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# EUROwire

IWCS Focus

The International Magazine for the Wire & Cable Industries

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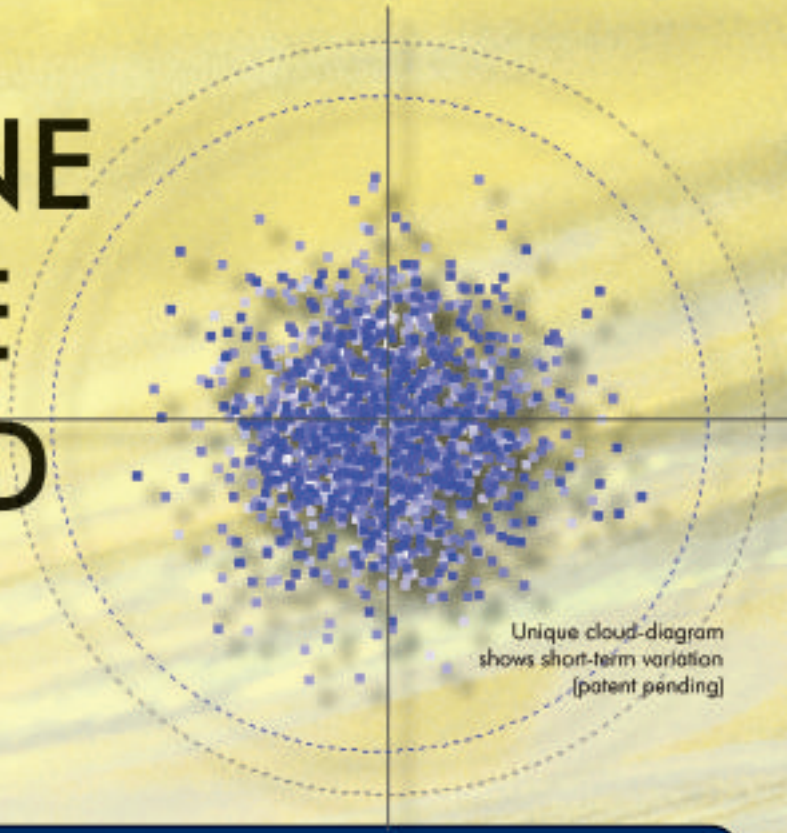

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# Magic in the mountains...

With the possible – and justified – exceptions of cancer cures and space exploration (though even the latter doesn't ignite the same enthusiasm it once did) scientific advances seem rarely to get the general media attention they deserve.

What a refreshing change, then, that the first attempt to circulate a beam through the entire 27km of CERN's Large Hadron Collider provoked radio and TV programming and acres of newsprint not confined to the usual scientific journals.

CERN's already produced some impressive technology. Established in 1954, its ENQUIRE project spawned the network we call the World Wide Web, and CERN scientists have Nobel prizes in physics for advances in computing and particle physics, but I'm sure the organisation has never received so much public attention as it did on 10th September.

About time too.

Perhaps if science could generate more media excitement, then the decline in students studying (in the UK) science subjects beyond the age of fourteen (and the consequent shortage of teachers and researchers in these subjects) would begin to be addressed. Would the public's attention have been captured to the same degree if we hadn't been threatened that the End of the World is (or just might be) Nigh? And does it matter, if the end result is more people enthused by science and the unseen powers that move us?

Professor Stephen Hawking was among the scientists and philosophers invited to explain the magic of wimps, dark matter and the hunt for the hypothetical Higgs boson. If his voice simulator can laugh out loud I'm surprised it didn't when he was asked about the possibility of the universe disappearing into a black hole within minutes of the LHC's activation. However, he treated the question with respect; it is, after all, a theory and it's the proving and disproving of theories that brings about advances.

Arthur C Clarke asserted that any sufficiently advanced technology is indistinguishable from magic. The Large Hadron Collider has all the ingredients – it even nestles inside a mountain, where all the best magic comes from.

Physics is magic. We can all use a little magic.

