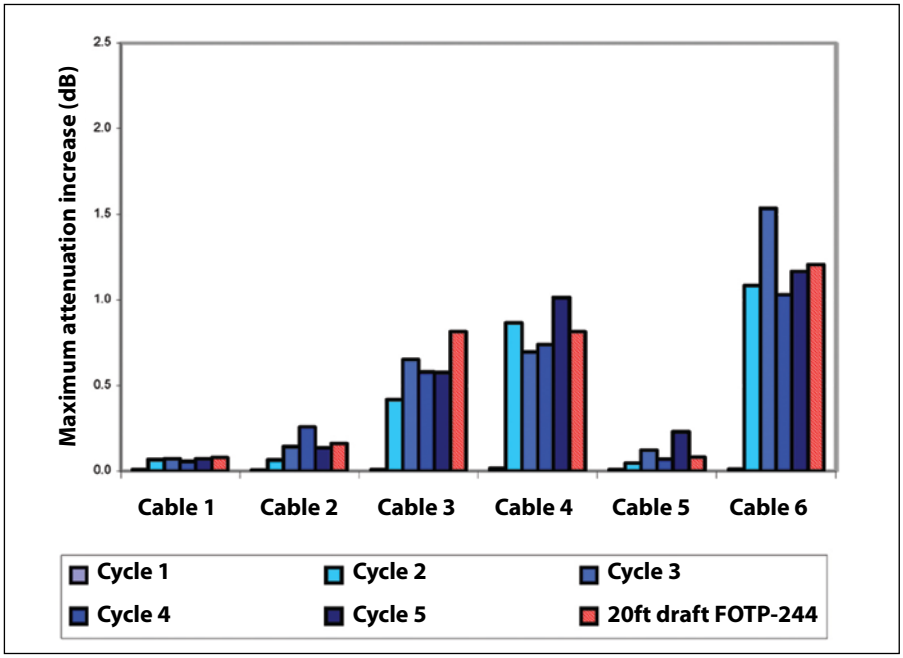
The PE-90 test requires that the last of at least five cycles be measured and evaluated. As can be seen in the multiple cycle PE-90 test data in *Figures 1* and *2*, the greatest attenuation increases may not necessarily occur during the fifth cycle and may occur anywhere from cycle two to cycle five.

In *Figures 1* and *2*, three out of the six cables tested show the greatest attenuation increases between the second and fourth cycles, not the fifth cycle. By only measuring the last cycle, attenuation increases that may occur in the field during the first one or two seasonal temperature extremes may be missed during testing.

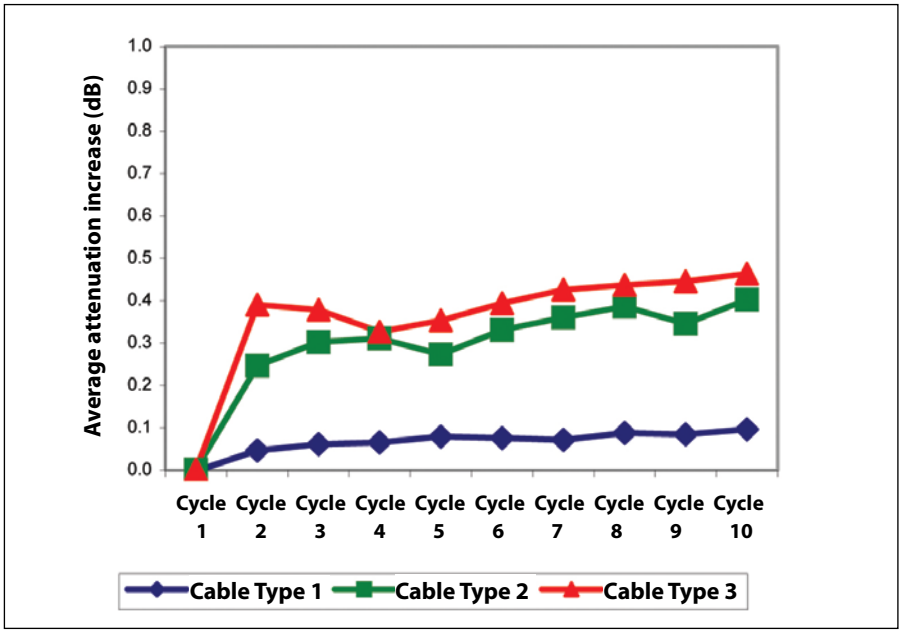
5.2 The effect of increasing the number of cycles

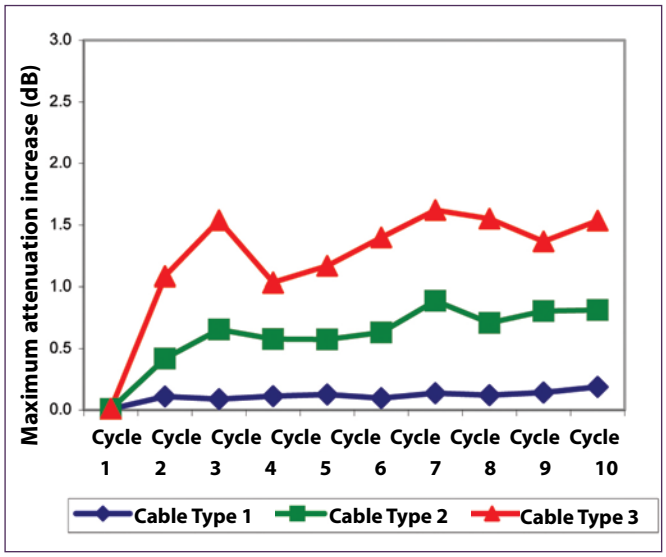
In order to better understand the effect of mid-span test temperature cycles on attenuation losses, three cables were

▼ **Figure 2**: *20-ft PE-90 and 20-ft draft FOTP-244 midspan test comparison – maximum attenuation increase*

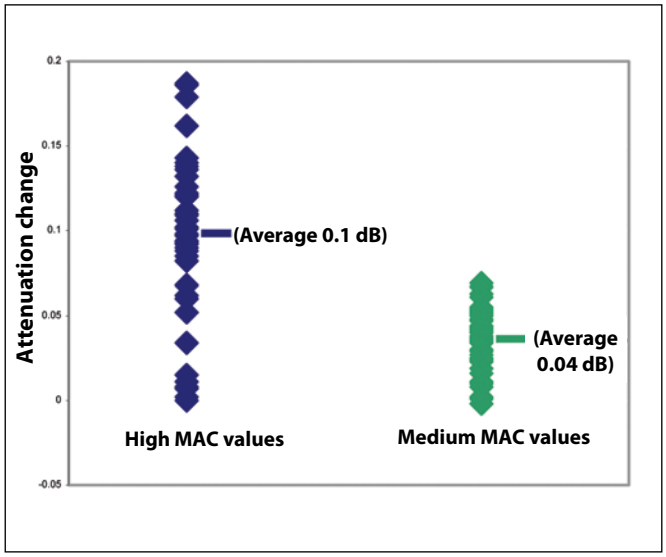


▼ **Figure 3**: *20-ft PE-90 mid-span test with five additional cycles – average attenuation increase*





▲ **Figure 4**: *20-ft PE-90 mid-span test with five additional cycles – maximum attenuation increase*



▲ **Figure 5**: *Attenuation change in high and medium MAC value fibres*

tested to the PE-90 standard. These three cables were tested with five additional temperature extreme cycles, for a total of ten cycles.

The resulting fibre attenuation trends for the ten cycles are shown in *Figures 3* and *4*.

Figure 3 presents the average attenuation increases for each of the ten cycles at the –40˚C temperature extreme and *Figure 4* shows the maximum attenuation increases for each cycle at –40˚C.

It is important to note that the current PE-90 requirement specifies at "least five cycles". This leaves room for additional cycles to be completed and only the last of the cycles to be evaluated against the specification.

The graphs in *Figure 4* shows that fibre attenuation loss can, at times, slightly improve with additional cycles.

6 The effect of fibre MAC values

The MAC value of a fibre strongly affects the magnitude of attenuation change in mid-span testing. The MAC number of a fibre is defined as its mode field diameter measured at 1,550nm divided by its cut-off wavelength.

This value is an indicator of a fibre's macro-bending sensitivity. *Figure 5* presents the individual fibre attenuation measurements in multiple tubes and multiple cables for mid-span testing.

Each tube tested contained three high MAC value fibres, three medium MAC value fibres and six scrap fibres to fill the twelve fibre maximum capacity of the tubes. Reviewing the maximums, averages and spread of each of the fibre types (*Figure 5*) it can be seen that the higher MAC value fibres perform poorly in cold temperature mid-span testing; high MAC value fibres need to be taken into account when qualifying a cable design.

7 Conclusions

It has been shown that the length of tube expressed for mid-span access testing affects the attenuation more so than the difference in the test methods PE-90 and FOTP-244. The 20-ft test requirement is consistently more severe then the 14-ft requirement.

It has also been shown that when mid-span testing 20ft of expressed tube, the results show similar losses between the two methods. Identical cable samples generally exhibit either passing or failing results regardless of the method.

When multiple cycles are defined in mid-span testing, the greatest attenuation losses may not occur during the last cycle, where mandatory measurements are made.

There is a general trend up in attenuation increase as the cycles are increased, but not necessarily increasing at each cycle.

Fibre MAC values have been shown to significantly affect the attenuation loss in mid-span testing.

It is important to evaluate the higher MAC value fibres when qualifying a cable design, as the results may appear better than a "worst case" scenario if this is not taken into account. ■

8 References

[1] Rural Utilities Service (RUS) 7 CRF Part 1755.902 (PE-90) Federal Register

[2] Telcordia Technologies generic requirements GR-20-CORE issue 3

[3] TIA-455-244/FOTP-244 draft "Methods for measuring the change in transmittance of optical fibres in expressed buffer tubes when subjected to temperature cycling"

[4] TIA-455-3B/FOTP-3 "Procedure to measure temperature cycling effects on optical fibre units, optical cable, and other passive fibre components"

[5] Ray Lovie, "Loose buffer tube construction for mid-span access" IWCS (2007)

[6] Ray Lovie and Bob Overton, "Reliability considerations for mid-span access points in FTTH optical fibre systems: cable termination and expressed buffer tube storage" IWCS (2008)

This paper was first presented at the 58th International Wire & Cable and Connectivity Symposium, held in Charlotte, NC, 8th–11th November 2009. It is reproduced with the generous permission of the organisers.

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AlphaGary wurde für 300 Millionen USD verkauft

ROCKWOOD Holdings hat seine AlphaGary Compounding Group an Mexichem SAB de CV im Wert von 300 Millionen USD verkauft.

Das am 17. Dezember 2010 angekündigte Deal sollte voraussichtlich im ersten Quartal 2011 abgeschlossen werden.

Es scheint , daß Mexichem, der wichtigste Hersteller von PVC-Rohr, Vinylharze und -mischungen in Mexiko, über 800 Millionen USD für diesen Erwerb innerhalb einer 3-Jahresfrist zahlen wird.

AlphaGary – der wichtigste Bereich im Segment Sondermischungen von Rockwood – wies im letzten Jahr Verkaufszahlen in Höhe von 231 Millionen USD auf.

Das Unternehmen aus Massachusetts entwickelt hochtechnologische Compounds für Anwendungen in Marktlücken. Die Compounds-Auswahl umfaßt Weich-PVC- und halogenfreie Legierungen, styren-, vinyl- und olefin-basierte thermoplastische Elastomere, Nylonlegierungen, Polyurethanmischungen und vernetzbares Polyethylen.

Das Unternehmen verfügt über vier Standorte in den USA, UK und Kanada.

"AlphaGary erwies sich schon seit mehreren Jahren als ein Nicht-Kerngeschäft," sagte Timothy McKenna, Vize-Präsident der Investor-Relations von Rockwood. "Ich glaube, dass es für beide Parteien ein gutes Geschäft ist."

Seifi Ghasemi, Vorsitzende der Geschäftsführung von Rockwood bemerkte diesbezüglich: "Der Abschluss des Verkaufs dieses Compounding-Geschäfts ist ein weiterer Schritt in der Konzentration unseres Portfolios was Geschäfte mit höheren Margen, Spezialchemikalien und hochmoderner Materialien betrifft."

Mexichem, Hersteller einer Vielzahl von chemischen Produkten in über 40 Anlagen in Lateinamerika, USA, UK, Japan und Taiwan, hat Nettoverkaufszahlen in Höhe von zirka 2,17 Milliarden USD für die ersten drei Quartale 2010 angekündigt.

"Mit diesem Erwerb können wir das Forschungs- und Entwicklungspotential sowie die innovativen Produkte von AlphaGary mit der geographischen Diversifizierung von Mexichem kombinieren, was wiederum wichtige Synergien bietet," gab das Unternehmen in der Börse von Mexiko-Stadt bekannt.

Bei Redaktionsschluss dieser Ausgabe ist dieses Geschäft noch von der Kartellbehörde genehmigt worden.

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Bestellung aus Korea für Zumbach

Zumbach Electronics hat eine Bestellung vom Unternehmen POSCO Pohang in Korea für 10 Steelmaster Durchmesser-/Profil-Messsysteme erhalten.

Diese neuen Systeme ersetzen teilweise vorhandene Messgeräte oder komplettieren noch nicht ausgerüstete Standorte in deren Fertigwalzstrassen 1, 2 und 3. Alle Einheiten sind mit 6 ODAC Hochgeschwindigkeits-Laserscanner (in 6 Achsen) ausgestattet, die 6.000 kalibrierte Messungen pro Sekunde liefern, sowie mit dem neuesten Hardware- und Software-Konzept.

Die Systeme werden, über ETHERNET, komplett mit Posco's Materialfluss und Qualitätskontrolle-System vernetzt.

Zumbach Electronic AG – Schweiz
Fax: +41 32 356 0430
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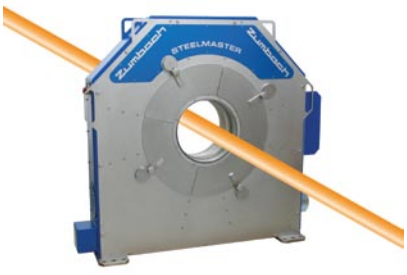


▲ *Steelmaster SMO-Messsysteme*

Nutzung der Erfahrung von Stolberger

Aktuelle Marktanalysen haben einen ständig zunehmenden Bedarf an verdichteten Aluminium- und Kupferleitern gezeigt, insbesondere an denen mit größeren Querschnitten bis 1.000mm^2.

Verdichtete Leiter, die den internationalen Normen entsprechen und entsprechende Qualitätsspezifikationen erfüllen, fordern eine erhöhte Erfahrung bei der Heraufsetzung der entsprechenden Verfahren.

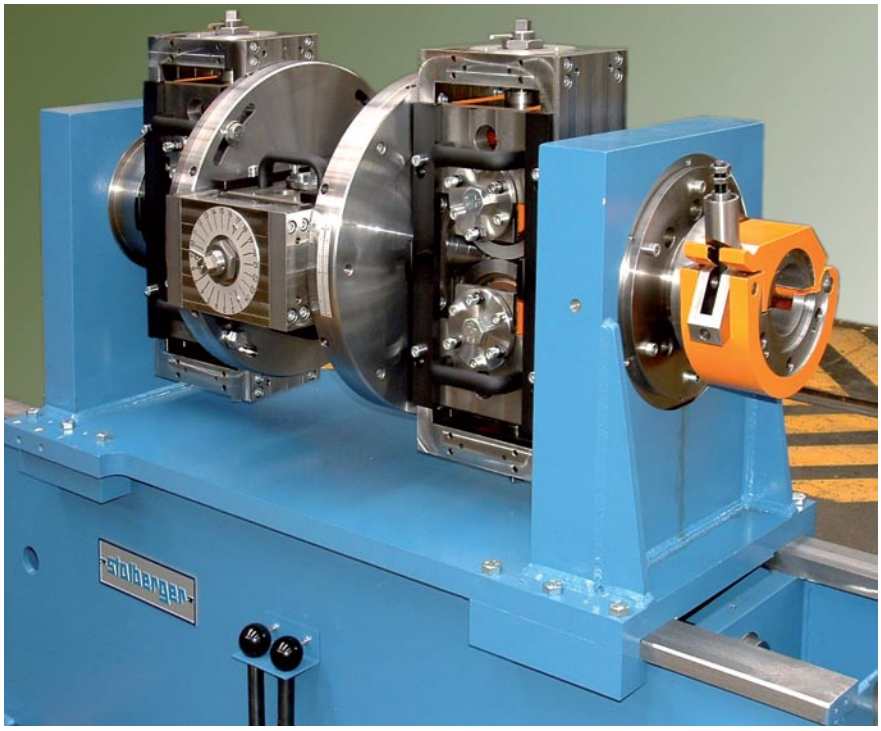
Stolberger KMB-Maschinenfabrik entwickelt und fertigt schon seit Jahrzehnten standfeste Verdichter.

Als Schleppwalzenverdichter bezeichnet, sind diese Einheiten mit 2, 3 oder 4 Rollenpaaren zum Herstellen von verdichteten Rundleitern ausgerüstet, wobei 1 oder 2 Rollenpaare bei der Herstellung gerader und vordrallierter Sektorleiter eingesetzt werden.

Kombinierte Verdichtereinheiten, mit bis zu 4 Rollenpaaren ausgerüstet, können zur Herstellung von runden oder gestreckten Sektorleitern sowie von vordrallierten Sektorleitern eingesetzt werden.

Komplette Ausrüstungen sind verfügbar für verdichtete Rundleiter bis 1.000mm^2 Querschnitt und Sektorleiter für Milliken-Leiter bis 2400mm^2 Querschnitt.

Die installierten Schleppwalzen werden gehärtet, um eine überdurchschnittliche Lebensdauer zu gewährleisten. Bedienerfreundliche Merkmale und schnelles Handling leiten die Effizienz dieser Verdichter.



▲ *Ständig zunehmender Bedarf an Produkten von Stolberger*

Unabhängig davon, umfassen in der Regel die Anforderungen, die beim Einsatz der Rentabilität grundlegend sind, die Bestimmung des geeignetsten Leiteraufbaus sowie die geforderten Abmessungen der Rollenprofile und Verseilnippel.

Die Erfahrung von Stolberger schließt alle erforderlichen Angaben ein, die beim Verdichten erforderlich sind, entsprechend den internationalen Normen, wie z. B.:

- Anzahl und Durchmesser der Drähte,
- Schleppwalzen mit passenden Profilen, auch für Fremdfabrikate,
- Angaben zum Innendurchmesser der Verseilnippel, und
- Alle zugrunde gelegten Berechnungen.

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Neue Position für Niina Saarto

Niina Saarto hat ab dem 1. Februar die Stelle des neuen Group Treasurer bei Componenta übernommen.

Saarto hat Februar 2010 bei Componenta als Treasury Manager begonnen, und zuvor war sie als Group Treasurer bei EM Group Oy tätig.

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Verkauf in Höhe von 720 Mio. USD bei Tyco

Tyco International hat einen Anteil von 51 Prozent seiner Sparte Elektro- und Metallprodukte an die Privatkapitalgesellschaft Clayton, Dubillier & Rice LLC für 720 Mio. USD verkauft.

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Mid-Span Access zum FTTx Pufferrohr des Bündeladertyps – ein Vergleich von Prüfmethoden

Von Denise L Matthews, Draka Communications, Claremont, NC

Übersicht

In diesem Artikel wird ein Vergleich von Prüfmethoden und Faserdämpfungsergebnisse zwischen den zwei unterschiedlichen Mid-Span-Prüfmethoden beschrieben, die von der LWL-Kabelindustrie festgelegt wurden.

Die zwei Standards unterscheiden sich in Bezug auf Temperaturextreme, Haltezeiten und Zyklenanzahl. Es bestehen zwei Kundenspezifikationen, bei denen diese unterschiedlichen Methoden mit verschiedenen Rohrlängen und Dämpfungs-Annahmekriterien eingesetzt werden. Bei einer dieser Spezifikationen, die vom amerikanischen ländlichen Versorgungsdienst Rural Utilities Service (RUS) festgelegt wurde, werden zumindest fünf Temperaturzyklen und 20 Fuß eines „expressed" (intakten) Pufferrohrs gefordert.

Die andere Spezifikation ist in den Anforderungen GR-20 von Telcordia für Außenkabel enthalten und bezieht sich auf die Vorstudie FOTP-244 für die Prüfmethode. Bei der Spezifikation GR-20 werden 14 Fuß eines „expressed" Pufferrohrs gefordert, und bei der Vorstudie FOTP-244 zwei Zyklen mit unterschiedlichen Haltezeiten. Die Dämpfungsanforderungen für diese zwei Kundenspezifikationen differieren ebenfalls.

Ziel des vorliegenden Artikels ist es, die Unterschiede der Faserdämpfung auszuwerten, wenn dieselben Kabel in jeder dieser zwei Prüfspezifikationen getestet werden. Dies erfolgt durch die Auswertung der Daten anhand der Prüfungen der von Draka sowie von anderen Kabelherstellern gefertigten Kabel. Diese Unterschiede werden in Bezug auf die Zyklenanzahl, Temperatur-Haltezeiten und Pufferrohrlänge ausgewertet.

Die sich ergebenden Daten zeigen wie sich jede Variable im Test auf die Ergebnisse der Kabelleistungen auswirkt.

1 Einleitung

In den letzten Jahren ist es üblich geworden, mehrere Füße „expressed" Rohre in Spleißgehäusen oder Podesten in FTTx-Applikationen zu lagern, mit Einsatz von Bündeladerkabel.

Bei einer Mid-Span-Zugangsstelle wird der Kabelmantel entfernt und die Rohre werden vom zentralen Stützelement entseilt und in einem Kasten/Podest gelagert. Je nach Einsatzfall werden einige Rohre geöffnet, sowohl um Drop- wie auch Verteilerkabel zu spleißen, während andere Rohre ungeöffnet bleiben. Ungeöffnete Rohre werden als „expressed" (intakte) Rohre bezeichnet.

Diese Rohre sind nicht mehr an das zentrale Stützelement der Kabelseele gekoppelt und sie werden in der Regel schrumpfen, wenn sie kalten Temperaturextreme ausgesetzt werden. Das Schrumpfen der Pufferrohre könnte zu Dämpfungserhöhungen durch Makrobiegung führen. Die Größe dieser Erhöhung hängt von der Rohrgröße, Niveau der Pufferrohrschrumpfung und Krümmungsempfindlichkeit der Fasern ab. Die Höhe der Pufferrohrschrumpfung kann variieren, je nach Materialtyp und Verfahrensbedingungen.

Diese Mechanismen wurden zuvor in vorhergehenden Artikeln im Detail beschrieben, einschließlich Bezug[5] und[6] im Literaturabschnitt des vorliegenden Artikels.

Um dieses Phänomen in einem Testlabor zu simulieren, wurden im Industriebereich zwei unterschiedliche Mid-Span-Prüfmethoden festgelegt. Eine Prüfmethode ist im US-Bundesregister des Rural Utilities Service (RUS), 7 CRF Teil 1755.902 (PE-90), Seite 20569 Abschnitt (15), spezifiziert. Die andere Prüfmethode ist die Vorstudie TIA/FOTP-244, auf die sich derzeit die Allgemeinen Anforderungen der Telcordia Technologies GR-20-CORE Ausgabe 3 Abschnitt 6.5.11 beziehen.

Die RUS-Methode wurde vor der Schaffung der FOTP-244 festgelegt.