Gill Watson



## The International Magazine for the Wire and Cable Industries


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*See page 108 for further details*


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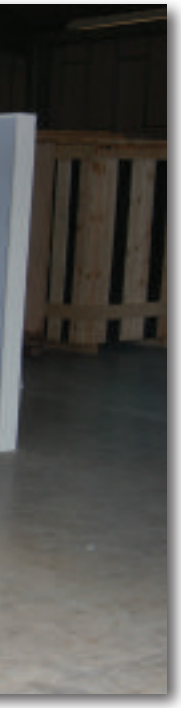
# contents

## Technical Articles







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## In The Next Issue

### Features On

- Wire drawing machines for ferrous & non-ferrous
- Wire working (bending, forming & welding)

### Getting Technical

Advances in high speed optical fibre colouring

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# dates for your diary . . .

**November**

20-22: **Wire and Cable India** – trade exhibition – Mumbai, India
**Organisers**: CII
**Fax**: +91 22 2493 9463
**Email**: info@ciionline.org
**Website**: www.ciionline.org

**April 2009**

27-30: **Interwire** – trade exhibition – Cleveland, USA
**Organisers**: Wire Association Intl
**Fax**: +1 203 453 8384
**Email**: info@wirenet.org
**Website**: www.wirenet.org

**May**

12-15: **wire Russia 2009** – trade exhibition – Moscow, Russia
**Organisers**:
Messe Düsseldorf GmbH
**Fax**: +49 211 4560 7740
**Email**: info@wire-russia.com
**Website**: www.wire-russia.com

**June**

17-19: **Wires & Fasteners Ukraine 2008** – trade exhibition – Kiev, Ukraine
**Organisers**: TDS – Expo
**Email**: olga@welding.kiev.ua
**Website**: www.weldexpo.com.ua

**September**

18-21: **Wire Turkey** – trade exhibition – Istanbul, Turkey
**Organisers**: Media Force
**Fax**: +90 212 465 7417
**Email**:
info@mediaforceonline.com
**Website**:
www.mediaforceonline.com

**October**

6 – 8: **Metaltech/Tubotech** – trade exhibition – Sao Paulo, Brazil
**Organisers**: Grupo Cipa
**Email**:
international@cipanet.com.br
**Website**: www.cipanet.com.br

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

**November**

TBA: 58th **IWCS** – technical conference – Rhode Island, USA
**Organisers**: IWCS Inc
**Fax**: +1 732 389 0991
**Email**: admin@iwcs.org
**Website**: www.iwcs.org

**April 2010**

12-16: **wire/Tube Düsseldorf**– trade exhibition – Düsseldorf, Germany
**Organisers**: Messe Düsseldorf
**Fax**: +49 211 45 6087 7793
**Email**: wire@messe-duesseldorf.de
**Website**: www.wire.de

# Amsterdam gets fibre to the houseboat

▲ *The well connected houseboat owner – Olivier Ax of Amsterdam*

Houseboat owners can now enjoy superfast broadband speeds by connecting to Amsterdam's CityNet, a citywide fibre optic communications network.

A new type of robust optical connector has been developed, inspired by military technology, which allows houseboats to physically connect to the network upon mooring and disconnect whenever a trip is necessary.

Amsterdam began the construction of a citywide, fibre optic network in 2006. Phase one of the CityNet project, which covers 40,000 households, will be completed on target this year.

A contract partner since participating in the open tender in 2006, Draka Communications, together with local Dutch company Van der Berg, proposed a solution for Citynet based upon a Fibre to the Home (FTTH) concept specifically developed for city environment applications.

"I now have ultra-fast Internet, television and telephone connection through a single cable," says Olivier Ax, owner of the first connected houseboat.

**Draka Holdings NV – The Netherlands**
**Fax**: +31 2056 89899
**Email**: info@draka.com
**Website**: www.draka.com

## British helping hand to international charity

A charity supporting orphans and needy people around the world is preparing to build a new facility in Eastern Europe – with help from cable management specialist Marshall-Tufflex.

The UK manufacturer, based in Hastings, has supplied the International Aid Trust (IAT) with a consignment of cable management products to help it fit out New Hope, a 90-bed property near the Black Sea coast, about 40 minutes from Odessa in the Ukraine.

When completed next year, New Hope will operate as a holiday home for children from orphanages throughout the Ukraine, Belarus and Romania. During their stay the youngsters will also be offered charity-funded medical and dental treatment.