▼ **Tabelle 1**: *Prüfmethoden für PE-90 und FOTP-244*

Prüf methode	Zyklus 1		Zyklus 2		Zyklus 3		Zyklus 4		Zyklus 5	
	Haltezeit (Stunden)		Haltezeit (Stunden)		Haltezeit (Stunden)		Haltezeit (Stunden)		Haltezeit (Stunden)	
	-40˚C	70˚C	-40˚C	70˚C	-40˚C	70ºC	-40˚C	70˚C	-40˚C	70˚C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Anschluss, bei dem optische Abmessungen von den Spezifikationen gefordert werden										

Dämpfungsanforderungen bei 1550nm		
	PE-90	**GR-20**
Länge des „expressed" Rohrs	20 Fuß	14 Fuß
Höchste Dämpfungserhöhung bei den letzten Temperaturextremen	0.1 dB	-
Durchschnittliche Dämpfungserhöhung bei den letzten Temperaturextremen	0.05 dB	0.15 dB
Höchste Dämpfungserhöhung bei 23°C Endtemperatur	0.05 dB	-
Durchschnittliche Dämpfungserhöhung bei 23°C Endtemperatur	-	0.15 dB

▲ **Tabelle 2**: *Vergleich zwischen PE-90 und GR-20 Mid-Span-Prüfdämpfungsanforderungen*

Höchste Dämpfungserhöhung (dB) bei 1550nm und –40°C				
PE-90 Zyklus	**Kable 1**	**Kable 2**	**Kable 3**	**Kable 4**
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
PE-90 (20 Fuß Rohr) - Endzyklus-Höchstwert	1.25	0.02	0.575	1.01
FOTP-244 (14 Fuß Rohr) - Höchstwert	0.59	0.01	0.311	0.31

▲ **Tabelle 3**: *Vergleich der Mid-Span-Prüf ung bei –40°C zwischen PE-90 (20 Fuß Rohr) und der Vorstudie FOTP-244 (14 Fuß Rohr)*

2 Vergleich von Prüfmethoden

Wie in der Einleitung angegeben wurde, gibt es derzeit zwei Prüfmethoden, die kurz davor stehen veröffentlicht und implementiert zu werden, die PE-90-Methode und die Vorstudie der FOTP-244-Methode. Beide Methoden beziehen sich auf die FOTP-3-Prüfmethode, die die Nullmessung, Zyklusbestimmung und Kammer-Aufheizrate festlegt. Die zwei Prüfmethoden sind nachfolgend beschrieben.

PE-90
Bei der PE-90 Mid-Span-Prüfmethode werden fünf oder mehr als fünf komplette Zyklen mit Temperaturextremen von –40°C und 70°C gefordert. Die Haltezeiten von drei Stunden werden für alle Temperaturextreme und für die Endtemperatur von 23°C gefordert.

Sämtliche Prüffasern müssen bei Raumtemperatur bei 1550nm Wellenlänge gemessen werden bevor sie den Temperaturzyklen ausgesetzt werden. Das entspricht der Bezugabmessung. Die Prüffasern werden dann bei 1550nm Wellenlänge im letzten Zyklus bei den Temperaturextremen und bei 23°C Endtemperatur gemessen. Die Dämpfungserhöhungen werden berechnet und ausgewertet in Bezug auf eine obere Spezifikationsgrenze. Die Rohre, Kabel und Aufbauten müssen ebenfalls bei Raumendtemperatur hinsichtlich jeglicher visueller Schäden geprüft werden.

FOTP-244
Bei der FOTP-244 Prüfmethode werden zwei komplette Zyklen und eine Haltezeit bei 23°C Endtemperatur gefordert. Dabei sind 14 Stunden Haltezeit für die ersten 70°C Temperaturextreme erforderlich. Diese erweiterte Haltezeit soll dazu dienen, eine Unterstützung bei der Entspannung der Rückschrumpfung-Spannungen zu bieten, die während des Verfahrens in den Rohren bleiben könnten. Alle andere Haltezeiten sollen mindestens eine Stunde dauern.

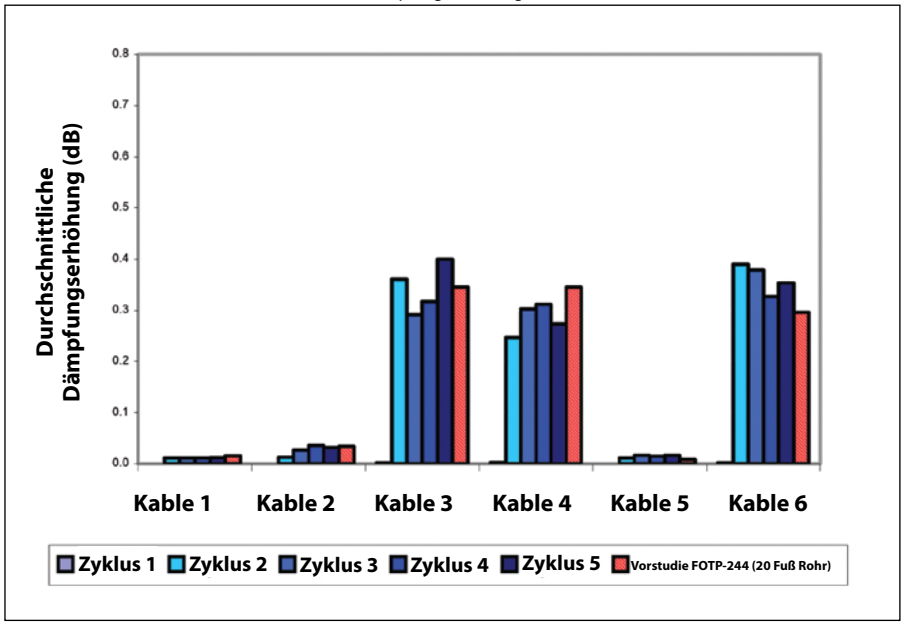
Sämtliche Prüffasern werden bei Raumtemperatur, bei einer Wellenlänge von 1550nm, vor den Temperaturzyklen gemessen. Das entspricht der Bezugabmessung. Die Prüffaserdämpfungen werden dann bei 1550nm Wellenlänge bei Temperatur-extremen des letzten Zyklus und am Ende der Prüfung bei Raumtemperatur gemessen. Die Rohre, Kabel und Aufbauten müssen ebenfalls bei Raumendtemperatur hinsichtlich jeglicher sichtbarer Schäden geprüft werden.

Ein Vergleich der zwei Prüfmethoden ist in der nachfolgenden *Tabelle* beschrieben.

Während der Prüfung wurde festgestellt, daß sich die einzigen wichtigen Dämpfungserhöhungen bei –40°C Temperaturextremen ergeben. Die Dämpfungserhöhungen bei 70°C und bei einer Endtemperatur von 23°C waren nicht von Bedeutung. Aus diesem Grund, werden alle Dämpfungserhöhungen, die in diesem Artikel beschrieben werden, bei –40°C Temperaturextremen gemessen.

Mehrere Fasern wurden in jeder Kabelprobe geprüft. Die durchschnittliche Dämpfungserhöhung wurde berechnet

▼ **Bild 1**: *Vergleich zwischen der Mid-Span-Prüfung gemäß der PE-90-Methode (20 Fuß Rohr) und der Vorstudie FOTP-244 (20 Fuß Rohr) - durchschnittliche Dämpfungserhöhung*



und die höchste Einzelabmessung wurde identifiziert. Daraus ergeben sich die in diesem Artikel beschriebenen Werte. Jede Kabelprobe wurde hinsichtlich Schäden am Kabel bei der Fertigstellung der Mid-Span-Prüfung untersucht. Physikalische Schäden wurden bei keiner Kabelprobe festgestellt.

3 Vergleich der Annahmekriterien

Es gibt auch zwei Satz Annahmekriterien, die mit diesen zwei Prüfmethoden verknüpft sind. Diese zwei Spezifikationen umfassen die Unterlage PE-90 und die Unterlage GR-20. Jede Spezifikation ist nachfolgend beschrieben.

Die PE-90-Spezifikation und die Annahmekriterien sind nachfolgend beschrieben:

a) Die Mid-Span-Öffnung für die Installation von Bündelader-Monomode-Lichtwellenleiterkabel in einem Podest soll 6,096m (20 Fuß) entsprechen
b) Dämpfungserhöhung nicht über 0,1 dB (bei 1550nm) an jeder einzelnen Faser und eine durchschnittliche Dämpfungserhöhung nicht über 0,05 dB (bei 1550nm) an allen Fasern, während des letzten Zyklus bei –40°C und 70°C
c) Dämpfungserhöhung nicht über 0,05 dB (bei 1550nm) an jeder einzelnen Faser bei 23°C Endtemperatur

Die GR-20-Spezifikation ist:

a) Bündelader, die in einem Podest oder in einem Kasten gelagert sind, sollten zumindest 14 Fuß eines „expressed" Pufferrohrs in einem Podest oder Kasten aufnehmen können
c) Durchschnittliche Dämpfungserhöhung nicht über 0,15 dB bei 1550nm an jeder Faser und nach dem letzten Zyklus

In der *Tabelle 2* sind diese Prüfungen beschrieben.

4 Vergleich zwischen den Prüfergebnissen der PE-90, GR-20 und FOTP-244

4.1 Vergleich zwischen dem freiliegenden Teil des 20 Fuß Rohrs aus PE-90 und des 14 Fuß Rohrs aus FOTP-244

Wie bereits erwähnt, zeigen die gängigen im Abschnitt 2 und 3 beschriebenen Spezifikationen untereinander mehrere Unterschiede.

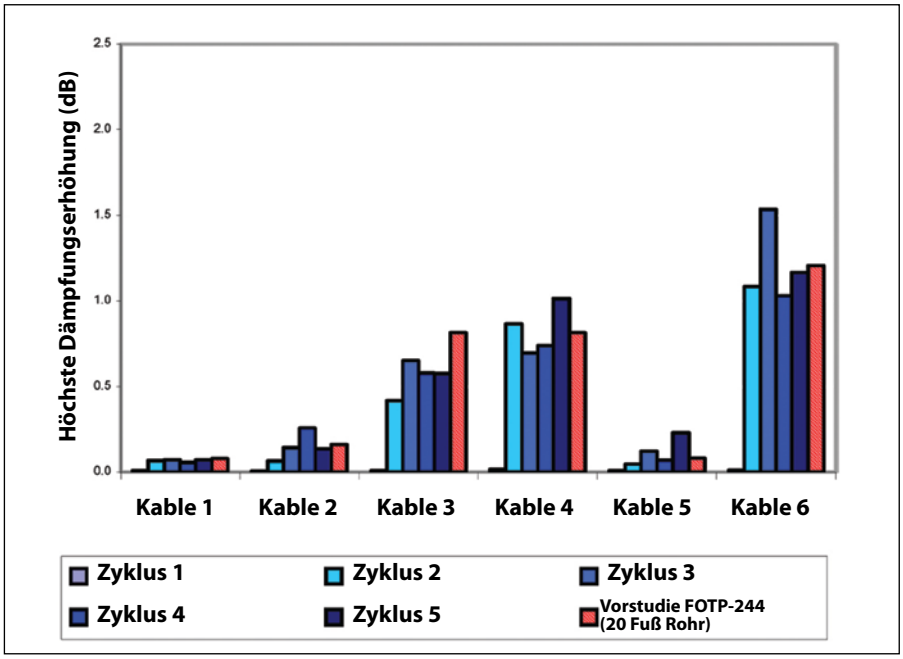
In diesem Abschnitt werden die Methoden verglichen, die in den Unterlagen PE-90 und GR-20 (auf FOTP-244 verweisend) festgelegt wurden, durch Vergleich des sich ergebenden Dämpfungsverlusts mit Einsatz identischer Kabelsegmente von mehreren Kabelherstellern.

Tabelle 3 ist ein Vergleich der Ergebnisse, die sich aus dem Prüfen identischer Kabelproben gegenüber der PE-90-Methode (die ein 20 Fuß Rohr fordert) und der FOTP-244-Methode (die ein 14 Fuß Rohr fordert) ergeben.

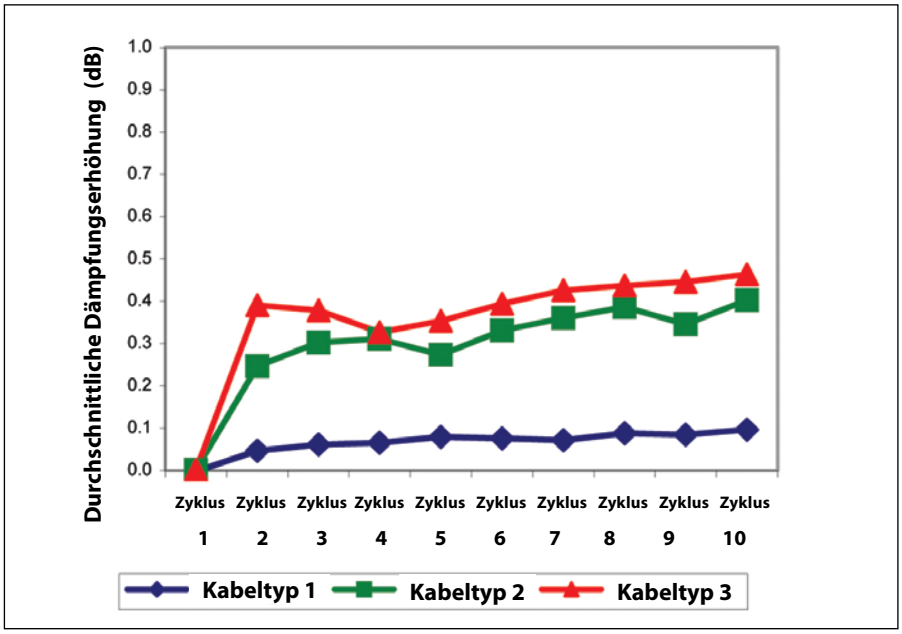
Vier Kabelproben, die von zwei unterschiedlichen Kabelherstellern gefertigt wurden, sind entsprechend der PE-90-Prüfmethode mit fünf Zyklen und der FOTP-244-Prüfmethode mit zwei Zyklen geprüft worden. Wie aus der *Tabelle 3* ersichtlich ist, weist die PE-90-Prüfung (20 Fuß Rohr) konsequent höhere Höchstdämpfungswechsel bei –40°C als die GR-20-/FOTP-244-Prüfung (14 Fuß Rohr) von Telcordia.

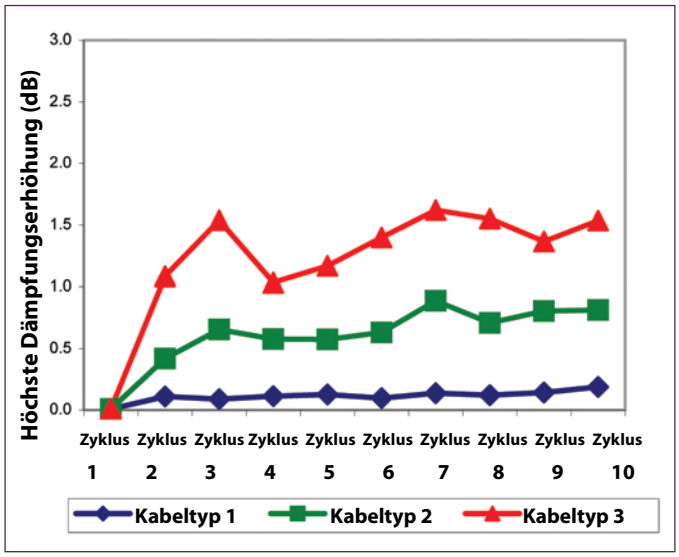
Die Größe dieser Dämpfungserhöhung erweist sich im Bereich von zwei Mal höher für die PE-90-Methode und -Spezifikation. Wie im nächsten Abschnitt dargestellt, trägt am meisten die Länge des

▼ **Bild 2**: *Vergleich zwischen der Mid-Span-Prüfung gemäß der PE-90-Methode (20 Fuß Rohr) und der Vorstudie FOTP-244 (20 Fuß Rohr) - höchste Dämpfungserhöhung*

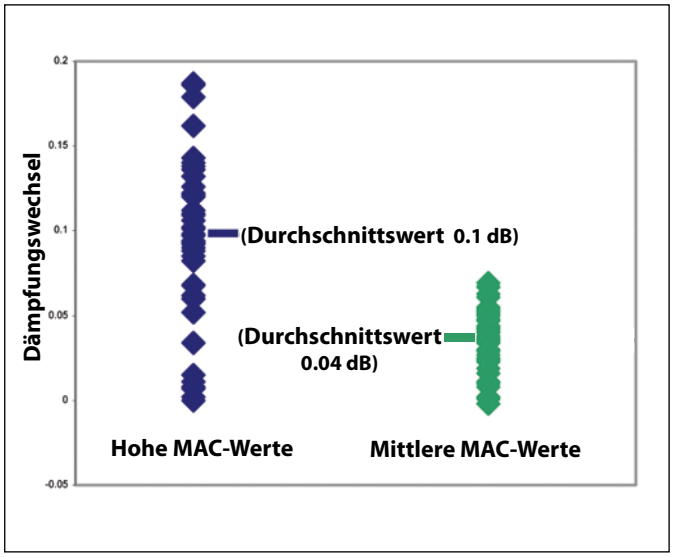


▼ **Bild 3**: *Mid-Span-Prüfung von PE-90 (20 Fuß Rohr) mit fünf zusätzlichen Zyklen - durchschnittliche Dämpfungserhöhung*





▲ **Bild 4**: *Mid-Span-Prüfung von PE-90 (20 Fuß Rohr) mit fünf zusätzlichen Zyklen - höchste Dämpfungserhöhung*



▲ **Bild 5**: *Dämpfungswechsel in Fasern mit hohen und mittleren MAC-Werten*

„expressed" Rohrs zu diesem Unterschied des Dämpfungsverlustes dar.

4.2 PE-90-Methode verglichen mit der FOTP-244-Methode

Um den Unterschied zwischen den Prüfmethoden PE-90 und FOTP-244 besser zu verstehen, wurde eine Mid-Span-Prüfung mit 20 Fuß Rohr auf sechs unterschiedlichen Kabeln je Prüfmethode durchgeführt.

Die sechs Kabel, die geprüft wurden, kamen aus drei unterschiedlichen Kabelherstellern. Die PE-90-Prüfmethode mit 20 Fuß Rohr und die FOTP-244-Methode mit 20 Fuß Rohr zeigen in der Regel ähnliche Unterschiede bei der Faserdämpfung, wie in *Bild 1* und *2* dargestellt.

Bild 1 zeigt die durchschnittlichen Dämpfungserhöhungen und *Bild 2* zeigt die höchsten Dämpfungserhöhungen. Von den sechs geprüften Kabeln, zeigten vier Kabel einen höheren Dämpfungsverlust mit der FOTP-Prüfmethode während des 5. Zyklus der PE-90-Methode. Während eine Abweichung der Ergebnisse besteht, wenn die zwei Methoden benutzt werden, ergibt sich in der Regel dagegen beim Einsatz der RUS-Grenze von höchstens 0,1 dB und durchschnittlich 0,05 dB, daß die Kabeltypen unabhängig von der Methode entweder positive oder negative Ergebnisse zeigen.

5 Die Wirkung der Zyklenanzahl

5.1 Zyklen und höchste Dämpfungspole

Bei der PE-90-Prüfung ist es erforderlich, daß der letzte von zumindest fünf Zyklen gemessen und ausgewertet wird. Wie aus den Prüfdaten des Mehrfachzyklus PE-90 in *Bild 1* und *2* ersichtlich ist, ergeben sich die höchsten Dämpfungserhöhungen nicht unbedingt während des fünften Zyklus und sie können anderswo vom zweiten Zyklus bis zum fünften Zyklus auftreten.

In *Bild 1* und *2*, zeigen drei der sechs geprüften Kabel die höchsten Dämpfungserhöhungen zwischen dem zweiten und dem vierten Zyklus, nicht aber zwischen dem fünften Zyklus.

Wenn nur der letzte Zyklus gemessen wird, könnten die Dämpfungserhöhungen während der Prüfung verfehlt werden, die im Feld während des ersten bzw. der ersten zwei jahreszeitlichen Temperaturextreme entstehen.

5.2 Die Wirkung der Erhöhung der Zyklenanzahl

Um die Wirkung der Temperaturzyklen der Mid-Span-Prüfung in Bezug auf die Dämpfungsverluste besser zu verstehen, wurden drei Kabel nach dem PE-90 Standard geprüft.

Diese drei Kabel wurden mit fünf zusätzlichen Zyklen von Temperaturextremen geprüft, was insgesamt zehn Zyklen ergibt.

Die sich daraus ergebenden Faserdämpfungstrends für die zehn Zyklen sind in *Bild 3* und *4* dargestellt. *Bild 3* zeigt die durchschnittlichen Dämpfungserhöhungen für alle zehn Zyklen bei einem Temperaturextrem von –40°C und *Bild 4* zeigt die höchsten Dämpfungserhöhungen je Zyklus bei –40°C. Es ist wichtig zu beachten, daß die gängige PE-90-Anforderung „zumindest fünf Zyklen" spezifiziert.

Damit wird Raum für zusätzliche fertigzustellende Zyklen gelassen und nur der letzte der Zyklen ist gegenüber der Spezifikation auszuwerten. Die Diagramme in *Bild 4* zeigen, daß der Faserdämpfungsverlust sich manchmal mit zusätzlichen Zyklen etwas bessern kann.

6 Die Wirkung der MAC-Werte einer Faser

Der MAC-Wert einer Faser hat einen hohen Einfluss auf die Größe des Dämpfungswechsels bei der Mid-Span-Prüfung. Die MAC-Nummer einer Faser wird bestimmt in dem sein bei 1550nm gemessener Modenfelddurchmesser durch seine kritische Wellenlänge geteilt wird. Dieser Wert ist ein Anzeiger der Makrokrümmungsempfindlichkeit der Faser.

Bild 5 zeigt die einzelnen Faserdämpfungsabmessungen in mehreren Rohren und Kabeln für die Mid-Span-Prüfung. In jedem geprüften Rohr sind drei Fasern mit hohem MAC-Wert enthalten, drei Fasern mit mittlerem MAC-Wert und sechs Abfallfasern um die höchste Kapazität der zwölf Faser der Rohre zu füllen.

Durch das Prüfen der Höchst- und Durchschnittswerte sowie deren Durchschnitt je Fasertyp (*Bild 5*) ist ersichtlich, daß Fasern mit höheren MAC-Werten geringe Leistungen bei Mid-Span-Prüfungen mit kalten Temperaturen aufweisen; Fasern mit hohen MAC-Werten müssen daher berücksichtigt werden, wenn der Kabelaufbau klassifiziert wird.

7 Schlußfolgerungen

Es wurde bewiesen, daß die Länge des „expressed" Rohrs für eine Prüfung des Mid-Span-Access, die Dämpfung mehr als der Unterschied zwischen den Prüfmethoden PE-90 und FOTP-244 beeinflussen.

Die Anforderung der Prüfung, bei der 20 Fuß Rohr gefordert werden, ist daher strenger als die entsprechende Anforderung der Prüfung, bei der 14 Fuß Rohr gefordert werden. Es wurde auch gezeigt, daß bei der Mid-Span-Prüfung von 20 Fuß eines „expressed" Rohrs, die Ergebnisse ähnliche Verluste zwischen den zwei Methoden aufweisen. Identische Kabelproben zeigen in der Regel positive oder negative Ergebnisse unabhängig von der Methode.

Wenn mehrere Zyklen bei der Mid-Span-Prüfung festgelegt werden, könnte es sein, daß die größten Dämpfungsverluste nicht während des letzten Zyklus entstehen, wo zwingende Abmessungen durchgeführt werden.

Es besteht ein allgemeiner Aufwärtstrend bei der Dämpfungserhöhung während die Zyklen erhöht werden, die jedoch nicht unbedingt je Zyklus steigern.

Es wurde bewiesen, daß die MAC-Werte der Faser einen wesentlichen Einfluss auf den Dämpfungsverlust bei der Mid-Span-Prüfung haben. Es ist wichtig die Faser mit den höheren MAC-Werten auszuwerten, wenn der Kabelaufbau klassifiziert wird, da die Ergebnisse besser als ein Szenarium des „schlimmsten Falls" erscheinen könnten, wenn dies nicht berücksichtigt wird. ■

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Diese Unterlage wurde während des in Charlotte, NC vom 8. bis 11. November 2009 stattgefundenen 58. International Wire & Cable and Connectivity Symposiums vorgestellt. Sie ist mit der freundlichen Genehmigung der Veranstalter vervielfältigt worden.

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Компания «АлфаГэри» продана за 300 миллионов долларов

Холдинг «Роквуд холдингс» (Rockwood Holdings) продал принадлежащую ему «АлфаГэри компаундинг груп» (AlphaGary Compounding Group) компании «Мехикем САБ де СВ» (Mexichem SAB de CV) в рамках сделки на сумму 300 млн. долларов США. Сделка, о которой было объявлено 17 декабря, предположительно, должна быть завершена в первом квартале 2011 года.

Условиями сделки предусматривается, что «Мехикем», являющаяся крупнейшим в Мексике производителем труб из ПВХ, а также виниловых смол и компаундов, вступит во владение приобретенной компанией, затратив в течение ближайших трех лет около 800 млн. долларов США. В прошлом году объем продаж «АлфаГэри», крупнейшего подразделения компании «Роквуд», занятого производством специальных компаундов, составил 231 млн. долларов США.

Компания, которая расположена в шт. Массачусетс, ведет разработку высокотехнологичных компаундов для узкоспециализированных сфер применения. В ассортименте выпускаемых компанией компаундов – ПВХ пластикаты и безгалогенные смеси, термопластичные эластомеры на основе стирола, винила и олефина, смеси нейлона, полиуретановые смеси и сшиваемый полиэтилен. Компания располагает четырьмя производственными предприятиями в США, Великобритании и Канаде.

«Несколько лет тому назад мы определили, что деятельность «АлфаГэри» является непрофильным для нас направлением, – сказал Тимоти Маккенна (Timothy McKenna), вице-президент компании «Роквуд» по работе с инвесторами. – Думаю, что это – отличная сделка для обеих сторон». Председатель правления и главный исполнительный директор компании «Роквуд» Зейфи Гхасеми (Seifi Ghasemi) заявил следующее: «Реализация сделки по продаже данного предприятия, специализирующегося на производстве компаундов, – это еще один шаг в направлении насыщения портфеля наших активов на основе высокодоходных предприятий, выпускающих специализированную химическую продукцию и новые материалы».

Компания «Мехикем», которая производит широкий ассортимент химической продукции на более чем 40 предприятиях в странах Латинской Америки, в США, Великобритании, Японии и на Тайване, объявила, что чистая выручка от продаж за первые девять месяцев 2010 года составила около 2,17 млрд. долларов США. «Благодаря этому приобретению мы можем объединить потенциал «АлфаГэри» в области научно-исследовательских и опытно-конструкторских работ и выпускаемую ею инновационную продукцию с географической диверсификацией компании «Мехикем», обеспечив тем самым важный синергетический эффект», – объявила компания на Мексиканской фондовой бирже. На момент публикации сделка все еще ожидала одобрения со стороны антимонопольных органов.

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«Цумбах» получила заказ из Кореи

Компания «Цумбах электроникс» (Zumbach Electronics) получила от корейского предприятия «Поско Поханг» (Posco Pohang) подряд на поставку 10 комплексов Steelmaster для измерения диаметра и профиля заготовок. Эти новые системы частично заменят существующие контрольно-измерительные приборы или будут установлены на участках чистовых линий прутковых прокатных станов №№1, 2 и 3, не оборудованных соответствующей аппаратурой. Все контрольно-измерительные устройства оборудованы шестью высокоскоростными лазерными сканерами серии ODAC (шестикоординатными), которые выполняют 6000 калиброванных измерений в секунду, и снабжены новейшим программно-аппаратным комплексом. Все устройства будут объединены в локальную сеть Ethernet с системой контроля материальных потоков и качества продукции компании «Поско». Контрольно-измерительные устройства отличаются чрезвычайно компактной конструкцией и практически не требуют технического обслуживания.

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Опыт «Штолбергер» востребован

Анализ текущей ситуации на рынке свидетельствует о постоянно растущем спросе на проводники из уплотненных алюминиевых и медных жил, в особенности на проводники большого сечения до 1000 мм^2.

Производство проводников с уплотненными жилами при соблюдении международных стандартов и соответствующих требований к качеству продукции требует высокого уровня квалификации в области модернизации сопутствующих технологических процессов. Компания «Штолбергер КМБ-машиненфабрик» (Stolberger KMB-Maschinenfabrik) на протяжении нескольких десятилетий разрабатывает и выпускает обжимные устройства стационарного типа.

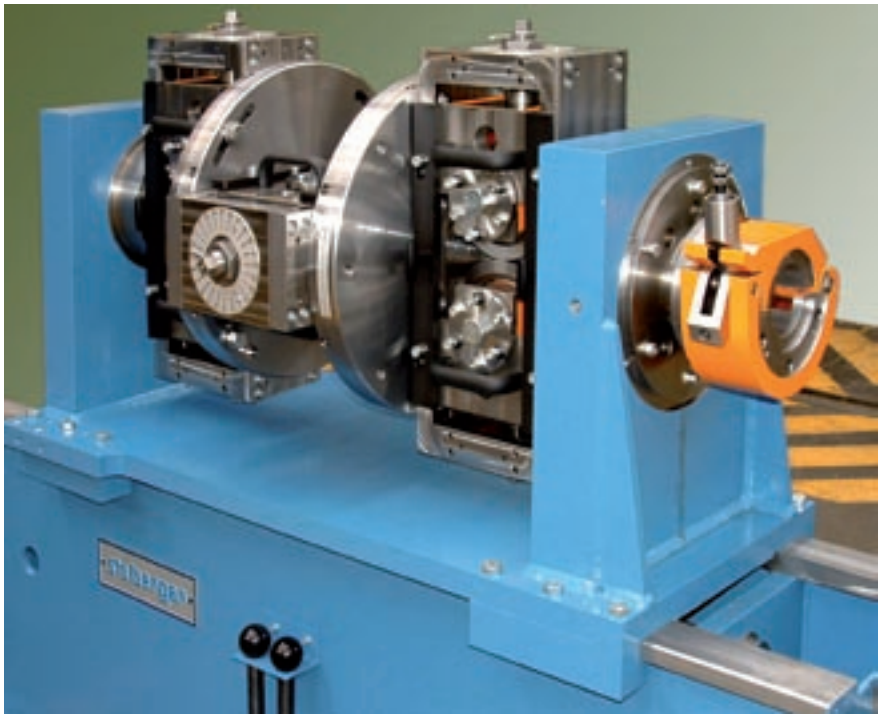
Указанные устройства, которые называются уплотнителями с опорным валком, снабжены 2, 3 или 4 парами валков для обжима жил круглого сечения, при этом одна или две пары валков используются при изготовлении прямых и предварительно подкрученных жил секторного сечения. Обжимные устройства комбинированного типа, в которых устанавливается до четырех пар валков, могут использоваться при изготовлении жил круглого и прямого секторного сечения, а также предварительно подкрученных секторных жил.

Предлагаются комплекты оборудования для производства уплотненных жил круглого сечения до 1000 мм^2 и жил секторного сечения для кабелей типа «Милликен» сечением до 2400 мм^2. Обжимные валки закалены для продления среднего срока службы. Простота и легкость в эксплуатации и обслуживании обеспечивает экономическую эффективность предлагаемых уплотнителей.

Безотносительно к вышесказанному, одним из стандартных требований, имеющих существенное значение для обеспечения рентабельности эксплуатации оборудования, является определение соответствующей конструкции жил, а также необходимых профилей валков и размеров свивающей воронки.

Опыт компании «Штолбергер», наряду с прочим, базируется на обладании комплексом данных, необходимых для производства уплотненных жил в соответствии с международными стандартами, включая:

- количество и диаметр жил,
- параметры обжимных валков соответствующих сечений, в том числе для использования в устройствах других производителей,
- информацию о внутреннем диаметре свивающих воронок, и
- все расчеты, принятые за основу.



▲ *Продукция компании «Штолбергер» пользуется постоянно растущим спросом*

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Доступ к буферным трубкам в кабелях со свободной укладкой волокон в средней части пролета на оптических линиях связи FTTx сетей – сравнительный анализ методов тестирования

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Аннотация

В настоящей работе представлен сравнительный анализ технологий проведения испытаний и результатов измерения затухания в волокне для двух различных методов тестирования в средней части пролета, установленных в волоконно-оптической промышленности.

Эти два стандарта различаются экстремальными значениями температуры, временем выдержки и количеством проводимых циклов. Существуют две спецификации заказчика, использующие указанные методы, в которых предусматриваются различные длины трубок и критерии допустимости уровня затухания сигналов. Первая спецификация, установленная Департаментом сельского коммунального обслуживания (Rural Utilities Service, или RUS), требует проведения не менее пяти циклов изменения температуры и использования транзитных буферных трубок длиной 20 футов. Вторая спецификация сформулирована в требованиях стандарта GR-20 компании «Телкордия» (Telcordia) для кабеля наружной прокладки и основана на проекте регламента FOTP-244 в качестве метода тестирования. Спецификация GR-20 требует использования транзитных буферных трубок длиной 14 футов, а проект спецификации FOTP-244 предусматривает два цикла с различным временем выдержки. Требования к уровню затухания в рамках двух указанных спецификаций заказчика также различны.

Цель настоящей работы состоит в оценке различий в значениях затухания в волокне при тестировании одних и тех же кабельных изделий согласно требованиям каждого из данных двух стандартов на проведение испытаний. Выполнено это будет посредством анализа данных тестирования кабелей производства компании «Драка», а также кабельных изделий других производителей. Указанные различия будут подвергнуты оценке по количеству температурных циклов, времени выдержки при разных температурах и по длине буферных трубок.

Полученные данные продемонстрируют, в какой степени каждый переменный параметр тестов влияет на результаты измерений эксплуатационных характеристик кабелей.

1. Введение

В последние годы в сетях FTTx, построенных с использованием оптических кабелей со свободной укладкой волокон в трубке, стало общепринятым иметь запас из нескольких футов транзитных буферных трубок в оптических муфтах или колонках. В точке доступа в середине волоконного пролета удаляется кабельная оболочка, а буферные трубки, навитые вокруг центрального силового элемента, раскручиваются и укладываются для хранения в контейнер или колонку. В зависимости от конкретного практического применения отдельные трубки вскрываются для сращивания либо с отводными, либо с распределительными кабелями, тогда как остальные трубки остаются невскрытыми. Невскрытые трубки

▼ **Таблица 1.** *Методы тестирования в средней части пролета согласно регламентам PE-90 и FOTP-244*

Метод тестирования	Цикл 1		Цикл 2		Цикл 3		Цикл 4		Цикл 5	
	Время выдержки (ч)		Время выдержки (ч)		Время выдержки (ч)		Время выдержки (ч)		Время выдержки (ч)	
	-40°C	70°C	-40°C	70°C	-40°C	70°C	-40°C	70°C	-40°C	70°C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Переход, при котором согласно спецификациям должны проводиться оптические измерения										

Требования к уровню затухания на длине волны 1550 нм		
	PE-90	**GR-20**
Длина транзитных буферных трубок	20 футов	14 футов
Максимальное значение роста затухания при крайних значениях температуры при проведении последнего цикла	0.1 dB	–
Среднее значение роста затухания при крайних значениях температуры при проведении последнего цикла	0.05 dB	0.15 dB
Максимальное значение роста затухания при конечной температуре в 23 ˚C	0.05 dB	–
Среднее значение роста затухания при конечной температуре в 23 ˚C	–	0.15 dB

▲ **Таблица 2.** *Сравнение требований к уровню затухания при тестировании в средней части пролета согласно регламентам PE-90 и GR-20*

Максимальное значение роста затухания (дБ) на длине волны 1550 нм и при температуре –40˚C				
PE-90 Цикл	**Кабель 1**	**Кабель 2**	**Кабель 3**	**Кабель 4**
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
Макс. значение для 20-фут. сегмента при проведении последнего цикла согласно регламенту PE-90	1.25	0.02	0.575	1.01
Макс. значение для 14-фут. сегмента при тестировании согласно регламенту FOTP-244	0.59	0.01	0.311	0.31

▲ **Таблица 3.** *Сравнительные данные тестирования в средней части пролета согласно регламенту PE-90 для 20-футового сегмента и согласно проекту регламента FOTP-244 для 14-футового сегмента при –40 ˚C*

называются «транзитными буферными трубками».

Эти трубки больше не связаны с центральным элементом кабельного сердечника и обычно дают усадку под воздействием экстремально низких температур. Усадка буферных трубок может привести к росту затухания при макроизгибах. Степень роста затухания зависит от диаметра буферной трубки, величины усадки трубки и чувствительности волокон к изгибам. Величина усадки буферных трубок может меняться в зависимости от вида материала и условий обработки. Эти процессы подробно описаны в предыдущих работах, в том числе в [5] и [6] из списка справочной литературы, приведенного в настоящей работе.

Для моделирования данного явления в условиях испытательной лаборатории в отрасли определены два разных метода тестирования в средней части пролета. Спецификация одного метода тестирования представлена Департаментом сельского коммунального обслуживания (RUS) в разделе 1755.902 части 7 Кодекса федеральных правил (PE-90) (Федеральный регистр, лист 20569, параграф (15)). Второй метод тестирования определен проектом стандарта TIA/FOTP-244, который в настоящее время рекомендован Общими требованиями GR-20-CORE (ред. 3, раздел 6.5.11) компании «Телкордия текнолоджиз». Методика тестирования согласно спецификации RUS была определена еще до составления FOTP-244.

2. Сравнительный анализ методов тестирования

Как было указано во вступительной части, существуют два метода тестирования, которые в настоящее время находятся в процессе опубликования и внедрения: метод PE-90 и метод, предлагаемый в рамках проекта регламента FOTP-244. В обоих этих методиках содержатся ссылки на регламент тестирования FOTP-3, который устанавливает перечень базисных измерений, параметры циклов изменения температуры и скорость изменения нагрузки в камере для температурных испытаний. Краткое описание двух указанных методов тестирования приводится ниже.

PE-90

Метод тестирования в средней части пролета согласно регламенту PE-90 требует выполнения пяти и более полных циклов с перепадами температур от –40˚C до +70˚C. Для всех экстремальных значений температуры и для конечной температуры в 23˚C требуемое время выдержки составляет три часа.

Перед началом термоциклирования проводится измерение параметров всех тестируемых оптических волокон при комнатной температуре и длине волны 1550 нм. Это – исходное измерение. Затем проводится измерение параметров тестируемых оптических волокон на длине волны 1550 нм в последнем цикле при крайних значениях температуры и при конечной температуре в 23 ˚C. Повышение уровня затухания рассчитывается и оценивается в сравнении с верхним пределом, установленным спецификацией. Кроме того, при конечной комнатной температуре трубки, кабели и волоконные модули должны быть осмотрены на наличие видимых повреждений.

FOTP-244

Регламент тестирования FOTP-244 требует проведения двух полных циклов и выдержки оптоволокна при конечной температуре в 23˚C. Для первого экстремального значения температуры в 70˚C регламентом установлено время выдержки, равное 14 часам. Дополнительное время выдержки должно способствовать снятию напряжений при возвратной усадке, которые могли остаться в структуре трубок в процессе обработки. Во всех остальных случаях требуемое время выдержки составляет не менее одного часа.

Перед проведением термоциклирования измеряются параметры всех тестируемых оптических волокон при комнатной температуре и длине волны 1550 нм. Это – исходное измерение. Затем проводится измерение затухания тестируемых оптических волокон на длине волны 1550 нм при крайних значениях температуры в последнем цикле и при комнатной температуре в последнем цикле. Кроме того, при конечной комнатной температуре трубки, кабели и волоконные модули должны быть осмотрены на наличие видимых повреждений. Результаты сравнительного анализа двух рассматриваемых нами методов

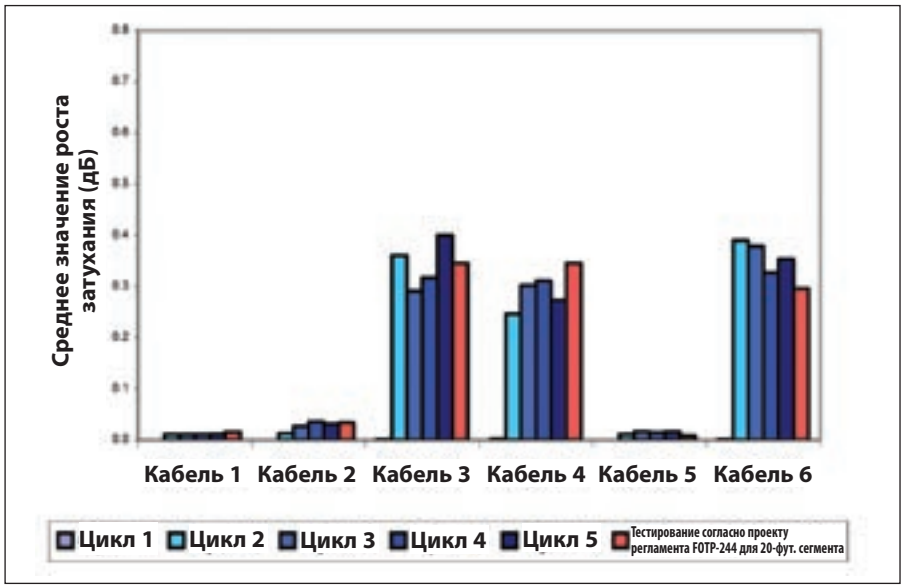
тестирования приводятся в таблице ниже.

Во время тестирования было обнаружено, что повышение уровня затухания достигало значительных величин только при экстремальных значениях температуры, равных –40˚C. Значения повышения уровня затухания при 70˚C и при конечной температуре в 23˚C были незначительными.

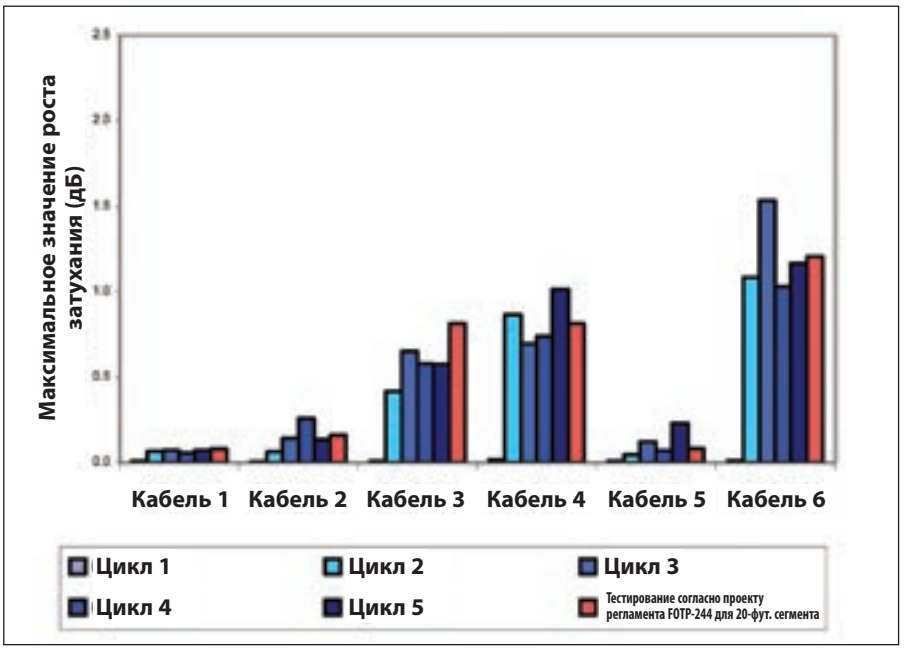
По этой причине все значения повышения уровня затухания, которые представлены в настоящей работе, были получены в ходе измерений при экстремальных значениях температуры, равных –40˚C. Тестирование волоконных жгутов проводилось в каждом кабельном образце. При этом выполнялся расчет среднего значения роста затухания, и определялась максимальная величина для каждого отдельного измерения. Именно эти значения представлены в настоящей работе.

По завершении тестирования в средней части пролета каждый образец кабеля осматривался на наличие повреждений. Никаких механических повреждений на всех образцах кабелей обнаружено не было.

▼ **Рис. 1.** *Сравнительные данные тестирования в средней части пролета согласно регламенту PE-90 для 20-футового сегмента и согласно проекту регламента FOTP-244 для 20-футового сегмента: среднее значение роста затухания*



▼ **Рис. 2.** *Сравнительные данные тестирования в средней части пролета согласно регламенту PE-90 для 20-футового сегмента и согласно проекту регламента FOTP-244 для 20-футового сегмента: максимальное значение роста затухания*



3. Сравнительный анализ критериев допустимости уровня затухания

Двум рассматриваемым методам тестирования также соответствуют два набора критериев допустимости уровня затухания. Обе спецификации представлены в нормативных документах PE-90 и GR-20. Ниже приводится краткое описание каждой спецификации.

Регламент PE-90 предусматривает следующие спецификации и критерии допустимости уровня затухания:

а) длина участка с разделанными жилами кабеля в середине пролета для монтажа одномодового волоконно-оптического кабеля со свободной укладкой волокон в трубке в волоконной колонке должна составлять 6,096 м (20 футов);

б) увеличение затухания не более чем на 0,1 дБ (на длине волны 1550 нм) в любом отдельном волокне и среднее значение увеличения затухания не более чем на 0,05 дБ (на длине волны 1550 нм) во всех волокнах при проведении последнего цикла при температурах –40˚C и 70˚C;

в) увеличение затухания не более чем на 0,05 дБ (на длине волны 1550 нм) в любом отдельном волокне при конечной температуре в 23˚C.

Спецификация GR-20 предусматривает следующее:

а) трубки со свободной укладкой волокон, хранящиеся в колонке или контейнере, должны обеспечивать запас транзитных буферных трубок в колонке или контейнере длиной не менее 14 футов;

б) среднее значение роста затухания во всех волокнах во время и после проведения последнего цикла не должно превышать 0,15 дБ на длине волны 1550 нм.

В таблице 2 представлены краткие сведения об этих тестах.

4. Сравнительные результаты тестирования согласно регламенту PE-90 и согласно регламентам GR-20 и FOTP-244

4.1 Сравнительный анализ воздействия термоциклирования при тестировании 20-футового сегмента согласно регламенту PE-90 и 14-футового сегмента согласно регламенту FOTP-244

Отмеченные в разделах 2 и 3 действующие спецификации, имеют, как указывалось, целый ряд отличий. В данном разделе проводится сравнительный анализ методов, которые определены в нормативных документах PE-90 и GR-20 (со ссылкой на регламент FOTP-244), путем сопоставления данных о потерях на затухание, полученных с использованием идентичных кабельных сегментов от разных производителей кабельной продукции. В таблице 3 дается сопоставление результатов, полученных при тестировании идентичных образцов кабеля по методу PE-90 для 20-футового сегмента и по методу FOTP-244 для 14-футового сегмента.