"The Ukraine, in common with many Eastern European countries, has many thousands of orphans and hugely disadvantaged young people, so we were more than happy to help out," said Marshall-Tufflex managing director Jim Fletcher.

"IAT contacted us with details of the project and what it hoped to achieve by developing this new facility. Not only will it give youngsters a break, it will also provide vital health care treatment, given that the Ukraine has no effective state-funded health service."

**Marshall-Tufflex – UK**
**Fax**: +44 1424 856666
**Email**: sales@marshall-tufflex.com
**Website**: www.marshall-tufflex.com

# Quali2Twist process for UTP data cable

Delegates from major USA LAN cable producers recently attended a three-day demonstration at Gauder's Greensboro facility.

The Quali2Twist assembling line is the latest cabling machine for production of LAN cable (UTP/FTP/SSTP) Cat. 5, 5E, 6, 6e, 7 and 10 Gig.

During the demonstration several different types of cable were assembled, ranging from a standard solid PE Cat. 5e UTP to a FEP Cat. 7 FTP with Mylar/Al tape.

Quali2Twist is said to operate at twice the capacity of a conventional single twist laying-up line, achieving speeds of up to 1,600 twists per minute during the demonstration.

The line gives the same quality and consistency of cable as common single twist machines, but with speeds closer to a double twist. However, unlike a standard double twist process, there is no cable geometry modification after the assembling point. Impedance is stable and NEXT level is low at 250 Mhz.


▲ *Delegates at Gauder's recent Quali2Twist demo*

The entire line was sold over the course of the event and will soon be producing up to Cat. 6e UTP/FTP cables.

**Gauder Group – Belgium**
**Fax**: +32 4 367 8798
**Email**: gauder@gaudergroup.com
**Website**: www.gaudergroup.com

# Sikora opens a service office in Egypt

Sikora AG, manufacturer and vendor of measuring and control technology for the wire, cable and hose and tube sector, has announced the opening of a service office in Cairo, Egypt.

The office offers a new strategic location for the company's service and technical support for customers in the Arabian countries.

The long-term partnership between Sikora AG and its Egyptian representative, Heavy Industries Services Co (HISCO), formed the basis for locating a professional Sikora service team on site. The new service office, which is based at the existing HISCO office, will provide on-call technical service support.

"Cairo represents an optimum location for our service office," says Harry Prunk, chairman of the Sikora AG.

"The intensive collaboration with our representative HISCO in Egypt during the last years has proven successful. The new service location allows us to offer improved service and responsiveness to the growing demands of our Arabian customers."

**Sikora AG – Germany**
**Fax**: +49 421 4890 090
**Email**: sales@sikora.net
**Website**: www.sikora.net

# Price increase for fluorochemicals may have impact on cable

Daikin America Inc, the second largest fluoropolymer supplier in the US, has announced the successful implementation of its May 2008 price increase announcement across all polymers.

The company reports that the increases were necessary to recover some of the production cost increases driven by freight, energy, and packaging plus, during the last six months, unprecedented increases for key raw materials.

Specifically, the price of sulphuric acid (a major component in the conversion of fluorspar to anhydrous HF) has increased by 600% and supply has tightened. This has forced HF suppliers to demand significant price increases.

Daikin America manufactures and sells a full range of fluoropolymers for a wide variety of high performance wire and cable, used across a broad range of industries.

**Daikin America Inc – USA**
**Fax**: +1 845 365 9598
**Email**: customerservice@daikin-america.com
**Website**: www.daikin.cc

# EuroWire

**Publication Programme 2009 / 2010**

## The International Magazine for the Wire & Cable Industries

## 2009

### JANUARY

- Wire drawing machines for ferrous and non-ferrous
- Wire working (bending, forming and welding)

### MARCH

- Interwire 2009: show issue
- Power cable manufacturing, materials and machinery
- wire Russia 2009: show issue

### MAY

- Wires & Fasteners Kiev 2009: show issue
- Materials, handling and equipment

### JULY

- Wire products for the automotive industry
- Dies and die shop equipment

### SEPTEMBER

- wire SE Asia 2009: show issue
- Steel wire, cable and rod

### NOVEMBER

- IWCS Conference and Exhibition
- Power cables (medium to extra-high voltage)
- Testing and measuring

## 2010

### JANUARY

- wire Düsseldorf: show preview
- Cleaning and descaling machinery and chemicals
- Extruding – machinery and equipment