Четыре образца кабелей от двух разных производителей кабельной продукции были испытаны как в соответствии с методом тестирования из пяти циклов согласно регламенту PE-90, так и в соответствии с методом тестирования из двух циклов согласно регламенту FOTP-244. Как видно из таблицы 3, тестирование по методу PE-90 для 20-футового сегмента неизменно демонстрирует более значительные изменения максимального уровня затухания при –40 ˚C, чем тестирование согласно регламенту GR-20/ FOTP-244 компании «Телкордия» для 14-футового сегмента. При этом видно, что повышение уровня затухания приблизительно в два раза больше при использовании методики и спецификации PE-90. Как будет продемонстрировано в следующем разделе, такая разница в потерях на затухание обусловлена, главным образом, длиной транзитных буферных трубок.

4.2 Сравнительный анализ методов тестирования согласно регламентам PE-90 и FOTP-244

Для того чтобы лучше понять разницу между методами тестирования согласно регламентам PE-90 и FOTP-244, было проведено тестирование в средней части пролета на 20-футовом участке в соответствии с требованиями, предусмотренными каждым методом. Шесть кабелей, которые подверглись тестированию, были изготовлены тремя разными производителями. В целом, как можно видеть на рис. 1 и 2, тестирование согласно регламенту PE-90 для 20-футового сегмента и согласно проекту регламента FOTP-244 для 20-футового сегмента демонстрирует аналогичные показатели изменения затухания в волокне. На рис. 1 представлены средние значения роста затухания, а на рис. 2 – максимальные значения роста затухания. Из шести протестированных кабелей в четырех потери на затухание при тестировании согласно регламенту FOTP оказались больше, чем при выполнении 5-го цикла тестирования согласно регламенту PE-90. Несмотря на различия в результатах, полученных при использовании обеих методик тестирования, применение установленных спецификацией RUS ограничений по максимальному значению затухания в 0,1 дБ и по среднему значению затухания в 0,05 дБ в общем случае приводит к тому, что кабели различных типов либо отвечают, либо не отвечают требованиям, вне зависимости от метода тестирования.

5. Влияние количества выполняемых циклов

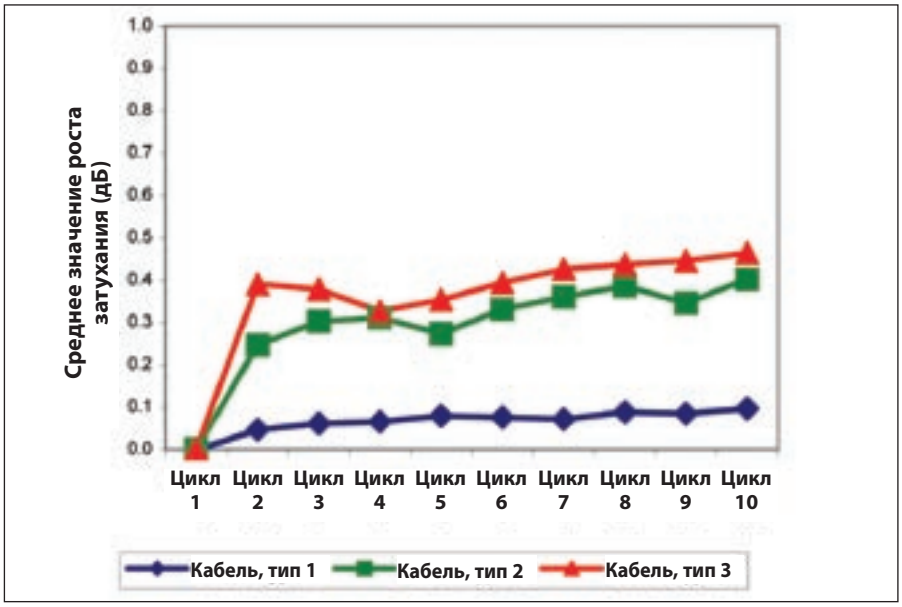
5.1 Количество циклов и максимальные значения затухания

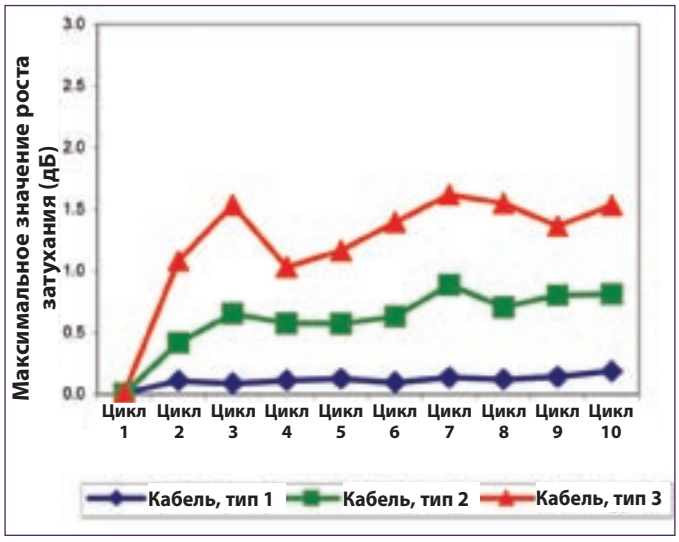
При тестировании согласно регламенту PE-90 требуется проведение замеров и оценка показателей последнего из не менее, чем пяти циклов. Как можно видеть по результатам многоциклового тестирования согласно регламенту PE-90, которые представлены на рис. 1 и 2, наибольшее повышение уровня затухания необязательно отмечается в пятом цикле и может иметь место в любом интервале между вторым и пятым циклами. На рис. 1 и 2 видно, что в трех из шести протестированных кабелей наибольшее повышение уровня затухания отмечено в интервале между вторым и четвертым циклами, а не в пятом цикле. Если замерять показатели только в последнем цикле, то повышение уровня затухания, которое может иметь место на линии в условиях эксплуатации во время одного или двух сезонных перепадов температуры, во время тестирования может оказаться незарегистрированным.

5.2 Влияние увеличения количества циклов

Для того чтобы лучше понять влияние цикличного изменения температуры на потери на затухание при тестировании в средней части пролета, три кабеля были испытаны в соответствии со стандартом PE-90. Испытания этих трех кабелей проводились с выполнением пяти дополнительных циклов изменения температуры в диапазоне крайних значений, то есть всего было выполнено десять циклов. Результирующие диаграммы затухания в волокне по десяти циклам представлены на рис. 3 и 4. На рис. 3 представлены средние значения роста затухания для каждого из десяти циклов при крайнем значении температуры, составляющем –40˚C, а на рис. 4 – максимальные значения роста затухания для каждого цикла при –40˚C. Важно отметить, что действующие требования PE-90 предусматривают выполнение «не менее пяти циклов». Благодаря этому остается возможность выполнения дополнительных циклов и оценки показателей согласно спецификации только для последнего цикла. На представленной на рис. 4 диаграмме видно, что потери на затухание в волокне при выполнении дополнительных циклов иногда могут незначительно снижаться.

▼ **Рис. 3.** *Тестирование в средней части пролета согласно регламенту PE-90 для 20-футового сегмента с выполнением пяти дополнительных циклов: среднее значение роста затухания*





▲ **Рис. 4.** *Тестирование в средней части пролета согласно регламенту PE-90 для 20-футового сегмента с выполнением пяти дополнительных циклов: максимальное значение роста затухания*

▲ **Рис. 5**. *Изменение уровня затухания в оптических волокнах с высоким и средним коэффициентами MAC*

6. Влияние коэффициента MAC в оптическом волокне

Коэффициент MAC оптического волокна в значительной мере влияет на величину изменения уровня затухания при проведении тестирования в средней части пролета. Коэффициент MAC оптического волокна определяется как отношение диаметра модового поля волокна, измеренного на длине волны 1550 нм, к длине волны отсечки. Данная величина является показателем, характеризующим чувствительность волокна к макроизгибам. На рис. 5 представлены результаты измерений затухания в отдельных волокнах в многоволоконных буферных трубках и многожильных кабелях при проведении тестирования в средней части пролета. Каждая трубка содержала три оптических волокна с высоким коэффициентом MAC, три оптических волокна со средним коэффициентом MAC и шесть вторичных волокон для заполнения пространства трубок до максимальной емкости, составляющей двенадцать волокон. Изучение максимальных и средних значений, а также разницы между параметрами каждого из представленных типов волокна (рис. 5) свидетельствует о том, что волокна с более высоким коэффициентом MAC демонстрируют неудовлетворительные характеристики в ходе тестирования в средней части пролета при низких температурах; поэтому при определении технических условий на кабельную конструкцию необходимо учитывать использование оптических волокон с высоким коэффициентом MAC.

7. Выводы

Продемонстрировано, что длина транзитной буферной трубки, используемой при тестировании в точке доступа в средней зоне волоконного пролета, влияет на величину затухания в значительно большей степени, чем различия в методах тестирования согласно регламентам PE-90 и FOTP-244. К испытаниям 20-футового сегмента неизменно предъявляются более жесткие требования, чем к испытаниям 14-футового сегмента. Продемонстрировано также, что при тестировании 20-футовых транзитных буферных трубок в средней части пролета показатели потерь при использовании обеих методик оказались аналогичными. В целом, идентичные образцы кабеля либо отвечают, либо не отвечают требованиям, вне зависимости от метода тестирования.

В случае если для тестирования в средней части пролета определено проведение нескольких циклов, потери на затухание могут не достигать максимальных значений в последнем цикле, когда выполняются обязательные замеры. С увеличением количества циклов наблюдается общая тенденция к повышению уровня затухания, при этом затухание не обязательно возрастает с каждым циклом. Подтверждено, что коэффициент MAC оптического волокна существенным образом влияет на потери на затухание при тестировании в средней части пролета. При определении технических условий на кабельную конструкцию важное значение имеет оценка параметров оптических волокон с более высоким коэффициентом MAC, так как, если этого не учитывать, то результаты могут представляться более высокими, чем при самом неблагоприятном сценарии. ■

8. Справочная литература

[1] Rural Utilities Service (RUS) 7 CRF Part 1755.902 (PE-90) Federal Register

[2] Telcordia Technologies generic requirements GR-20-CORE issue 3

[3] TIA-455-244/FOTP-244 draft "Methods for measuring the change in transmittance of optical fibres in expressed buffer tubes when subjected to temperature cycling"

[4] TIA-455-3B/FOTP-3 "Procedure to measure temperature cycling effects on optical fibre units, optical cable, and other passive fibre components"

[5] Ray Lovie, "Loose buffer tube construction for mid-span access" IWCS (2007)

[6] Ray Lovie and Bob Overton, "Reliability considerations for mid-span access points in FTTH optical fibre systems: cable termination and expressed buffer tube storage" IWCS (2008)

Настоящая работа была впервые представлена на 58-ой Конференции Международного симпозиума IWCS по кабельно-проводниковой продукции и системам связи, состоявшейся в г. Шарлотте (шт. Северная Каролина) с 8 по 11 ноября 2009 года, и перепечатывается с любезного разрешения организаторов.

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Vente de AlphaGary pour un montant de 300 millions de dollars américains

ROCKWOOD Holdings a conclu la vente de son groupe de composés plastiques AlphaGary à Mexichem SAB de CV pour un montant de 300 millions de dollars américains.

L'accord de vente, annoncé le 17 décembre dernier, doit être finalisé le premier trimestre 2011.

Dans ses opérations de rachat, Mexichem, principal producteur mexicain de tubes en PVC, résines et composés en vinyle va dépenser plus de 800 millions de dollars américains pendant trois ans.

AlphaGary, principale division de Rockwood dans le secteur des composés pour applications spécifiques, a enregistré l'an dernier un volume de ventes de 231 millions de dollars américains.

La société basée dans le Massachussets est spécialisée dans le développement de composés de haute technologie pour des applications dans les segments de marché spécifiques. Sa gamme de composés comprend des alliages de PVC flexible et sans halogènes, élastomères thermoplastiques à base de styrène, vinyle et oléfines, alliages de nylon, mélanges de polyuréthane et polyéthylène réticulé.

La société compte quatre installations aux États-Unis, au Royaume-Uni et au Canada. "Il y a plusieurs années la société AlphaGary était considérée comme une activité secondaire," a déclaré Timothy McKenna, vice-président des relations avec les investisseurs de Rockwood. "Je crois qu'il s'agit d'un bon accord pour les deux parties".

Seifi Ghasemi, président et directeur général de Rockwood, a déclaré: "La conclusion de la vente de cette entreprise représente un pas supplémentaire vers la concentration de notre portefeuille de produits dans des activités de produits chimiques pour des applications spécifiques et de matériaux avancés de marge élevée".

Mexichem, spécialisé dans la production d'une ample gamme de produits chimiques dans plus de 40 installations en Amérique Latine, aux États-Unis, au Japon et à Taiwan, a déclaré un chiffre d'affaires d'environ 2,17 milliards de dollars américains pendant les trois premiers trimestres 2010.

"Ce rachat nous permet d'associer les potentialités de recherche et de développement et les produits innovants de AlphaGary avec la diversification géographique de Mexichem, en générant ainsi des synergies importantes", a publié la société dans la bourse de la capitale du Mexique.

L'accord, en phase d'impression du présent article, était encore dans l'attente d'être approuvé par les autorités anti-trust.

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Commande coréenne pour Zumbach

La société Zumbach Electronics s'est adjugée un contrat avec la société coréenne Posco Pohang pour la fourniture de 10 systèmes Steelmaster pour la mesure de diamètres et de profils.

Ces nouveaux systèmes de mesure remplaceront partiellement les jauges existant déjà ou complèteront les points non encore équipés des lignes de finissage de ses installations de laminage pour fil machine 1, 2 et 3.

Les jauges sont équipées de 6 scanneurs à laser haute vitesse ODAC (en 6 axes) conçus pour fournir 6 000 mesures calibrées par seconde, et avec un équipement matériel et un logiciel de pointe. Les systèmes seront totalement intégrés au moyen d'Ethernet dans le système de contrôle de qualité et du flux des matériaux de Posco.

Les jauges présentent une structure extrêmement compacte et n'exigent presque aucun entretien.

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Application de l'expérience de Stolberger

LES analyses de marché actuelles montrent que la demande de conducteurs compacts en aluminium et en cuivre est en croissance constante, spécialement avec des sections de dimensions supérieures arrivant jusqu'à 1 000mm^2.

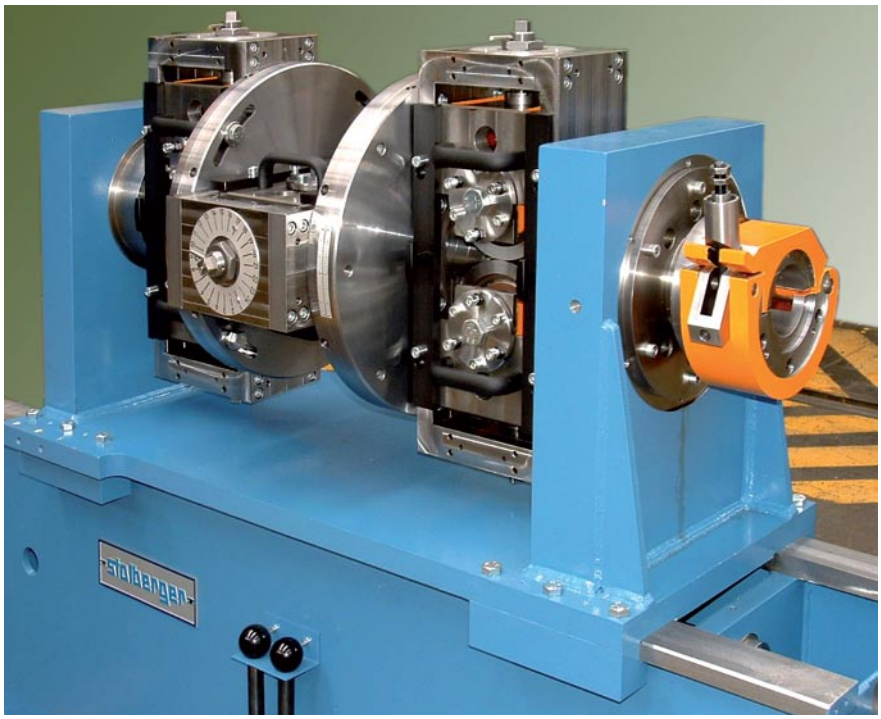
Le compactage des conducteurs, conformément aux normes internationales et selon les spécifications de qualité correspondantes, exige une majeure expérience dans l'amélioration des processus correspondants.

Stolberger KMB-Maschinenfabrik a développé et réalisé des compacteurs stables pendant des décennies. Ces machines, connues comme compacteurs de rouleaux fous, sont équipées de 2, 3 ou 4 paires de rouleaux pour compacter les conducteurs circulaires, dont 1 ou 2 paires de rouleaux sont utilisées pour la production de conducteurs sectoriels droits ou "pre-spiralled".

Les compacteurs de type combiné, avec un équipement arrivant même à quatre paires de rouleaux, peuvent être utilisés pour produire des conducteurs sectoriels circulaires ou droits comme également les conducteurs sectoriels "pre-spiralled".

Des équipements complets sont disponibles pour le compactage de conducteurs circulaires jusqu'à 1 000mm^2 et des conducteurs sectoriels pour les conducteurs Milliken jusqu'à 2400mm^2.

Les rouleaux compacteurs installés sont réalisés en acier trempé pour garantir une vie utile supérieure à la moyenne. Les caractéristiques d'utilisation facile et de manutention rapide déterminent le rendement de ces compacteurs.



▲ *Croissance continue de la demande de Stolberger*

Indépendamment de cela, les exigences essentielles pour une utilisation à haut rendement comprennent généralement la détermination de la structure la plus adéquate pour un conducteur spécifique ainsi que les valeurs requises pour les sections des rouleaux et les dimensions des filières de tréfilage.

L'expérience de Stolberger comprend les données nécessaires à la réalisation d'un compactage conforme aux normes internationales telles que:

- nombre et diamètre des fils
- rouleaux compacteurs de section adéquate, y compris les applications d'autres marques
- informations concernant le diamètre des filières de tréfilage et
- tous les calculs de base

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Nouveau rôle pour Niina Saarto

Niina Saarto a assumé le nouveau rôle de trésorier du groupe auprès de Componenta, à partir du 1er février.

Saarto a commencé son activité en tant que responsable de la trésorerie de Componenta en février 2010 et précédemment il exerçait la fonction de trésorier du groupe chez EM Group Oy.

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Vente d'actions de Tyco pour un montant de 720 millions de dollars

Tyco International a cédé sa quote-part de 51% des actions de son activité de produits électriques et métalliques à la société de fonds de capitaux propres Clayton, Dubillier & Rice LLC pour un montant de 720 millions de dollars américains.

La société opèrera en tant qu'unité indépendante sous le nom de Atkore International. L'activité principale de la société comprend la conception, la fabrication et la vente de tubes en acier galvanisé, canalisations électriques, fils et câbles armés, armures métalliques et éléments de construction destinés à une vaste gamme d'applications pour le secteur du bâtiment, électrique, de la protection contre les incendies, de la sécurité et mécanique.

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Accès en plein câble dans le tube de protection (*buffer*) de câbles FTTx du type à structure libre – une comparaison des méthodes d'essai

Par Denise L Matthews, Draka Communications, Claremont, NC

Résumé

Cet article présente une comparaison de procédures d'essais et des résultats de l'atténuation dans les fibres entre deux méthodes d'essai en plein câble définis par le secteur industriel des câbles à fibres optiques. Les deux normes diffèrent en termes de valeurs maximales et minimales de température, de temps de maintien à température et de nombre de cycles. Il existe deux spécifications des clients qui utilisent ces méthodes différentes avec des longueurs de tubes et des critères d'acceptation de l'atténuation.

Une spécification définie par le Département de l'Agriculture des États-Unis RUS (Rural Utilities Service) exige au moins cinq cycles de température et 20 pieds de tube de protection (*buffer tube*) intact («*expressed*»).

L'autre spécification est contenue dans les exigences GR-20 de Telcordia concernant les câbles pour installation extérieure et se réfère à l'étude préliminaire FOTP-244 pour la méthode d'essai. La spécification GR-20 exige 14 pieds de tube de protection «*expressed*» alors que l'étude préliminaire FOTP-244 prévoit deux cycles avec des temps de maintien à température différents.

Les conditions requises concernant l'atténuation pour ces deux spécifications du client sont également différentes.

Le présent article a pour but d'évaluer les différences d'atténuation des fibres dans l'essai des mêmes câbles conformément à ces deux spécifications d'essai. Cela sera réalisé en analysant les données résultant des essais de câbles de Draka et d'autres fabricants de câbles. Ces différences seront évaluées par rapport au nombre de cycles, aux temps de maintien à température et à la longueur du tube de protection. Les données ainsi obtenues mettront en évidence comme chaque variable de l'essai influence les résultats des performances des câbles.

1 Introduction

Au cours des dernières années il est devenu de plus en plus commun de stocker les tubes «*expressed*» dans des boîtiers d'épissures ou des piédestaux dans les applications FTTx utilisant les câbles à structure libre. Dans un point d'accès en plein câble, la gaine du câble est retirée et les tubes sont séparés de l'armature centrale et stockés dans un boîtier/piédestal.

En fonction de l'application, certains tubes seront ouverts pour effectuer l'épissurage à des câbles-souches ou à des câbles de distribution, alors que les autres tubes seront laissés fermés. Les tubes non-ouverts seront indiqués comme tubes intacts ("*expressed*)". Ces tubes ne sont plus couplés à l'armature centrale du noyau du câble et ils sont généralement sujets à retrait lorsqu'ils sont exposés à des températures extrêmement basses. Le retrait des tubes de protection peut entraîner des augmentations de l'atténuation due aux macrocourbures.

Le taux d'augmentation dépend des dimensions du tube, du degré de retrait du tube de protection et de la sensibilité à la courbure de la fibre. Le degré du retrait du tube de protection peut varier en fonction du type de matériau et des conditions de processus.

Ces mécanismes ont été décrits en détail dans les articles précédents comme ceux inclus comme références[5] et [6] de la section des références du présent article.

Pour simuler le phénomène dans un laboratoire d'essai, le secteur industriel a défini deux différentes méthodes d'essai du point d'accès en plein câble.

Une méthode d'essai est spécifiée dans le Registre Fédéral du Département de l'Agriculture des Etats-Unis RUS, 7 CRF Partie 1755.902 (PE-90), page 20569 section (15).

L'autre méthode d'essai est l'étude préliminaire TIA/FOTP-244 à laquelle font référence les Exigences Génériques de Telcordia Technologies GR-20-CORE numéro 3 section 6.5.11. La méthode RUS a été définie avant la rédaction du document FOTP-244.