### MARCH

- wire Düsseldorf 2010: show issue
- Armouring and reinforcing of cables

### MAY

- Wire Expo 2010: show issue
- Wires & Fasteners Ukraine 2010: show issue
- Spools, reels and pre-packaging systems

### JULY

- Straightening, cutting and welding of wire and rod
- Re-conditioned and second hand machinery – buyers' guide

### SEPTEMBER

- wire China 2010: show issue
- Fibre Optic – machinery and equipment

### NOVEMBER

- IWCS Conference and Exhibition
- Compounds and colourings
- Tooling manufacturers and suppliers
- Springs

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## Welsh wire factory to close

The board of Draka Holding NV, in line with Draka's Stop, Swap and Share (Triple S) programme, has announced its intention to stop production of copper wire in its Llanelli (UK) copper wire factory and consolidate production in other factories within Europe, where wire drawing is already part of the manufacturing process.

The Llanelli factory is part of the Energy & Infrastructure Europe division and employs approximately 135 people. Sales served by the Llanelli facility will be absorbed by Draka's Derby (UK) site.

The closure has been discussed with the European Works Council and the National Works Council in the UK.

**Draka Holding NV – Netherlands**
**Fax**: +31 2056 89899
**Email**: info@draka.com
**Website**: www.draka.com

## US DoC offers support to WAI

The Wire Association International (WAI), has announced that Interwire has been selected to participate in the US Department of Commerce (DoC) 2009 International Buyer Program (IBP).

Offered through the International Trade Administration, the US Commercial Service IBP programme offers export counselling to exhibitors as well as assistance to international buyers to help meet their purchasing and representation objectives.

The programme is committed to promoting exports by attracting international buyers to leading US trade events.

Interwire ranks among Tradeshow Week's top 200 largest tradeshows in the US; it runs from 25th to 30th April 2009, at the I-X Center in Cleveland, Ohio, USA.

**Wire Association International – USA**
**Fax**: +1 203 453 8384
**Website**: www.wirenet.org

## Big clients, but still a family firm

Founded in 1951 by Mr Arie Shomer, Chavmal Ltd continues to be a family-owned business.

Chavmal is among the largest manufacturers in its field in Israel, naming the Israeli Ministry of Defence and Israel Electric Co among its major customers.

Chavmal manufactures nails, chain link fences, welded meshes, hen-houses, gabions, crepe wire mesh, expended metal, tying iron wires, twisted wires, galvanized wires, PVC coated wires, black annealed wires, barbed wires, concertinas, fence poles and pickets, plaster corners, concrete reinforcing welded mesh and fence welded nettings.

**Chavmal Co Ltd – Israel**
**Fax**: + 972 4849 2776
**Email**: saramal@netvision.net.il

# New brochure and data sheets from Chem Polymer

A new brochure from Chem Polymer, a unit of Teknor Apex Company, gives detailed information on the company's range of engineering thermoplastic (ETP) compounds.

Chem Polymer has also published accompanying data sheets focusing on the automotive and electrical and electronics (E&E) applications of these materials.

The general publication on ETPs is an 8-page brochure that lists property data for Chemlon® nylon 6, 66, 66/6 copolymer, and 12 compounds. Tables show these products to be available in many reinforced, filled, wear-protected and flame-retardant versions, in formulations modified for impact resistance, enhanced flow and other characteristics, and in products that combine these technologies.

All compounds can be supplied in pre-coloured form.

The automotive data sheet presents a schematised automobile indicating the many applications served by Chem Polymer compounds, plus a listing of Chemlon compounds approved by Chrysler, General Motors and Ford.

The illustrated electrical and electronics data sheet lists non-halogenated flame retardant (FR) grades of Chemlon non-filled and glass-filled nylon 6 and 66 compounds.

The data sheet also reports on existing applications such as connectors and terminal blocks, power distribution components, wiring devices, and housings and enclosures.

All three items can be downloaded from the Chem Polymer pages at www.teknorapex.com

**Teknor Apex Company – USA**
**Email**: info@chempolymer.com
**Website**: www.teknorapex.com

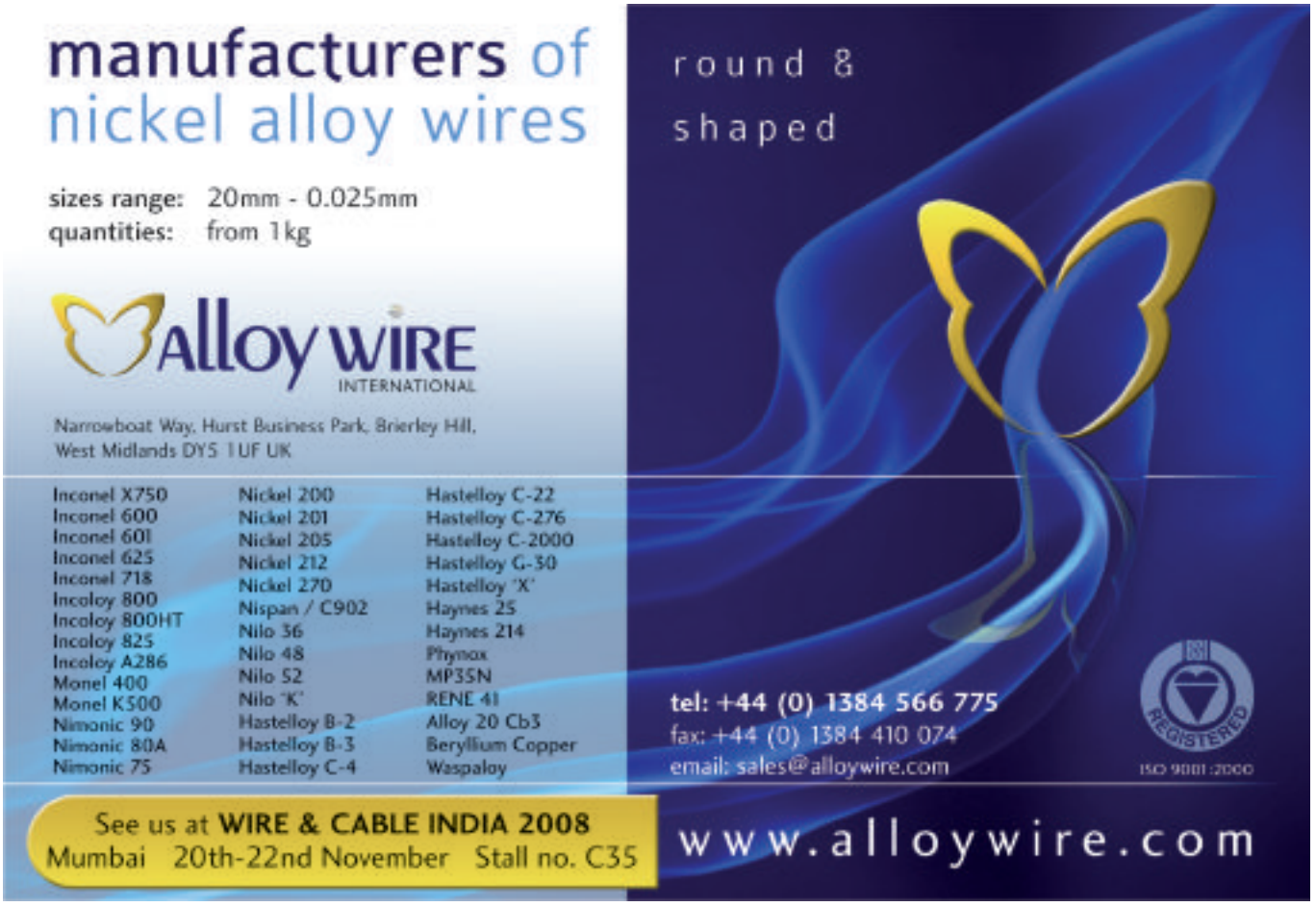
## REMSAC's expanded coverage for RichardsApex

RichardsApex Inc has announced an expansion of duties for its current representative, REMSAC, to include Brazil and Argentina.

REMSAC currently covers Peru, Chile, Ecuador and Colombia for RichardsApex Inc from its home office and warehouse in Lima, Peru.

REMSAC has full representation of the entire RichardsApex product line and has been a partner with RichardsApex, Inc for 11 years. With this move, RichardsApex Inc intends to strengthen its current positioning within the South American market.