▼ **Tableau 1**: *Méthodes d'essai PE-90 et FOTP-244 réalisées en plein câble*

Méthode d'essai	Cycle 1		Cycle 2		Cycle 3		Cycle 4		Cycle 5	
	Temps de maintien à température (heures)		Temps de maintien à température (heures)		Temps de maintien à température (heures)		Temps de maintien à température (heures)		Temps de maintien à température (heures	
	-40˚C	70˚C	-40˚C	70˚C	-40˚C	70ºC	-40˚C	70˚C	-40˚C	70˚C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Jonction où les spécifications exigent des mesures optiques										

Exigences d'atténuation à 1550nm	PE-90	GR-20
Longueur du tube «*expressed*»	20 Pieds	14 Pieds
Augmentation maximale de l'atténuation aux dernières valeurs extrêmes de température	0.1 dB	-
Augmentation moyenne de l'atténuation aux dernières valeurs extrêmes de température	0.05 dB	0.15 dB
Augmentation maximale de l'atténuation à la température finale de 23°C	0.05 dB	-
Augmentation moyenne de l'atténuation à la température finale de 23°C	-	0.15 dB

▲ **Tableau 2**: *Comparaison des exigences d'atténuation des essais PE-90 et GR-20 en plein câble*

Augmentation maximale d'atténuation (dB) à 1550nm et –40°C				
PE-90 Cycle	**Câble 1**	**Câble 2**	**Câble 3**	**Câble 4**
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
PE-90 (20 pieds de tube)– valeur maximale du cycle final	1.25	0.02	0.575	1.01
FOTP-244 (14 pieds de tube) valeur maximale	0.59	0.01	0.311	0.31

▲ **Tableau 3**: *Comparaison de l'essai en plein câble à –40°C entre PE-90 (20 pieds de tube) et l'étude préliminaire FOTP-244 (14 pieds de tube)*

2 Comparaison des méthodes d'essai

Comme déjà expliqué dans l'introduction, actuellement il existe deux méthodes d'essai dans l'attente d'être publiées et appliquées: la méthode PE-90 et la méthode de l'étude préliminaire FOTP-244. Ces deux méthodes se réfèrent à la méthode d'essai FOTP-3 qui précise la mesure de base, la définition du cycle et la vitesse de la rampe de la chambre. Les deux méthodes d'essai sont décrites ci-après.

PE-90

La méthode d'essai PE-90 en plein câble exige cinq ou plus cycles complets avec des valeurs extrêmes de température de –40°C et 70°C ainsi que des temps de maintien à température de trois heures pour les valeurs extrêmes de température et pour la température finale de 23°C.

Les fibres soumises à l'essai doivent être mesurées à température ambiante, à la longueur d'onde de 1550nm avant d'être soumises à l'essai de variation cyclique de la température. Celle-ci est la mesure de référence. Les fibres sont ensuite mesurées à la longueur d'onde de 1550nm dans le dernier cycle aux valeurs extrêmes de température et à la température finale de 23°C. Les augmentations d'atténuation sont calculées et évaluées par rapport à une limite de spécification supérieure. En outre, les tubes, le câble et les ensembles doivent être contrôlés à la température ambiante finale pour vérifier visuellement la présence éventuelle de dommages.

FOTP-244

La méthode d'essai FOTP-244 exige deux cycles complets et un temps de maintien à la température finale de 23°C. Cette méthode exige également 14 heures de maintien pour la première valeur extrême de température de 70°C. Ce temps de maintien prolongé a pour but de faciliter la relaxation des tensions générées par la contraction pouvant être restées dans les tubes durant le processus. Les autres temps de maintien doivent durer une heure minimum.

Les fibres de l'essai sont mesurées à la température ambiante, à la longueur d'onde de 1550nm avant l'essai de variation cyclique de la température. Celle-ci est la mesure de référence. Les valeurs d'atténuation des fibres d'essai sont donc mesurées à la longueur d'onde de 1550nm aux valeurs extrêmes de température du dernier cycle et à la fin de l'essai, à la température ambiante. Les tubes, le câble et les ensembles doivent également être contrôlés à la température ambiante finale pour vérifier visuellement la présence éventuelle de dommages. Le tableau suivant illustre une comparaison des deux méthodes d'essai. Au cours de l'essai il a été démontré que les seules augmentations d'atténuation significatives ont eu lieu à la température minimale de –40°C. Les augmentations d'atténuation à 70°C et à la température finale de 23°C n'étaient pas importantes. Pour cette raison, les augmentations d'atténuation examinées dans cet article sont mesurées à la température minimale de –40°C.

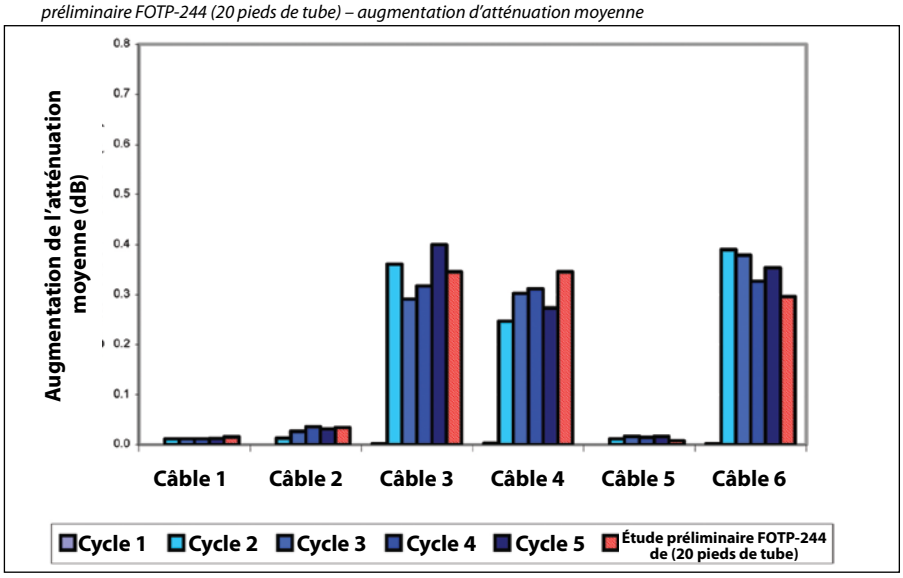
Plusieurs fibres ont été essayées dans chaque échantillon de câble. On a calculé l'augmentation d'atténuation moyenne et on a identifié la mesure individuelle maximale. Ces valeurs sont reportées dans le présent article. À la fin de l'essai en plein câble, pour chaque échantillon de câble on à vérifié la présence éventuelle de dommages. Aucun dommage physique n'a été relevé sur aucun échantillon de câble.

3 Comparaison des critères d'acceptation

Il existe également deux séries de critères d'acceptation associés à ces deux méthodes d'essai. Ces deux spécifications sont incluses dans le document PE-90 et dans le document GR-20. Chaque spécification est illustrée ci-après. La spécification PE-90 et les critères d'acceptation sont les suivants:

a) L'ouverture en plein câble pour l'installation de câbles optiques monomodaux du type à structure libre en piédestal doit être égale à 6 096m (20 pieds)

▼ **Figure 1**: *Comparaison entre les essais en plein câble selon la méthode PE-90 (20 pieds de tube) et l'étude préliminaire FOTP-244 (20 pieds de tube) – augmentation d'atténuation moyenne*



b) Augmentation d'atténuation non supérieure à 0,1dB (à 1550nm) sur chaque fibre individuelle et augmentation d'atténuation moyenne non supérieure à 0,05dB (à 1550nm) sur la totalité des fibres, durant le dernier cycle à –40°C et 70°C
c) Augmentation d'atténuation non supérieure à 0,05dB (à 1550nm) sur chaque fibre individuelle et à la température finale de 23°C

La spécification GR-20 est la suivante:
a) Les tubes à structure libre stockés dans un piédestal ou dans un boîtier doivent contenir un tube de protection «*expressed*» d'au moins 14 pieds, stocké dans un piédestal ou dans un boîtier.
b) Augmentation d'atténuation non supérieure à 0,15dB à 1550nm sur la totalité des fibres, durant et après le dernier cycle

Le *Tableau 2* illustre ces essais.

4 Comparaison entre les résultats des essais PE-90, GR-20 et FOTP-244

4.1 *Comparaison entre la partie exposée de tube de l'essai PE-90 (20 pieds) et la partie exposée de tube de l'essai FOTP-244 (14 pieds)*

Ainsi que nous l'avons remarqué précédemment, les spécifications en vigueur illustrées dans les sections 2 et 3 présentent de nombreuses différences entre elles. Cette section propose une comparaison des méthodes précisées dans les documents PE-90 et GR-20 (faisant référence au document FOTP-244) en comparant la perte d'atténuation résultante en utilisant des segments de câble identiques de différents fabricants de câbles.

Le *Tableau 3* présente une comparaison des résultats obtenus de l'essai d'échantillons de câble identiques conformément à la méthode PE-90 exigeant 20 pieds de tube et à la méthode FOTP-244 exigeant 14 pieds de tube.

Quatre échantillons de câbles fabriqués par deux producteurs de câbles différents ont été soumis à l'essai conformément à la méthode d'essai PE-90 à cinq cycles et à la méthode d'essai FOTP-244 à deux cycles. Comme l'on peut remarquer au *Tableau 3*, l'essai PE-90 (20 pieds) présente constamment des variations d'atténuation maximales à –40°C supérieures à celles résultant de l'essai de GR-20/FOTP-244 (14 pieds de tube) de Telcordia.

L'augmentation d'atténuation est de l'ordre de deux fois supérieure pour la méthode et la spécification PE-90. Comme il sera expliqué dans la section successive, le facteur de contribution majeure à cette différence de perte d'atténuation est représenté par la longueur du tube «*expressed*».

4.2 *Méthode PE-90 comparé avec la méthode FOTP-244*

Pour une meilleure compréhension de la différence entre les méthodes d'essai PE-90 et FOTP-244, un essai en plein câble avec 20 pieds de tube a été effectué sur six câbles différents, conformément à chaque méthode d'essai. Les six câbles étaient fabriqués par trois différents producteurs de câbles. Comme représenté aux *Figures 1* et *2*, généralement la méthode d'essai PE-90 avec 20 pieds de tube et la méthode FOTP-244 avec de 20 pieds de tube entraînent des variations d'atténuation de la fibre similaires.

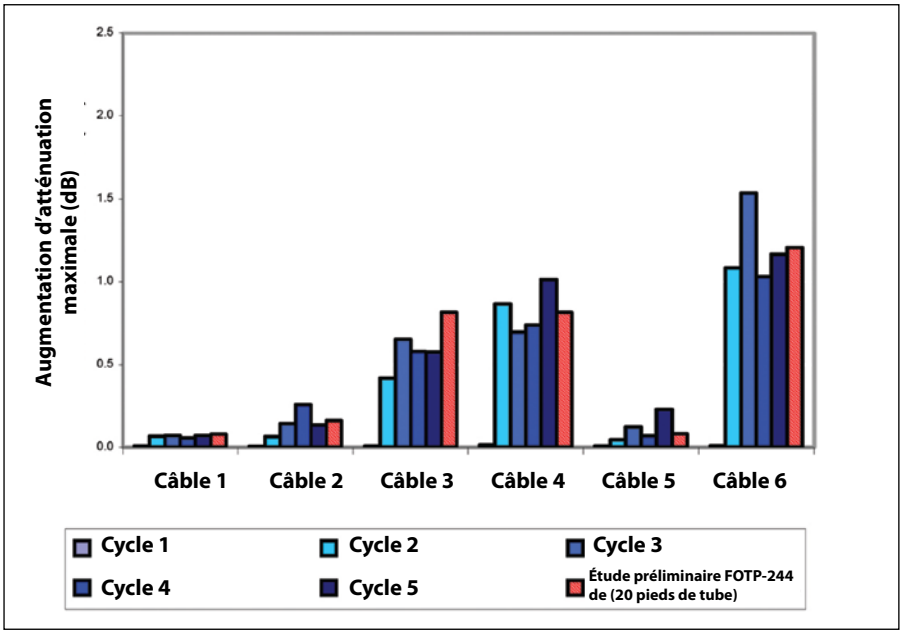
La *Figure 1* met en évidence les augmentations d'atténuation moyenne et la *Figure 2* les augmentations d'atténuation maximales. Des six câbles essayés, quatre ont présenté une perte d'atténuation supérieure avec la méthode d'essai FOTP durant le cinquième cycle de la méthode PE-90. En général, si d'un côté il y a une variation des résultats en utilisant les deux méthodes, lorsqu'on applique la limite RUS maximale de 0,1dB et moyenne de 0,05dB, les types de câble présentent des résultats positifs ou négatifs indépendamment de la méthode utilisée.

5 Effet du nombre des cycles

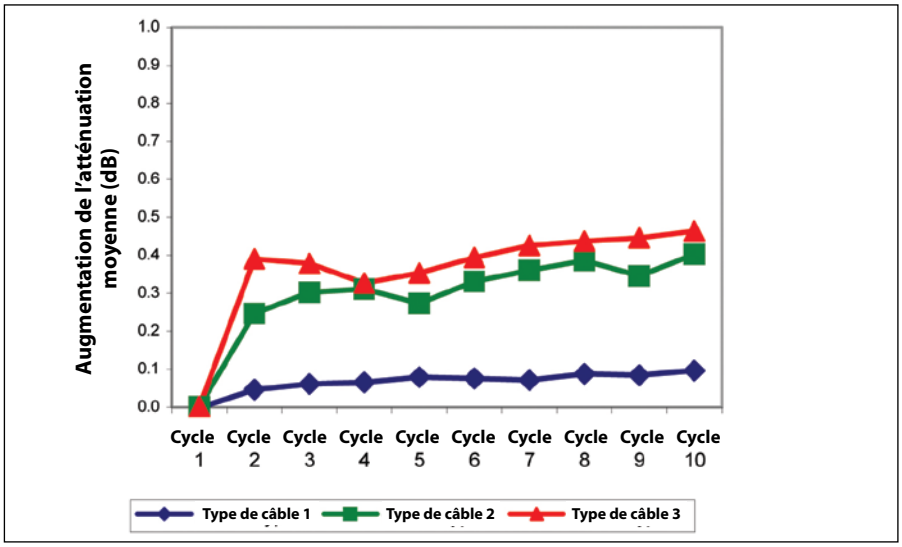
5.1 *Cycles et crêtes d'atténuation maximales*

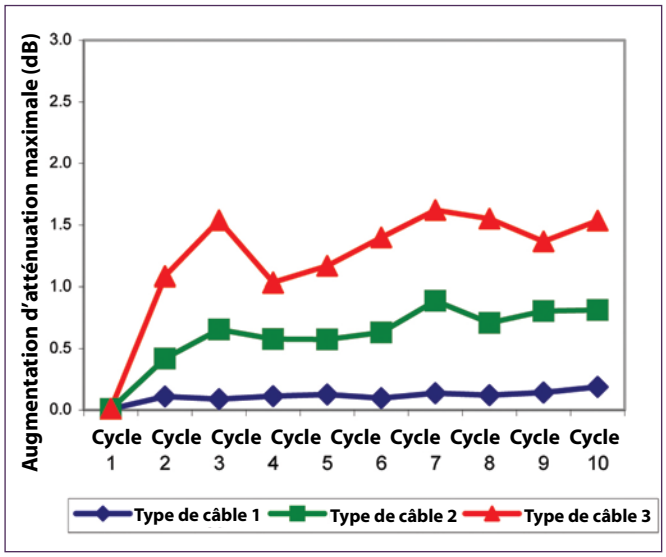
L'essai PE-90 prévoit la mesure et l'évaluation du dernier d'au moins cinq cycles. Come l'on peut remarquer à partir des données de l'essai PE-90 à cycles multiples dans les *Figures 1* et *2*, les augmentations d'atténuation majeures n'on pas nécessairement lieu durant le cinquième cycle et peuvent se produire à tout moment du 2ème au 5ème cycle. Dans les *Figures 1* et *2*, trois des six câbles essayés présentent des augmentations d'atténuation

▼ **Figure 2**: *Comparaison entre les essais en plein câble selon la méthode PE-90 (20 pieds) et l'étude préliminaire FOTP-244 (20 pieds) – augmentation d'atténuation maximale*

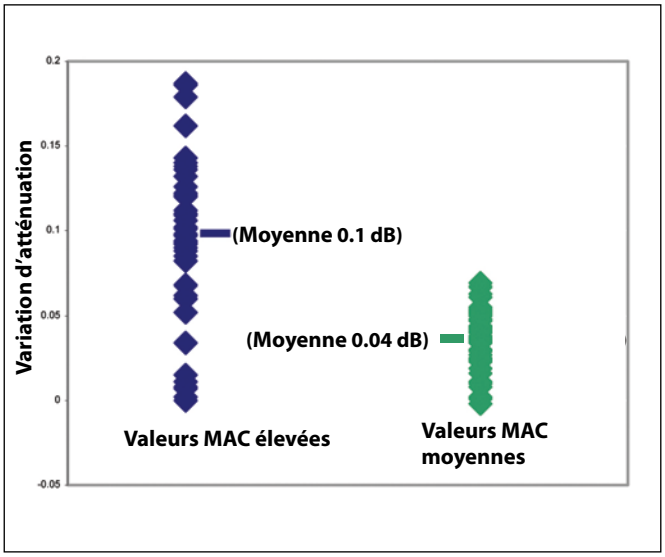


▼ **Figure 3**: *Essai en plein câble PE-90 (20 pieds de tube) avec 5 cycles additionnels – augmentation d'atténuation moyenne*





▲ **Figure 4**: *Essai en plein câble PE-90 (20 pieds de tube) avec 5 cycles additionnels – augmentation d'atténuation maximale*



▲ **Figure 5**: *Variation d'atténuation en fibres avec des valeurs MAC élevées et moyennes*

entre le deuxième et le quatrième cycle, pas pendant le cinquième cycle. En effectuant les mesures seulement dans le dernier cycle, les augmentations d'atténuation pouvant se produire dans le champ durant le premier ou les deux premières valeurs extrêmes de température saisonnières peuvent être ratées durant l'essai.

5.2 Effet de l'augmentation du nombre de cycles

Pour une meilleure compréhension de l'effet des cycles de température de l'essai en plein câble sur les pertes d'atténuation, trois câbles ont été essayés selon la norme PE-90. Ces trois câbles ont été essayés avec cinq cycles de température additionnels, pour un total de dix cycles.

Les tendances de l'atténuation de la fibre en résultant pour les dix cycles sont représentées aux *Figures 3* et *4*. La *Figure 3* illustre les augmentations d'atténuation moyennes pour chacun des dix cycles à la température extrême de –40°C et la Figure 4 illustre des augmentations d'atténuation maximales pour chaque cycle à –40°C. Il faut remarquer que l'exigence courante de la norme PE-90 spécifie "au moins cinq cycles". Cela permet d'effectuer des cycles additionnels et seulement le dernier des cycles doit être évalué par rapport à la spécification. Les diagrammes de la *Figure 4* soulignent que la perte d'atténuation de la fibre peut parfois améliorer légèrement avec des cycles additionnels.

6 L'effet des valeurs MAC de la fibre

La valeur MAC d'une fibre influence considérablement le degré de variation d'atténuation dans un essai en plein câble. Le nombre MAC d'une fibre est défini comme son diamètre du champ modal mesuré à 1550nm divisé par la longueur d'onde de coupure correspondante. Cette valeur est un indicateur d'une sensibilité aux macrocourbures de la fibre. La *Figure 5* présente les mesures d'atténuation de la fibre individuelle dans des tubes et des câbles différents pour l'essai en plein câble. Chaque tube essayé contenait trois fibres avec des valeurs MAC élevées, trois valeurs MAC moyennes et six fibres de rebut pour couvrir la capacité maximale des tubes.

En examinant les valeurs maximales, moyennes et la moyenne de ces dernières pour chaque type de fibre (*Figure 5*), l'on peut remarquer que les fibres avec des valeurs MAC supérieures, ont donné de faibles performances dans les essais en plein câble à de basses températures; par conséquent les fibres avec des valeurs MAC élevées doivent être prises en considération lors de la classification d'une structure de câble.

7 Conclusion

Il a été démontré que la longueur du tube intact ("*expressed*") dans les essais d'accès en plein câble a une influence supérieure sur l'atténuation par rapport à la différence des méthodes d'essai PE-90 et FOTP-244. La spécification de l'essai exigeant 20 pieds de tube de protection "*expressed*" est donc décidément plus rigoureuse par rapport à la spécification concernant l'essai de 14 pieds. Il a été également démontré, lorsqu'on effectue l'essai en plein câble de 20 pieds d'un tube "*expressed*", que les pertes entre les deux méthodes sont similaires. Généralement, les échantillons de câbles identiques mettent en évidence des résultats positifs ou négatifs indépendamment de la méthode utilisée.

Lorsque les cycles multiples sont définis dans un essai en plein câble, il est possible que les pertes d'atténuation les plus importantes ne se produisent pas durant le dernier cycle, où sont effectuées les mesures obligatoires.

Il y a une tendance générale vers l'augmentation d'atténuation avec l'augmentation des cycles, mais l'augmentation n'a pas lieu nécessairement à chaque cycle.

Il a été démontré que les valeurs MAC de la fibre influencent de façon significative la perte d'atténuation dans l'essai en plein câble. Il est important d'évaluer les fibres avec les valeurs MAC les plus élevées lorsqu'on classifie une structure de câbles puisque autrement les résultats pourraient apparaître meilleurs que dans le pire scénario. ■

8 Références bibliographiques

[1] Rural Utilities Service (RUS) 7 CRF Part 1755.902 (PE-90) Federal Register

[2] Telcordia Technologies generic requirements GR-20-CORE issue 3

[3] TIA-455-244/FOTP-244 draft "Methods for measuring the change in transmittance of optical fibres in expressed buffer tubes when subjected to temperature cycling"

[4] TIA-455-3B/FOTP-3 "Procedure to measure temperature cycling effects on optical fibre units, optical cable, and other passive fibre components"

[5] Ray Lovie, "Loose buffer tube construction for mid-span access" IWCS (2007)

[6] Ray Lovie and Bob Overton, "Reliability considerations for mid-span access points in FTTH optical fibre systems: cable termination and expressed buffer tube storage" IWCS (2008)

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Vendita di AlphaGary per 300 milioni di dollari

ROCKWOOD Holdings ha concluso la vendita del proprio gruppo di composti plastici AlphaGary a Mexichem SAB de CV per 300 milioni di dollari.

L'accordo di vendita, annunciato il 17 dicembre scorso, deve essere finalizzato nel primo trimestre del 2011.

Pare che nelle sue operazioni di acquisizione, Mexichem, il maggiore produttore messicano di tubi in PVC, resine e composti in vinile, spenderà oltre 800 milioni di dollari nell'arco di tre anni.

AlphaGary, principale divisione di Rockwood nel settore dei composti per applicazioni speciali, lo scorso anno ha registrato un volume di vendite di 231 milioni di dollari.

La società con sede nel Massachussets è specializzata nello sviluppo di composti di alta tecnologia per applicazioni in nicchie di mercato. La sua gamma di composti comprende leghe di PVC flessibile e senza alogeni, elastomeri termoplastici a base di stirene, vinile e olefine, leghe di nylon, miscele di poliuretano e polietilene reticolato.

La società conta quattro impianti negli Stati Uniti, nel Regno Unito e nel Canada.

"Già da vari anni AlphaGary risultava essere un'attività secondaria," ha dichiarato Timothy McKenna, vice presidente dei rapporti con gli investitori di Rockwood. "Penso che questo sia un buon accordo per entrambe le parti".

Seifi Ghasemi, presidente e direttore generale di Rockwood, ha dichiarato: "La conclusione della vendita di questa azienda di composti rappresenta un ulteriore passo verso la concentrazione del nostro portafoglio di prodotti in attività di alto margine, prodotti chimici per applicazioni speciali e materiali avanzati."

Mexichem, specializzata nella produzione di un'ampia gamma di prodotti chimici in oltre 40 impianti nell'America Latina, negli Stati Uniti, nel Regno Unito, nel Giappone e a Taiwan, ha dichiarato un fatturato netto di circa 2,17 miliardi di dollari nei primi tre trimestri del 2010.