**RichardsApex – USA**
**Fax**: +1 215 487 3090
**Email**: information@richardsapex.com
**Website**: www.richardsapex.com



# Eland Cables awarded ISO 14001

Eland Cables has achieved ISO 14001 accreditation. The ISO 14001 international standard provides both a model for streamlining environmental management and guidelines to ensure environmental issues are considered within decision-making practices.

Eland Cables is among the first electrical cable companies in the UK to achieve the ISO 14001 accreditation after a series of audits by Bureau Veritas Certification at its London and Doncaster sites. Both locations will be assessed annually to ensure continual development of the Environmental Management System (EMS) currently in place.

Eland Cables has reduced materials sent to landfill. All scrap cable and wood is recycled, plywood reels come from sustainable sources and wooden drums are reused. Future initiatives include reducing energy consumption, further increases in recycling and improving employees' environmental awareness.

Philip Brown, managing director, commented: "Minimising our impact on the environment will continue to be a focus as the company grows."

**Eland Cables – UK**
**Fax**: +44 20 7241 8700
**Email**: sales@eland.co.uk
**Website**: www.eland.co.uk

# IRIS anti-rust products

Yangzhou Zhonghua South Technology Co Ltd specialises in the development, production and sale of IRIS grease for steel wire ropes and anti-rust oil for metal products and petroleum pipes.

The company is also equipped to undertake trials, the production of additives, treatment of base oil, preparation of oil products, storage and inspection.

IRIS grease products are effective in prolonging the usage of wire rope, with strong adhesion, excellent lubricity, anti-rust qualities and a high dropping point to suit, for example, the wide temperature ranges experienced in the mining industry.

IRIS grease products are designed to be easy to use. After 24 hours solidification a sticky soft lubricating film forms on the steel wire rope surface.

IRIS diversified products are already in use to protect port machinery, engineering machinery, elevator equipment, petroleum machinery and mine steel wire ropes.

**Yangzhou Zhonghua South Technology Co Ltd – China**
**Fax**: +86 514 8776 1057
**Email**: sale@irischem.net

# In brief...

Dow Europe GmbH has announced a price increase of up to US$900 per metric ton for its wire and cable products across India, Middle East and Africa. This increase will be of immediate effect, or as contract terms allow.

**Dow Europe GmbH – Switzerland**
**Website**: www.dow.com

◆ ◆ ◆ ◆

Ajex & Turner has been appointed sole distributor in India for Tecnova (TKT) products, including a large variety of lubricants for high carbon, $CO_2$, low carbon, stainless steel and spring steel, and for the wire descaling spiral brush manufactured by Sealeze of the USA.

**Ajex & Turner Wire Dies Co – India**
**Fax**: +91 11 2394 0226
**Email**: sales@ajexturner.in
**Website**: www.ajexturner.com

◆ ◆ ◆ ◆

LHI Technology, a manufacturer of medical cable assemblies, has established a base for sales, engineering and logistical support for North American operations.

**LHI Technology Ltd – USA**
**Website**: www.lhitechnology.com

# Qatar contract for HV powerlinks

Nexans has been awarded a turnkey contract worth €58 million by the Qatar General Electricity and Water Corporation (KAHRAMAA) to implement six underground powerlinks, ranging from 34 to 250 MVA, to reinforce and extend the high voltage (HV) network serving Doha, the capital of Qatar.

These powerlinks, which will connect substations serving the Al Wajbah area of Doha, form part of KAHRAMAA's phase VIII projects for the expansion and development of Qatar's electricity network to increase its capacity to meet the rapid increase in demand created by the country's urban and economic development.