"Questa acquisizione ci consente di combinare le potenzialità di ricerca e sviluppo ed i prodotti innovativi di AlphaGary con la diversificazione geografica di Mexichem, creando così importanti sinergie", ha pubblicato la società nella borsa di Città del Messico.

In fase di stampa del presente articolo, l'accordo era ancora in attesa di essere approvato dalle autorità antitrust.

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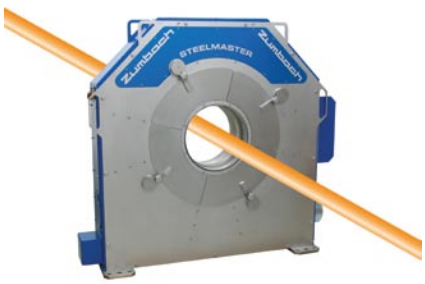
Ordine coreano a Zumbach

La società Zumbach Electronics si è aggiudicata un contratto con la società coreana Posco Pohang per la fornitura di 10 sistemi Steelmaster per la misurazione di diametri e profili.

Questi nuovi sistemi di misurazione sostituiranno parzialmente i misuratori esistenti o completeranno i punti non ancora equipaggiati delle linee di finitura dei suoi impianti di laminazione per vergella 1, 2 e 3.

Tutti i misuratori sono equipaggiati con 6 scanner a laser ad alta velocità



▲ *Sistema di misurazione SMO Steelmaster*

ODAC (in 6 assi) progettati per fornire 6.000 misurazioni tarate al secondo, e con hardware e software di ultima generazione.

I sistemi saranno integrati totalmente attraverso Ethernet nel sistema di controllo di qualità e di flusso del materiale di Posco.

I misuratori presentano una struttura estremamente compatta e non richiedono praticamente alcuna manutenzione.

Zumbach Electronic AG – Svizzera
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Applicazione dell'esperienza di Stolberger

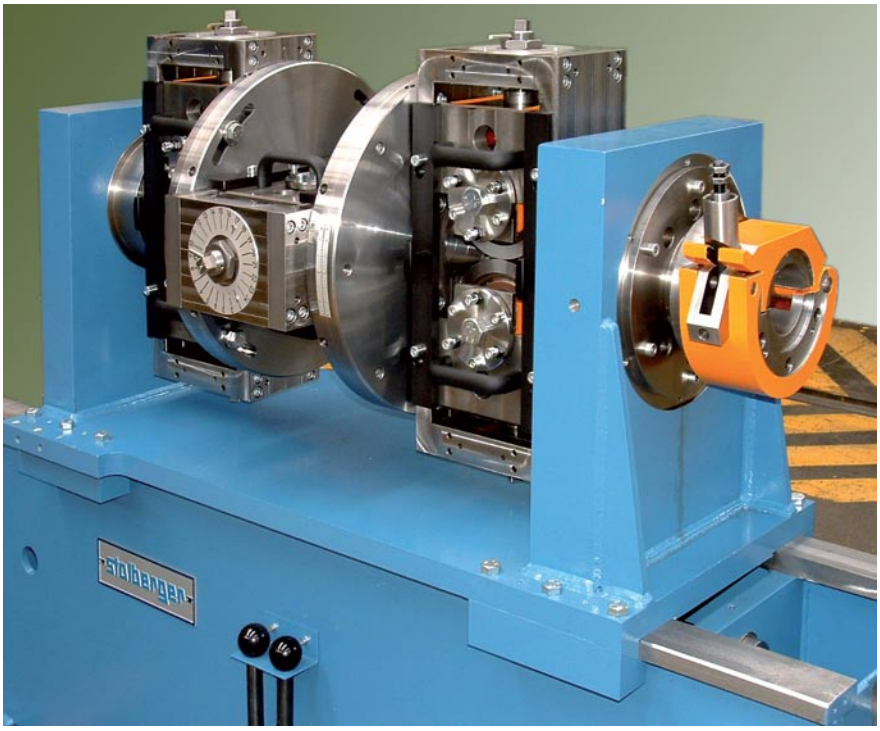
LE attuali analisi di mercato mostrano che vi è un costante aumento della domanda di conduttori compatti di alluminio e rame, specialmente di sezioni di maggiori dimensioni fino a 1000mm^2.

La compattazione dei conduttori, conformemente alle norme internazionali e secondo le relative specifiche di qualità corrispondenti, richiede una vasta esperienza nel miglioramento dei relativi processi.

Stolberger KMB-Maschinenfabrik sviluppa e fabbrica compattatori stabili da decenni.

Queste macchine, conosciute come compattatori di rulli folli, sono equipaggiate con 2, 3 o 4 paia di rulli per compattare conduttori tondi, in cui 1 o 2 paia di rulli sono utilizzate per la produzione di conduttori settoriali diritti o prespiralati.

I compattatori di tipo combinato, equipaggiati con fino a quattro paia di rulli, possono essere utilizzati per produrre conduttori settoriali tondi o diritti come pure conduttori settoriali prespiralati.



▲ *La domanda dei prodotti di Stolberger è in costante aumento*

Sono disponibili equipaggiamenti completi per la compattazione di conduttori tondi fino a 1000mm^2 e conduttori settoriali per conduttori Milliken fino a 2400mm^2.

I rulli compattatori installati sono realizzati in acciaio temprato per garantire una vita utile superiore alla media. Le caratteristiche di facile utilizzo e rapida manipolazione determinano l'elevata efficienza di questi compattatori. A parte ciò, fra i requisiti di base essenziali per un utilizzo ad alto rendimento si suole includere la determinazione della struttura più adeguata per un determinato conduttore nonché i valori richiesti per le sezioni dei rulli e le dimensioni delle filiere di trafilatura.

L'esperienza di Stolberger comprende tutti i dati necessari per realizzare una compattazione conforme alle norme internazionali quali:

- numero e diametro dei fili
- rulli compattatori di sezione adeguata, incluse le applicazioni di altre marche
- informazioni sul diametro interno delle filiere di trafilatura, e
- tutti i calcoli di base

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Tyco vende azioni per un valore di 720 milioni di dollari

Tyco International ha venduto la propria quota del 51% delle azioni della propria attività di prodotti elettrici e metallici alla società di capitali privati Clayton, Dubillier & Rice LLC per 720 milioni di dollari.

La società opererà come ente indipendente sotto il nome di Atkore International. L'attività principale della società comprende la progettazione, la fabbricazione e la vendita di tubi in acciaio galvanizzato, canalizzazioni elettriche, fili e cavi armati, armature metalliche e componenti per l'edilizia destinati ad un'ampia gamma di applicazioni per il settore edilizio, elettrico, antincendio, della sicurezza e meccanico.

Nel 2010 la società ha registrato entrate per un valore di 1,4 miliardi di dollari.

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Accesso intermedio al tubo di protezione (buffer) di cavi FTTx di tipo a tubo libero – una comparazione di metodi di prova

A cura di Denise L Matthews, Draka Communications, Claremont, NC

Riassunto

Questo articolo presenta una comparazione delle procedure di prova e dei risultati dell'attenuazione nelle fibre fra due diversi metodi di prova del punto di accesso intermedio definiti dal settore dei cavi a fibre ottiche.

Le due norme differiscono in termini di valori minimi e massimi di temperatura, tempi di permanenza a temperatura e numero di cicli. Esistono due specifiche di clienti che utilizzano questi metodi distinti con diverse lunghezze di tubo e criteri di accettazione dell'attenuazione. Per una specifica definita dall'agenzia statunitense RUS (Rural Utilities Service) si richiedono almeno cinque cicli di temperatura e 20 piedi di tubo di protezione (buffer) "intatto" (*expressed*). L'altra specifica è inclusa nei requisiti GR-20 di Telcordia relativi a cavi per installazioni esterne e si riferisce allo studio preliminare FOTP-244 per il metodo di prova. La specifica GR-20 richiede 14 piedi di tubo buffer "intatto" mentre lo studio preliminare FOTP-244 prevede due cicli con tempi di permanenza a temperatura distinti. I requisiti di attenuazione per queste due specifiche del cliente sono anch'essi diversi.

Il presente articolo ha lo scopo di valutare le differenze di attenuazione delle fibre in prove di cavi uguali secondo queste due specifiche di prova. Ciò verrà realizzato esaminando i dati ottenuti dalle prove di cavi prodotti da Draka e di altri produttori di cavi. Tali differenze saranno valutate rispetto al numero di cicli, ai tempi di permanenza a temperatura e alla lunghezza del tubo buffer.

I dati così ottenuti evidenzieranno come ciascuna variabile della prova influenzerà i risultati delle prestazioni dei cavi.

1 Introduzione

Negli ultimi anni è diventato usuale immagazzinare grandi quantità di tubi "intatti" in scatole di giunzioni o piedestalli in applicazioni FTTx utilizzando cavi del tipo loose tube. In un punto di accesso intermedio, la guaina del cavo viene rimossa ed i tubi vengono separati dall'elemento di rinforzo centrale e collocati in una cassetta/piedistallo A seconda dell'applicazione, alcuni tubi saranno aperti per effettuare la giunzione ai cavi di derivazione o ai cavi di distribuzione, mentre gli altri tubi saranno lasciati chiusi. I tubi non aperti sono indicati come tubi intatti ("*expressed tubes*").

Questi tubi non sono più accoppiati all'elemento di rinforzo centrale dell'anima del cavo e tendono a contrarsi quando sono esposti a temperature estremamente basse. La contrazione dei tubi buffer può causare aumenti dell'attenuazione indotta da macropiegatura. L'entità dell'aumento dipende delle dimensioni del tubo, dal grado di contrazione del tubo buffer e dalla sensibilità di piegatura della fibra. Il grado di contrazione del tubo buffer può variare a seconda del tipo di materiale e delle condizioni di processo. Questi meccanismi sono stati descritti in dettaglio in articoli precedenti come quelli inclusi come riferimenti[5] e [6] nella sezione dei riferimenti del presente articolo. Per simulare il fenomeno in un laboratorio di prova, il settore industriale ha definito due diversi metodi di prova del punto di accesso intermedio. Un metodo di prova è specificato nel Registro Federale dell'agenzia statunitense Rural Utilities Service (RUS), 7 CRF Parte 1755.902 (PE-90), pagina 20569 sezione (15). L'altro metodo di prova è lo studio preliminare TIA/FOTP-244 al quale attualmente fanno riferimento i Requisiti Generici Telcordia Technologies GR-20-CORE numero 3 sezione 6.5.11. Il metodo RUS è stato definito prima della redazione del documento FOTP-244.

2 Comparazione dei metodi di prova

Come affermato nell'introduzione, attualmente esistono due metodi di prova in attesa di essere pubblicati e applicati: il metodo PE-90 e il metodo dello studio preliminare FOTP-244. Entrambi questi metodi fanno riferimento al metodo di prova FOTP-3 che precisa la misura di base, la definizione del

▼ **Tabella 1**: *Metodi di prova PE-90 e FOTP-244 relativi al punto di accesso intermedio*

Metodo di prova	Ciclo 1		Ciclo 2		Ciclo 3		Ciclo 4		Ciclo 5	
	Tempo di permanenza a temperatura (ore)		Tempo di permanenza a temperatura (ore)		Tempo di permanenza a temperatura (ore)		Tempo di permanenza a temperatura (ore)		Tempo di permanenza a temperatura (ore)	
	-40˚C	70˚C	-40˚C	70˚C	-40˚C	70ºC	-40˚C	70˚C	-40˚C	70˚C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Giunzione in cui le specifiche richiedono le misurazioni ottiche										

Requisiti di attenuazione a 1550nm		
	PE-90	GR-20
Lunghezza del tubo "intatto" (*expressed tube*)	20 Piedi	14 Piedi
Aumento massimo di attenuazione agli ultimi estremi di temperatura	0.1 dB	-
Aumento medio di attenuazione agli ultimi estremi di temperatura	0.05 dB	0.15 dB
Aumento massimo di attenuazione alla temperatura finale di 23°C	0.05 dB	-
Aumento medio di attenuazione alla temperatura finale di 23°C	-	0.15 dB

▲ **Tabella 2**: *Comparazione dei requisiti di attenuazione delle prove PE-90 e GR-20 relative al punto di accesso intermedio*

Aumento massimo di attenuazione (dB) a 1550nm e –40°C				
PE-90 Cavo	Cavo 1	Cavo 2	Cavo 3	Cavo 4
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
PE-90 (20 piedi di tubo) – valore massimo del ciclo finale	1.25	0.02	0.575	1.01
FOTP-244 (14 piedi di tubo) - valore massimo	0.59	0.01	0.311	0.31

▲ **Tabella 3**: *Comparazione della prova del punto di accesso intermedio a –40°C fra PE-90 (20 piedi di tubo) e lo studio preliminare FOTP-244 (14 piedi di tubo)*

ciclo e la velocità di rampa della camera. I due metodi di prova sono descritti qui di seguito.

PE-90

Il metodo di prova PE-90 del punto di accesso intermedio richiede cinque o più cicli completi con estremi di temperatura di –40°C e 70°C. Si richiedono tempi di permanenza a temperatura di tre ore per tutti i valori estremi di temperatura e per la temperatura finale di 23°C.

Tutte le fibre sottoposte alla prova devono essere misurate a temperatura ambiente, alla lunghezza d'onda di 1550nm prima di essere sottoposte alla prova di variazione ciclica della temperatura. Questa è la misura di riferimento. Le fibre sono quindi misurate alla lunghezza d'onda di 1550nm nell'ultimo ciclo agli estremi di temperatura e alla temperatura finale di 23°C. Gli aumenti di attenuazione sono calcolati e valutati rispetto ad un limite di specificazione superiore. I tubi, il cavo e gli assiemi devono inoltre essere controllati alla temperatura ambiente finale per verificare visivamente l'eventuale presenza di danni.

FOTP-244

Il metodo di prova FOTP-244 richiede due cicli completi ed un periodo di permanenza alla temperatura finale di 23°C. Richiede 14 ore di permanenza per il primo estremo di temperatura di 70°C. Questo tempo di permanenza prolungato serve a facilitare il rilassamento delle tensioni generate dalla contrazione che possono essere rimaste nei tubi durante il processo. Tutti gli altri tempi di permanenza devono durare un minimo di un'ora.

Tutte le fibre della prova vengono misurate a temperatura ambiente, alla lunghezza d'onda di 1550nm prima della prova di variazione ciclica della temperatura. Questa è la misura di riferimento. I valori di attenuazione delle fibre di prova sono quindi misurati alla lunghezza d'onda di 1550nm agli estremi di temperatura dell'ultimo ciclo e alla fine della prova a temperatura ambiente. I tubi, il cavo e gli assiemi devono inoltre essere controllati alla temperatura ambiente finale per verificare visivamente la presenza di eventuali danni.

La tabella seguente illustra una comparazione dei due metodi di prova.

Nel corso della prova è stato scoperto che gli unici aumenti di attenuazione significativi si sono verificati alla temperatura minima di –40°C. Gli aumenti di attenuazione a 70°C e alla temperatura finale di 23°C non erano significativi.

Per questa ragione, gli aumenti di attenuazione in esame nel presente articolo sono tutti misurati alla temperatura minima di –40°C.

Sono state testate varie fibre in ciascun campione di cavo. È stato calcolato l'aumento di attenuazione medio ed è stata identificata la misura singola massima. Questi sono i valori riportati nel presente articolo.

Per ciascun campione di cavo è stata verificata la presenza di eventuali danni in seguito al completamento della prova del punto di accesso intermedio. Non è stato riscontrato alcun danno fisico su nessuno dei campioni di cavo.

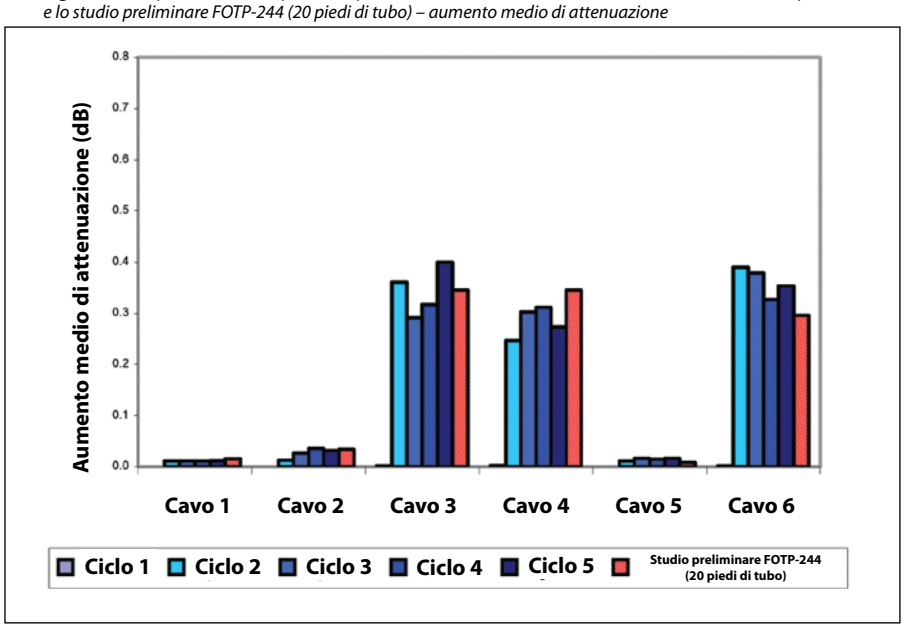
3 Comparazione dei criteri di accettazione

Esistono anche due serie di criteri di accettazione associati a questi due metodi di prova. Queste due specifiche sono incluse nel documento PE-90 e nel documento GR-20. Ciascuna specifica è illustrata qui di seguito.

La specifica PE-90 e i criteri di accettazione sono i seguenti:

a) L'apertura nel punto di accesso intermedio per l'installazione di cavi ottici monomodali del tipo loose tube in piedistallo deve essere pari a 6,096m (20 piedi)

▼ **Figura 1**: *Comparazione fra le prove del punto di accesso intermedio secondo il metodo PE-90 (20 piedi di tubo) e lo studio preliminare FOTP-244 (20 piedi di tubo) – aumento medio di attenuazione*



b) Aumento di attenuazione non superiore a 0,1dB (a 1550nm) su ciascuna fibra singola e aumento di attenuazione medio non superiore a 0,05dB (a 1550nm) su tutte le fibre, durante l'ultimo ciclo a –40°C e 70°C
c) Aumento di attenuazione non superiore a 0,05dB (a 1550nm) su ciascuna fibra singola alla temperatura finale di 23°C

La specifica GR-20 è la seguente:
a) I tubi del tipo Loose custoditi in un piedistallo o in una cassetta devono poter contenere un tubo buffer "intatto" di almeno 14 piedi, custodito in piedistallo o in cassetta
b) Aumento medio di attenuazione non superiore a 0,15dB a 1550nm su tutte le fibre durante e dopo l'ultimo ciclo

La *Tavola 2* illustra queste prove.

4 Comparazione fra i risultati delle prove PE-90, GR-20 e FOTP-244

4.1 Comparazione fra la parte esposta di tubo della prova PE-90 (20 piedi) e la parte esposta di tubo della prova FOTP-244 (14 piedi)

Le specifiche correnti illustrate nelle sezioni 2 e 3 presentano numerose differenze fra loro, come osservato precedentemente. Questa sezione propone una comparazione dei metodi precisati nei documenti PE-90 e GR-20 (che fanno riferimento al documento FOTP-244) confrontando la perdita di attenuazione risultante utilizzando segmenti di cavo identici di vari fabbricanti di cavi.

La *Tabella 3* presenta una comparazione di risultati ottenuti dalla prova di campioni di cavo identici secondo il metodo PE-90 che richiede 20 piedi di tubo e il metodo FOTP-244 che richiede 14 piedi di tubo.

Sono stati sottoposti a prova quattro campioni di cavo prodotti da due diversi fabbricanti di cavi secondo il metodo di prova PE-90 a cinque cicli e il metodo di prova FOTP-244 a due cicli. Come si può osservare nella *Tabella 3*, la prova PE-90 (20 piedi) presenta costantemente delle variazioni di attenuazione massime a –40°C superiori a quelle risultanti dalla prova GR-20/FOTP-244 (14 piedi di tubo) di Telcordia. L'aumento di attenuazione è dell'ordine di due volte maggiore per il metodo e la specifica PE-90. Come verrà illustrato nella sezione successiva, il maggiore contributo a questa differenza di perdita di attenuazione è rappresentato dalla lunghezza del tubo "intatto".

4.2 Metodo PE-90 comparato con il metodo FOTP-244

Per meglio comprendere la differenza fra i metodi di prova PE-90 e FOTP-244, è stata effettuata una prova del punto di accesso intermedio con 20 piedi di tubo su sei diversi cavi, secondo ciascun metodo di prova.

I sei cavi testati provenivano da tre diversi produttori di cavi. Come illustrato nelle *Figure 1* e *2*, generalmente il metodo di prova PE-90 con 20 piedi di tubo e il metodo FOTP-244 con 20 piedi di tubo determinano variazioni di attenuazione della fibra simili. La *Figura 1* evidenzia gli aumenti di attenuazione media e la *Figura 2* evidenzia gli aumenti massimi di attenuazione. Dei sei cavi testati, quattro hanno presentato una maggiore perdita d'attenuazione con il metodo di prova FOTP durante il quinto ciclo del metodo PE-90.

Se da una lato vi è una variazione dei risultati utilizzando i due metodi, quando si applica il limite RUS massimo di 0,1dB e medio di 0,05dB, generalmente, i tipi di cavo presentano risultati positivi o negativi, indipendentemente dal metodo utilizzato.

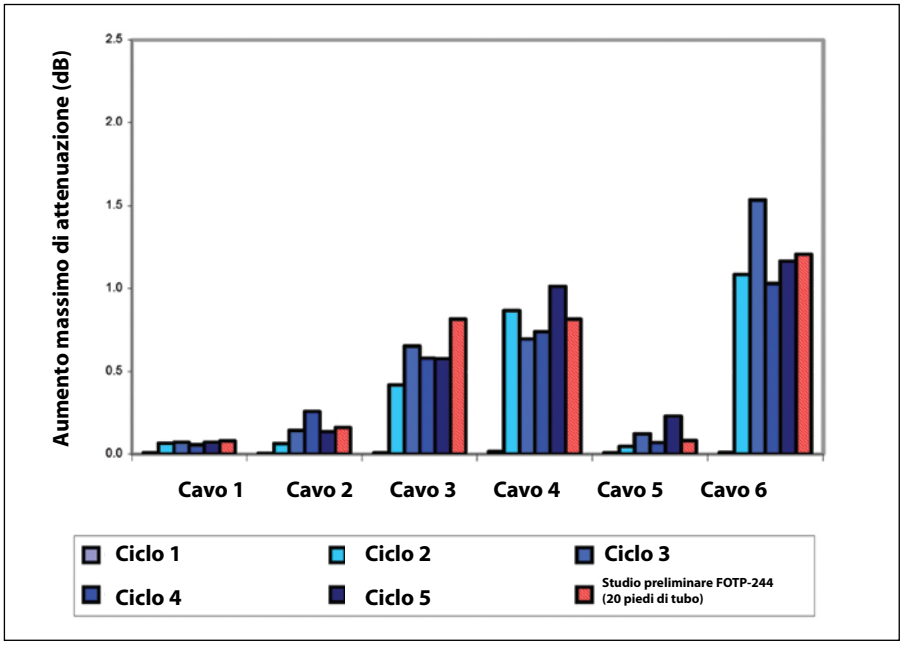
5 Effetto del numero dei cicli

5.1 Cicli e picchi massimi di attenuazione

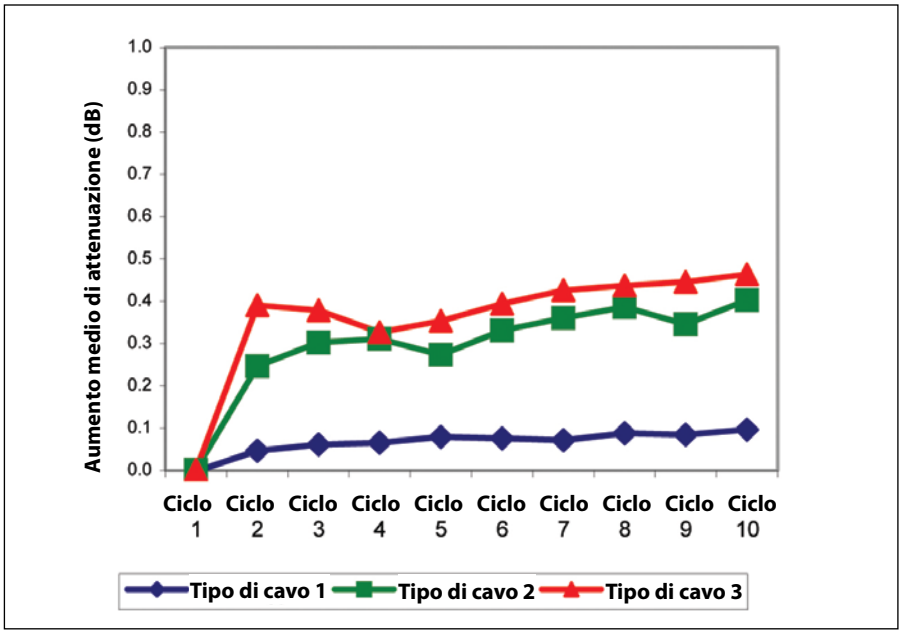
Il test PE-90 prevede la misurazione e la valutazione dell'ultimo di almeno 5 cicli. Come si può notare dai dati del test PE-90 a cicli multipli nelle Figure 1 e 2, i maggiori aumenti di attenuazione non si verificano necessariamente durante il quinto ciclo e possono prodursi ovunque dal 2° al 5° ciclo.

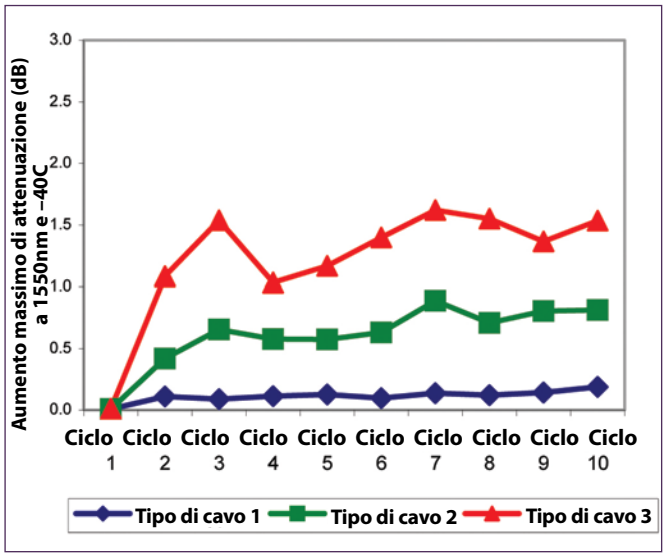
Nelle *Figure 1* e *2*, tre di sei cavi testati presentano i maggiori aumenti di attenuazione fra il secondo e il quarto ciclo, non nel 5° ciclo. Effettuando misure solo nell'ultimo ciclo, durante la prova possono andare persi gli aumenti di attenuazione che si possono

▼ **Figura 2**: *Comparazione fra le prove del punto di accesso intermedio secondo il metodo PE-90 (20 piedi)e lo studio preliminare FOTP-244 (20 piedi) – aumento massimo di attenuazione*

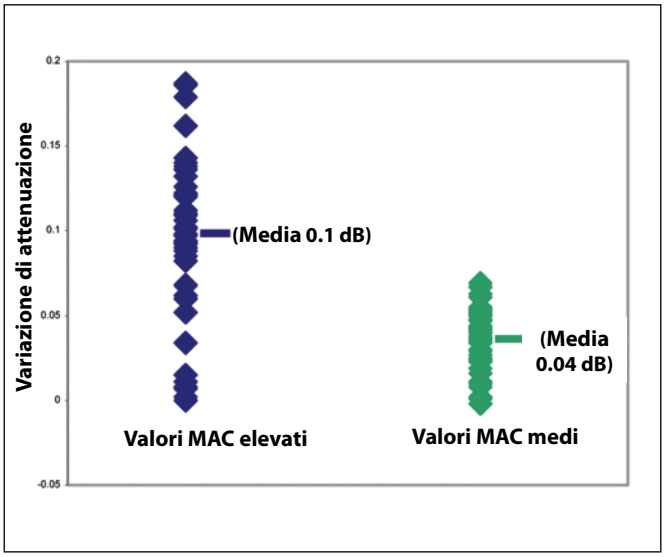


▼ **Figura 3**: *Prova del punto di accesso intermedio PE-90 (20 piedi di tubo) con 5 cicli aggiuntivi – aumento medio di attenuazione*





▲ **Figura 4**: *Prova del punto di accesso intermedio PE-90 (20 piedi di tubo) con 5 cicli aggiuntivi – aumento massimo di attenuazione*



▲ **Figura 5**: *Variazione di attenuazione in fibre con valori MAC alti e medi*

verificare in campo durante il primo o i primi due estremi di temperatura stagionali.

5.2 Effetto dell'aumento del numero dei cicli

Per una migliore comprensione dell'effetto dei cicli di temperatura della prova del punto di accesso intermedio sulle perdite di attenuazione, sono stati testati tre cavi secondo la norma PE-90. Questi tre cavi sono stati testati con cinque cicli di estremi di temperatura aggiuntivi, per un totale di dieci cicli.

Gli andamenti dell'attenuazione della fibra risultanti per i dieci cicli sono illustrati nelle *Figure 3* e *4*. La *Figura 3* evidenzia gli aumenti di attenuazione medi per ciascuno dei dieci cicli all'estremo di temperatura di –40°C e la *Figura 4* illustra aumenti massimi di attenuazione per ciascun ciclo a –40°C. É importante notare che il requisito corrente della norma PE-90 specifica "almeno cinque cicli". Ciò lascia spazio per effettuare cicli aggiuntivi e solo l'ultimo dei cicli deve essere valutato rispetto alla specifica. I grafici nella *Figura 4* evidenziano che la perdita di attenuazione della fibra può a volte migliorare leggermente con cicli aggiuntivi.

6 L'effetto dei valori MAC della fibra

Il valore MAC di una fibra influenza notevolmente l'entità della variazione di attenuazione in una prova del punto di accesso intermedio. Il numero MAC di una fibra è definito come il suo diametro del campo modale misurato a 1550nm diviso per la relativa lunghezza d'onda di taglio. Questo valore è un indicatore di una sensibilità alla macropiegatura della fibra.

La *Figura 5* presenta le misurazioni di attenuazione della fibra singola in vari tubi e cavi per la prova del punto di accesso intermedio.

Ciascun tubo testato conteneva tre fibre con valori MAC elevati, tre fibre con valori MAC medi e sei fibre di scarto per colmare la capacità massima delle dodici fibre dei tubi. Esaminando i valori massimi, medi e la media degli stessi per ogni tipo di fibra (*Figura 5*), si può notare che le fibre con valori MAC maggiori, hanno dato scarse prestazioni nelle prove del punto di accesso intermedio a basse temperature; pertanto nella classificazione di una struttura di cavo è necessario prendere in considerazione le fibre con valori MAC elevati.

7 Conclusione

É stato dimostrato che la lunghezza del tubo "intatto" (*expressed*) nelle prove di accesso al punto intermedio ha una maggiore influenza sull'attenuazione che la differenza dei metodi di prova PE-90 e FOTP-244. Il requisito della prova che richiede 20 piedi di tubo buffer "intatto" è di conseguenza decisamente più rigoroso del requisito relativo alla prova di 14 piedi di tubo.

É stato inoltre dimostrato che quando si effettua la prova del punto di accesso intermedio di 20 piedi di un tubo "intatto", si hanno perdite simili fra i due metodi. Generalmente, campioni di cavi identici evidenziano risultati positivi o negativi indipendentemente dal metodo.

Quando vengono definiti cicli multipli in una prova del punto di accesso intermedio, è possibile che le perdite d'attenuazione maggiori non si verifichino durante l'ultimo ciclo, ove vengono effettuate le misurazioni obbligatorie. Vi è una tendenza generale al rialzo nell'aumento di attenuazione con l'aumentare dei cicli, ma l'aumento non si verifica necessariamente a ciascun ciclo.

É stato dimostrato che i valori MAC della fibra influenzano in modo significativo la perdita di attenuazione nella prova del punto di accesso intermedio. È importante valutare le fibre con valori MAC più elevati nella classificazione di una struttura di cavo poiché, diversamente, i risultati potrebbero apparire migliori che in uno scenario di "caso peggiore". ■

8 Riferimenti bibliografici

[1] Rural Utilities Service (RUS) 7 CRF Part 1755.902 (PE-90) Federal Register

[2] Telcordia Technologies generic requirements GR-20-CORE issue 3

[3] IA-455-244/FOTP-244 draft "Methods for measuring the change in transmittance of optical fibres in expressed buffer tubes when subjected to temperature cycling"

[4] TIA-455-3B/FOTP-3 "Procedure to measure temperature cycling effects on optical fibre units, optical cable, and other passive fibre components"

[5] Ray Lovie, "Loose buffer tube construction for mid-span access" IWCS (2007)

[6] Ray Lovie and Bob Overton, "Reliability considerations for mid-span access points in FTTH optical fibre systems: cable termination and expressed buffer tube storage" IWCS (2008)

Il presente articolo è stato presentato nel corso del 58° Seminario International Wire & Cable and Connectivity Symposium, tenutosi a Charlotte, NC dall'8 all'11 novembre 2009, ed è stato è stato riprodotto con la cortese autorizzazione degli organizzatori.

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Venta de AlphaGary por 300 millones de dólares

ROCKWOOD Holdings ha vendido su grupo de compuestos AlphaGary a Mexichem SAB de CV por 330 millones de dólares.

Está previsto que el acuerdo de venta, anunciado el 17 de diciembre, quede cerrado definitivamente en el primer trimestre de 2011.

En sus operaciones de adquisición, parece que Mexichem, el mayor fabricante de tubos de PVC, resinas y compuestos vinílicos de todo México, gastará más de 800 millones de dólares en tres años.

AlphaGary, la mayor división de Rockwood en el sector de los compuestos para aplicaciones especiales, el año pasado registró un volumen de ventas valorado en 231 millones de dólares.

La empresa de Massachussets desarrolla compuestos de alta tecnología para aplicaciones en segmentos de mercado específicos. Su gama de compuestos comprende aleaciones de PVC flexible y sin halógenos, elastómeros termoplásticos con base de estireno, vinilo y oleofinas, aleaciones de nylon, mezclas de poliuretano y polietileno reticulado.

La empresa cuenta con cuatro plantas en Estados Unidos, Reino Unido y Canadá.

"Hace años vimos a AlphaGary como una empresa que no encajaba con nuestra actividad principal," comentó Timothy McKenna, vice presidente de relaciones con inversores de Rockwood. "Ahora pienso que es un negocio que beneficia a ambas partes".

Seifi Ghasemi, presidente y director ejecutivo de Rockwood, declaró: "El cierre de la venta de esta empresa de compuestos representa otro paso hacia la concentración de nuestra cartera de productos en actividades de alto margen, productos químicos para aplicaciones especiales y materiales avanzados."

Mexichem, que produce una variedad de productos químicos en más de 40 plantas de Latinoamérica, Estados Unidos, Reino Unido, Japón y Taiwán, declaró un importe neto de ventas de unos 2,170 millones de dólares en los primeros tres trimestres de 2010.

"Con esta adquisición podemos combinar el potencial en investigación y desarrollo y los productos innovadores de AlphaGary con la diversificación geográfica de Mexichem, generando así importantes sinergias", publicó la empresa en la bolsa de la Ciudad de México.

En fase de impresión del presente artículo, el acuerdo todavía estaba en espera de la aprobación de las autoridades antimonopolio.

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Pedido de Corea a Zumbach

Zumbach Electronics ha firmado un contrato con la coreana Posco Pohang para el suministro de 10 sistemas Steelmaster para la medida de diámetros y perfiles.

Estos nuevos sistemas de medida reemplazarán una parte de los medidores existentes o completarán los puntos desprovistos de los sectores de acabado de sus plantas de laminación de alambrones 1, 2 y 3. Todos los medidores están equipados con 6 sondas ODAC de alta velocidad (en 6 ejes), capaces de hacer 6000 medidas calibradas por segundo, y dotados del hardware y software más modernos.

Los sistemas serán integrados totalmente a través de Ethernet en el sistema de control de calidad y de flujo del material de Posco. Los medidores tienen un diseño altamente compacto y prácticamente no requieren mantenimiento.

Zumbach Electronic AG – Suiza
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Aplicando la experiencia de Stolberger

LOS análisis de mercado actuales muestran que hay una demanda en constante crecimiento de conductores compactos de aluminio y cobre, especialmente de secciones grandes de hasta 1000mm^2.

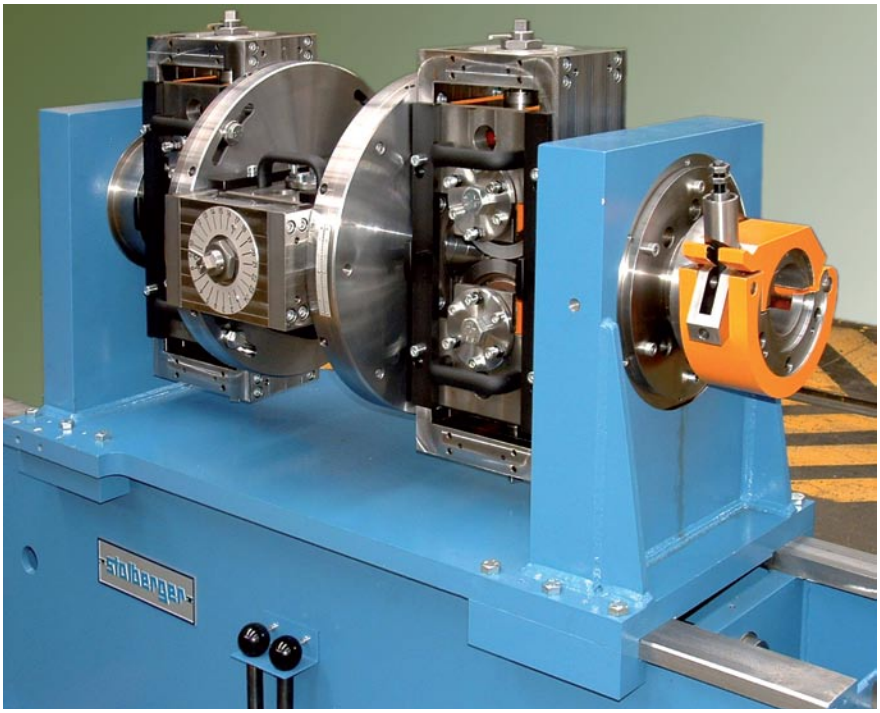
Para la compactación de conductores, cumpliendo las normas internacionales y a la vez siguiendo las correspondientes especificaciones de calidad, es necesario poseer una vasta experiencia en la mejora de procesos relacionados.

Stolberger KMB-Maschinenfabrik lleva décadas desarrollando y fabricando compactadoras estables.

Estas máquinas, conocidas como compactadores de rodillos locos, están equipadas con 2, 3 ó 4 pares de rodillos para compactar conductores redondos, de los que 1 ó 2 pares de rodillos son utilizados para la producción de conductores sectoriales rectos o precurvados en espiral.

Las compactadoras de tipo combinado, equipadas con hasta cuatro pares de rodillos, pueden ser usadas para producir conductores sectoriales redondos o rectos, así como conductores sectoriales precurvados en espiral.

Hay equipos disponibles para la compactación de conductores redondos de hasta 1000mm^2 y conductores sectoriales para conductores Milliken de hasta 2400mm^2.



▲ *Demanda de productos de Stolberger en constante crecimiento*

Los rodillos compactadores de las máquinas son de acero templado, lo que garantiza una vida útil superior a la media. Sus funciones fáciles de usar y su manejo rápido determinan la alta eficiencia de estas compactadoras.

Dejando a un lado esto, entre los requisitos básicos para la rentabilidad de uso se suele incluir la determinación del diseño más adecuado para un determinado conductor, así como de los valores requeridos para las secciones de los rodillos y las dimensiones de las hileras de trefilado.

La experiencia de Stolberger comprende todos los datos necesarios para compactar de acuerdo con las normas internacionales como:

- número y diámetro de los alambrones
- rodillos compactadores de sección adecuada, incluidos los de otras marcas
- información sobre el diámetro interno de las hileras de trefilado
- todos los cálculos de base

Stolberger KMB-Maschinenfabrik GmbH – Alemania
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Niina Saarto ocupa nuevo cargo

Niina Saarto lleva desde el 1 de febrero en su nuevo cargo como tesorera del grupo Componenta.

La Sra. Saarto empezó como gerente de la tesorería de Componenta en febrero de 2010. Anteriormente, había ejercido las funciones de tesorera del grupo EM Group Oy.

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Tyco vende acciones por valor de 720 millones de dólares

Tyco International ha vendido el 51% de las acciones de su empresa de productos eléctricos y metálicos al fondo Clayton, Dubillier & Rice LLC por 720 millones de dólares.

La empresa operará ahora como entidad independiente bajo el nombre de Atkore International. La actividad de la empresa comprende el diseño, fabricación y venta de tubos de acero galvanizado, canalizaciones eléctricas, alambre y cable armados, armazones metálicos y componentes para la construcción para una amplia gama de aplicaciones eléctricas, mecánicas, para la construcción, contra incendios y seguridad.

En 2010 la empresa registró ingresos por valor de 1,400 millones de dólares.

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Acceso intermedio al tubo protector (buffer) de cables FTTx de tubo holgado: comparación de métodos de prueba

Por Denise L Matthews, Draka Communications, Claremont, NC

Resumen

Este artículo presenta una comparación de los procedimientos de prueba y de los resultados de atenuación de la fibra adoptando dos distintos métodos de prueba en el punto de acceso intermedio definidos por el sector de la fibra óptica. Las dos normas difieren en términos de valores de temperatura mínimos y máximos, tiempos de permanencia a temperatura y número de ciclos. Existen dos especificaciones de clientes que usan estos métodos distintos con longitudes de tubo y criterios de aceptación de atenuación diferentes. Para una especificación, definida por la agencia estadounidense RUS (Rural Utilities Service), se requiere por lo menos cinco ciclos de temperatura y 20 pies de tubo protector intacto (*express buffer tube*).

La otra especificación está incluida en los requisitos GR-20 de Telcordia para cables de instalaciones externas y hace referencia al estudio preliminar FOTP-244 para el método de prueba. La especificación GR-20 requiere 14 pies de tubo buffer intacto, mientras el estudio preliminar FOTP-244 requiere dos ciclos con tiempos de permanencia a temperatura distintos. Los requisitos de atenuación de estas dos especificaciones de clientes también son diferentes. El objetivo de este artículo es evaluar las diferencias de atenuación de la fibra en pruebas de cables iguales siguiendo estas dos especificaciones de prueba. La evaluación se realizará examinando los datos obtenidos en las pruebas de cables de Draka y de otros fabricantes. Las diferencias serán evaluadas en función del número de ciclos, tiempos de permanencia a temperatura y longitud del tubo buffer. Los datos resultantes mostrarán cómo afecta cada variable de la prueba a los resultados de las prestaciones de los cables.

1 Introducción

En los últimos años se ha vuelto muy corriente colocar varios pies de tubo buffer intacto en cajas de empalme o pedestales en aplicaciones FTTx usando cable de tubo holgado. En un punto de acceso intermedio, se quita la cubierta del cable, se destrenzan los tubos del elemento de refuerzo central y se colocan en una caja/pedestal. Según la aplicación, algunos tubos serán abiertos para empalmarlos a cables de bajada o de distribución y otros se dejarán sin abrir. Los tubos sin abrir se indican como tubos buffer intactos (en inglés *express buffer tubes*).

Estos tubos no están acoplados con el elemento central del núcleo del cable y, normalmente, se contraen al exponerlos a temperaturas mínimas. La contracción de los tubos buffer puede causar aumentos de atenuación por macrocurvaturas. La magnitud del aumento depende del tamaño del tubo buffer, del nivel de contracción de tubo buffer y de la sensibilidad al doblado de la fibra. El nivel de contracción del tubo buffer puede variar según el tipo de material y las condiciones de elaboración. Estos mecanismos han sido descritos detalladamente en artículos anteriores, como los incluidos como referencias[5] y [6] en la sección de referencias de este artículo. Para simular este fenómeno en un laboratorio de prueba, el sector industrial ha definido dos distintos métodos de pruebas del tramo intermedio. Un método de prueba está especificado en el Registro Federal de la agencia estadounidense Rural Utilities Service (RUS), 7 CRF, Parte 1755.902 (PE-90), página 20569, sección (15). El otro método de prueba es el estudio preliminar TIA/FOTP-244, al cual hacen referencia actualmente los Requerimientos Genéricos Telcordia Technologies GR-20-CORE, edición 3, sección 6.5.11. El método RUS fue definido antes de la elaboración del FOTP-244.

2 Comparación de los métodos de prueba

Como se ha indicado en la introducción, hay dos métodos de prueba actualmente en fase

▼ **Tabla 1**: *Métodos de prueba PE-90 y FOTP-244 del tramo intermedio*

Método de prueba	Ciclo 1		Ciclo 2		Ciclo 3		Ciclo 4		Ciclo 5	
	Tiempo de permanencia a temperatura (horas)		Tiempo de permanencia a temperatura (horas)		Tiempo de permanencia a temperatura (horas)		Tiempo de permanencia a temperatura (horas)		Tiempo de permanencia a temperatura (horas)	
	-40˚C	70˚C	-40˚C	70˚C	-40˚C	70ºC	-40˚C	70˚C	-40˚C	70˚C
PE-90	3	3	3	3	3	3	3	3	3*	3*
FOTP244	1	14	1*	1*	NA	NA	NA	NA	NA	NA
*Empalme para el que las especificaciones requieren las medidas ópticas										

Requisitos de atenuación a 1550nm		
	PE-90	GR-20
Longitud del tubo buffer intacto	20 Pies	14 Pies
Aumento de atenuación máximo a los últimos extremos de temperatura	0.1 dB	-
Aumento de atenuación medio a los últimos extremos de temperatura	0.05 dB	0.15 dB
Aumento de atenuación máximo a la temperatura final de 23°	0.05 dB	-
Aumento de atenuación medio a la temperatura final de 23°	-	0.15 dB

▲ **Tabla 2**: *Comparación de los requisitos de atenuación de la pruebas PE-90 y GR-20 del tramo intermedio*

Aumento de atenuación máximo (dB) a 1550nm y –40°C				
PE-90 Ciclo	Cable 1	Cable 2	Cable 3	Cable 4
1	0.02	0.02	0.007	0.02
2	1.34	0.02	0.417	0.87
3	1.11	0.03	0.653	0.70
4	1.73	0.02	0.577	0.74
5	1.25	0.02	0.575	1.01
PE-90 (20 pies de tubo) - valor máximo del ciclo final	1.25	0.02	0.575	1.01
FOTP-244 (14 pies de tubo) - valor máximo	0.59	0.01	0.311	0.31

▲ **Tabla 3**: *Comparación de la prueba en el punto de acceso intermedio a –40°C entre PE-90 (20 pies de tubo) y versión preliminar FOTP-244 (14 pies de tubo)*

de publicación e implementación, el método PE-90 y el método del estudio preliminar FOTP-244. Ambos métodos hacen referencia al método de prueba FOTP-3 que indica la medida de base, determina los ciclos y la velocidad de rampa de la cámara. Se describen estos dos métodos a continuación.

PE-90

El método de prueba PE-90 del tramo intermedio requiere cinco o más ciclos completos con extremos de temperatura de –40°C y 70°C. Se requieren tiempos de permanencia a temperatura de tres horas a todos los extremos de temperatura y a la temperatura final de 23°C.

Todas las fibras probadas deben ser medidas a temperatura ambiente, a longitud de onda de 1550nm, antes de ser sometidas a la prueba de variación cíclica de temperatura. Esta es la medida de referencia. Luego, se miden las fibras a una longitud de onda de 1550nm en el último ciclo a los extremos de temperatura y a la temperatura final de 23°C. Los aumentos de atenuación son calculados y evaluados respecto a un límite de especificación mayor. Los tubos, el cable y los conjuntos de cables también deben ser inspeccionados a la temperatura ambiente final para verificar visualmente posibles daños.

FOTP-244

El método de prueba FOTP-244 requiere la realización de dos ciclos completos y un periodo de permanencia a la temperatura final de 23°C. Requiere 14 horas de permanencia para el primer extremo de temperatura de 70°C.

Este tiempo de permanencia a temperatura prolongado ayuda a relajar las tensiones generadas por la contracción (*shrink-back*) que pueden quedar atrapadas en los tubos durante su elaboración. Todos los demás tiempos de permanencia a temperatura deben ser de una hora como mínimo.

Todas las fibras son medidas a temperatura ambiente, a longitud de onda de 1550nm, antes de la prueba de variación cíclica de temperatura. Esta es la medida de referencia. Luego, se miden los valores de atenuación de las fibras a una longitud de onda de 1550nm a los extremos de temperatura del último ciclo y, al final de la prueba, a temperatura ambiente. Los tubos, el cable y los conjuntos de cables también deben ser inspeccionados a la temperatura ambiente final para verificar visualmente posibles daños. El esquema siguiente muestra una com- paración de los dos métodos de prueba.

Durante la prueba se ha observado que los únicos aumentos de atenuación significativos se produjeron a la temperatura mínima de –40°C. Los aumentos de atenuación a 70°C y a la temperatura final de 23°C no eran significativos. Por esta razón, todos los aumentos de atenuación que se presentan en este artículo están medidos a la temperatura mínima de –40°C. En cada muestra de cable se han realizado pruebas en varias fibras. Se ha calculado el aumento de atenuación medio y se ha determinado la medida individual máxima. Estos son los valores presentados en este artículo. Al final de la prueba en el punto de acceso intermedio, se ha observado si las muestras de cable habían sufrido daños. No se han encontrados daños en ninguna muestra de cable.

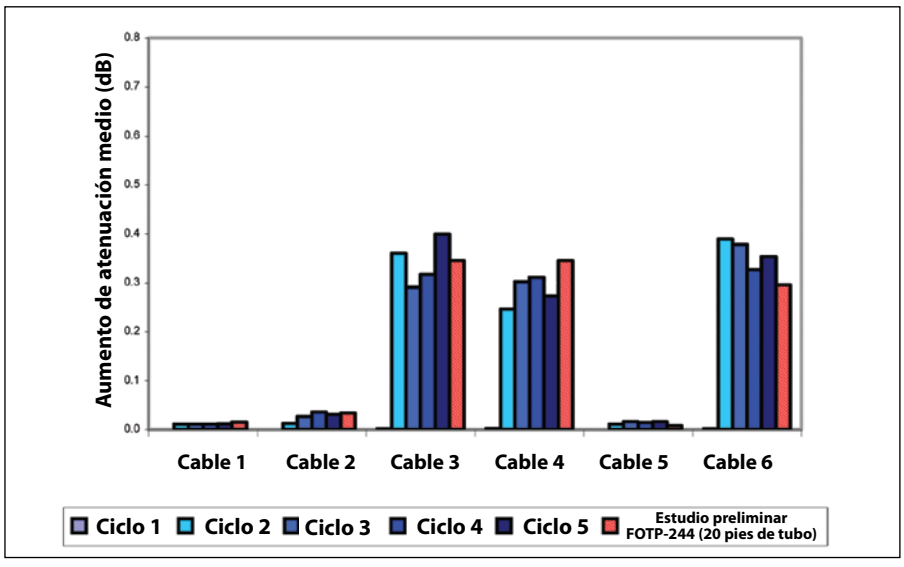
3 Comparación de los criterios de aceptación

Existen también dos series de criterios de aceptación asociados a estos dos métodos de prueba. Estas dos especificaciones están incluidas en el documento PE-90 y en el documento GR-20. Dichas especificaciones están descritas a continuación.

La especificación PE-90 y los criterios de aceptación establecen lo siguiente

a) La abertura en un punto intermedio para instalar un cable óptico monomodo de tipo holgado en un pedestal debe ser de 6,096m (20 pies)

▼ **Figura 1**: *Comparación entre las pruebas del tramo intermedio según el método PE-90 (20 pies de tubo) y el estudio preliminar FOTP-244 (20 pies de tubo) – aumento de atenuación medio*



b) Aumento de atenuación no superior a 0,1dB (a 1550nm) en cada fibra y aumento de atenuación medio no superior a 0,05dB (a 1550nm) en todas las fibras, durante el último ciclo a –40°C y 70°C
c) Aumento de atenuación no superior a 0,05dB (a 1550nm) en cada fibra a la temperatura final de 23°C

La especificación GR-20 establece lo siguiente:
a) Los tubos holgados colocados en un pedestal o caja deben tener tubo buffer intacto de 14 pies como mínimo colocado en un pedestal o caja
c) Aumento de atenuación media no superior a 0,15dB (a 1550nm) en todas las fibras, durante y después del último ciclo

La *Tabla 2* resume el resultado de estas pruebas.

4 Comparación de los resultados de las pruebas PE-90, GR-20 y FOTP-244

4.1 Comparación de la parte expuesta de tubo de la prueba PE-90 (20 pies de tubo) con la parte expuesta de tubo de la prueba FOTP-244 (14 pies de tubo)

Las especificaciones corrientes descritas en las secciones 2 y 3 presentan varias diferencias entre ellas, como se ha dicho antes. Esta sección compara los métodos definidos en los documentos PE-90 y GR-20 (que hace referencia al documento FOTP-244), comparando la pérdida por atenuación resultante usando segmentos de cables idénticos de distintos fabricantes de cable.

La *Tabla 3* muestra una comparación de los resultados obtenidos en la prueba de muestras de cables idénticos según el método PE-90 que requiere 20 pies de tubo buffer intacto y el método FOTP-244 que requiere 14 pies de tubo buffer intacto. Se han probado cuatro muestras de cable de dos fabricantes diferentes según el método de prueba PE-90 de cinco ciclos y el método de prueba FOTP-244 de dos ciclos. Como se puede ver en la Tabla 3, la prueba PE-90 (20 pies de tubo) presenta, coherentemente, cambios de atenuación máximos a –40°C mayores que los de la prueba GR-20/FOTP-244 (14 pies de tubo) de Telcordia. El aumento de atenuación es del orden de dos veces mayor con el método y la especificación PE-90. Como veremos en la sección siguiente, el factor que más afecta a esta diferencia de pérdida por atenuación es la longitud del tubo buffer intacto.

4.2 Método PE-90 comparado con el método FOTP-244

Para comprender mejor la diferencia entre los métodos de prueba PE-90 y FOTP-244, se ha realizado una prueba en el punto de acceso intermedio con 20 pies de tubo buffer en seis cables diferentes, aplicando los dos métodos de prueba. Los seis cables probados eran de tres fabricantes diferentes. Por lo general, el método de prueba PE-90 con 20 pies de tubo buffer intacto y el método FOTP-244 con 20 pies de tubo buffer intacto dan como resultado cambios de atenuación de la fibra similares, como se puede ver en las *Figuras 1* y *2*.

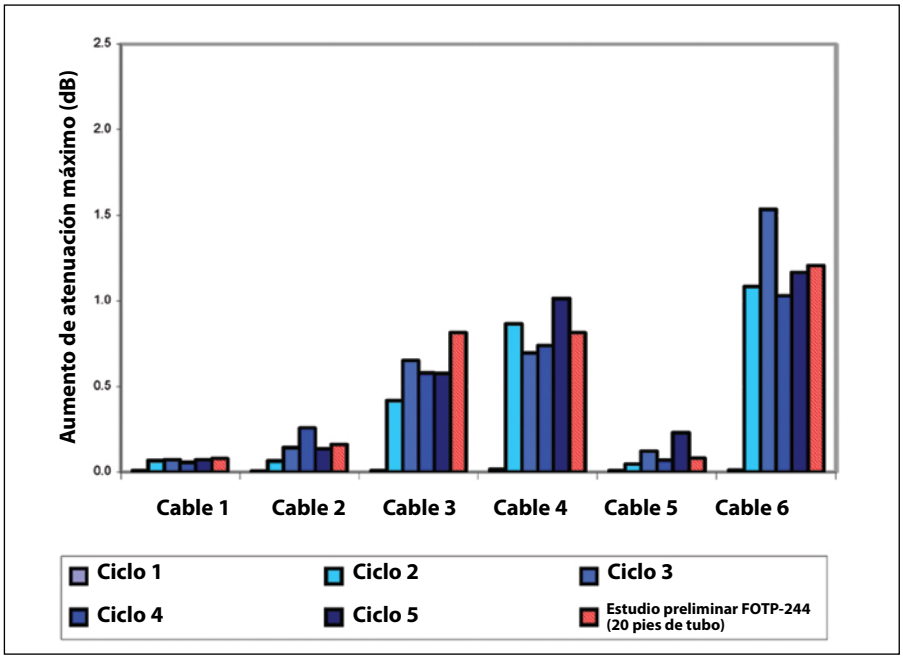
La *Figura 1* muestra los aumentos de atenuación media y la *Figura 2* muestra los aumentos de atenuación máximos. De estos seis cables probados, cuatro han presentado la mayor pérdida por atenuación con el método de prueba FOTP durante el quinto ciclo del método PE-90. Aunque los dos métodos den resultados distintos, cuando se aplica el límite RUS máximo de 0,1dB y medio de 0,05 dB, generalmente, los tipos de cable dan resultados pasa o no pasa, ya se use uno u otro método.

5 Efecto del número de ciclos

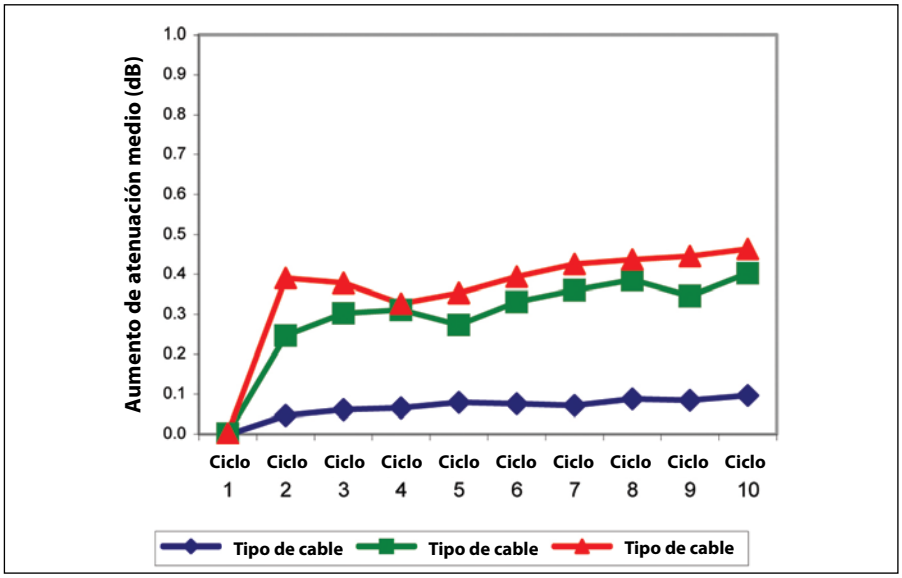
5.1 Ciclos y picos máximos de atenuación

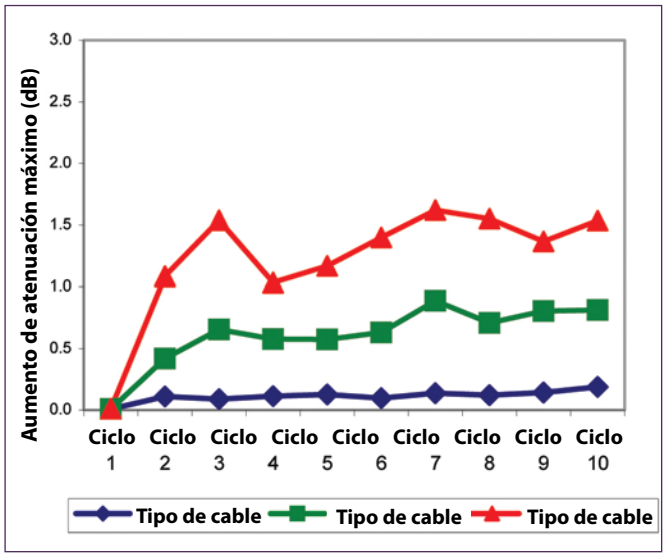
La prueba PE-90 requiere que se mida y evalúe el último de cinco ciclos por lo menos. Como se puede ver en los datos de la prueba PE-90 de ciclos múltiples en las *Figuras 1* y *2*, los mayores aumentos de atenuación no ocurren necesariamente durante el quinto ciclo y pueden producirse en cualquier momento, entre el segundo y el quinto ciclo. En las *Figuras 1* y *2*, tres de los seis cables probados muestran los

▼ **Figura 2**: *Comparación entre las pruebas del tramo intermedio según el método PE-90 (20 pies de tubo) y el estudio preliminar FOTP-244 (20 pies de tubo) – aumento de atenuación máximo*

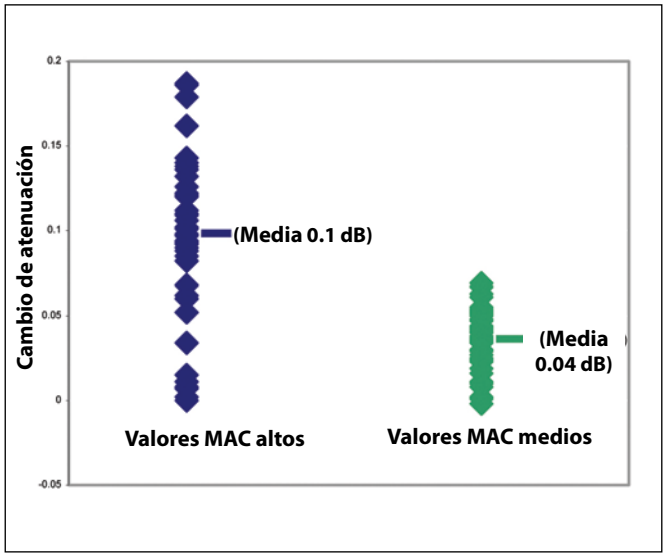


▼ **Figura 3**: *Prueba en el punto de acceso intermedio PE-90 (20 pies de tubo) con cinco ciclos adicionales – aumento de atenuación medio*





▲ **Figura 4**: *Prueba en el punto de acceso intermedio PE-90 (20 pies de tubo) con cinco ciclos adicionales – aumento de atenuación máximo*



▲ **Figura 5**: *Cambio de atenuación en fibras con valores MAC altos y medios*

aumentos de atenuación mayores entre el segundo y el cuarto ciclo, no en el quinto ciclo. Realizando medidas solamente en el último ciclo, durante la prueba pueden saltarse los aumentos de atenuación que pueden ocurrir en campo durante el primero o los dos primeros extremos de temperatura estacionales.

5.2 Efecto del aumento del número de ciclos

Para comprender mejor el efecto de los ciclos de temperatura de la prueba en el punto de acceso intermedio en las pérdidas por atenuación, se han probado tres cables según la norma PE-90. Estos tres cables han sido probados con cinco ciclos a extremos de temperatura adicionales, por un total de diez ciclos.

Las tendencias de la atenuación en la fibra resultantes en los diez ciclos están ilustradas en las *Figuras 3* y *4*. La *Figura 3* presenta los aumentos de atenuación medios para cada uno de los diez ciclos al extremo de temperatura de –40°C, y la Figura 4 muestra los aumentos de atenuación máximos para cada ciclo a –40°C. Es importante notar que el requisito PE-90 corriente especifica "por lo menos cinco ciclos". Esto permite para efectuar ciclos adicionales, y solamente el último ciclo debe ser evaluado respecto a la especificación. El gráfico de la *Figura 4* muestra que la pérdida por atenuación de la fibra a veces puede mejorar un poco con ciclos adicionales.

6 Efecto de los valores MAC de la fibra

El valor MAC de una fibra tiene una grande influencia sobre la variación de la atenuación en una prueba en el punto de acceso intermedio. El número MAC de una fibra es definido como su diámetro del campo modal medido a 1550nm dividido por su longitud de onda de corte.

Este valor es un indicador de sensibilidad a la macrocurvatura de la fibra. La *Figura 5* presenta las medidas de atenuación de cada fibra individual en varios tubos y varios cables de la prueba en el punto de acceso intermedio. Cada tubo probado contenía tres fibras con valores MAC altos, tres fibras con valores MAC medios y seis fibras de descarte para llegar a la capacidad máxima de doce fibras de los tubos.

Examinando los valores máximos, medios y la media de los mismos para cada tipo de fibra (*Figura 5*) se puede ver que las fibras con valores MAC más altos han tenido bajas prestaciones en la prueba en el punto de acceso intermedio a bajas temperaturas; por lo tanto, las fibras con valores MAC altos deben ser tenidas en cuenta cuando se clasifica un diseño de cable.

7 Conclusiones

Se ha demostrado que la longitud del tubo buffer intacto en las pruebas de acceso al punto intermedio tiene más influencia sobre la atenuación que la diferencia de los métodos de prueba PE-90 y FOTP-244.

El requisito de la prueba que requiere 20 pies de tubo buffer intacto es, por consiguiente, más estricto que el requisito de la prueba de 14 pies de tubo.

Se ha demostrado también que cuando se efectúa la prueba en el punto de acceso intermedio de 20 pies de tubo buffer intacto, hay pérdidas similares en los dos métodos. Muestras de cable idénticos generalmente dan resultados pasa o no pasa a pesar del método.

Cuando se definen ciclos múltiples en pruebas del tramo intermedio, es posible que las mayores pérdidas por atenuación no ocurran durante el último ciclo, que es cuando se efectúan las medidas obligatorias. Hay una tendencia general hacia el aumento de atenuación al aumentar los ciclos, pero el aumento no se produce necesariamente en cada ciclo.

Se ha mostrado que los valores MAC de la fibra afectan significativamente a la pérdida por atenuación en las pruebas del tramo intermedio. Es importante evaluar las fibras con valores MAC más elevados cuando se clasifica un diseño de cable, dado que los resultados pueden aparecer mejores que los de un escenario de "caso peor", si no se consideran los valores MAC. ■

8 Referencias

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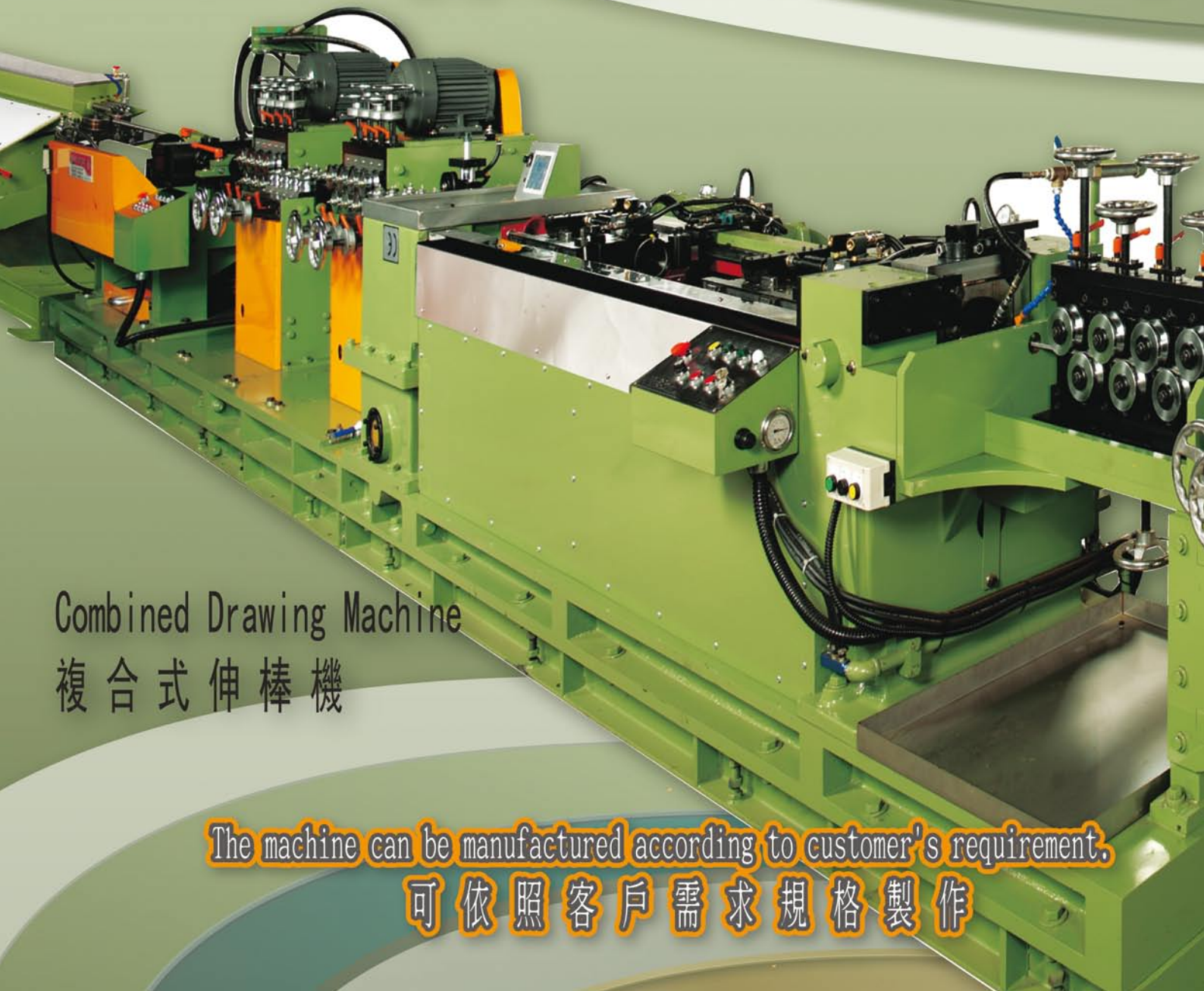

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