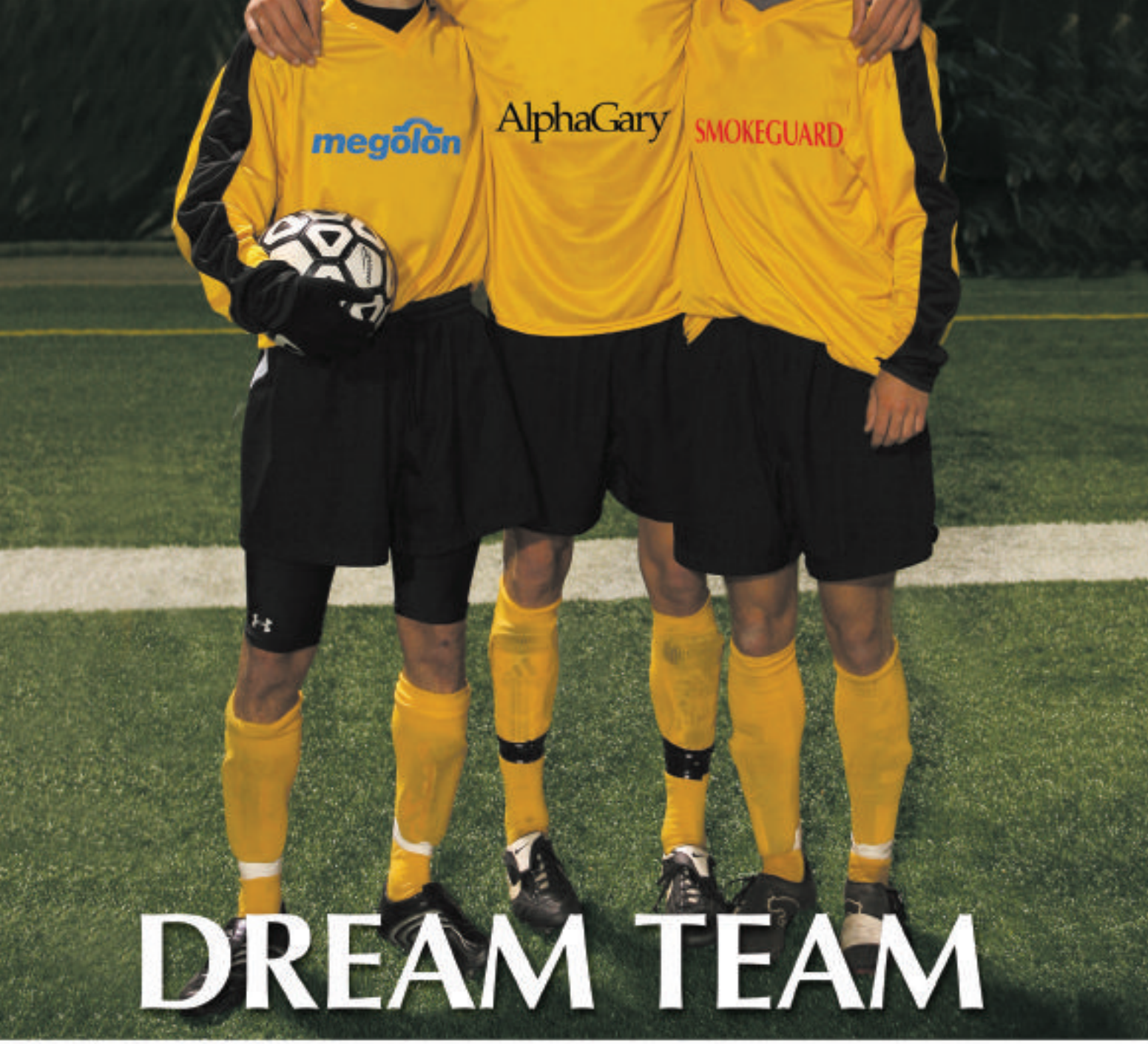
Nexans will provide a complete turnkey package for the project, which is due for completion in July 2009.

This includes design, development, supply and installation of a total of 96 km of 66kV and 132kV single core cables and accessories.

This project is the latest in Nexans' long history of collaboration with KAHRAMAA, the first contract dating back to the 1970s.

The cables will be manufactured in Nexans' factories in France and Belgium.

**Nexans – France**
**Fax**: +33 15669 8484
**Email**: nexans.web@nexans.com
**Website**: www.nexans.com




THE RIGHT PLAYERS: Two star players - MEGOLON and SMOKEGUARD — are now on the same team! As our customer, you will benefit greatly from our diverse and proven portfolio of cable compound materials.

THE RIGHT STRATEGY: Our game plan is focused on three key initiatives: 1) fulfilling our customers' needs, 2) providing leading-edge technology, 3) planning for the future. We are involved, experienced, and established. You can count on us.

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# Six months of expansion for Madem

Madem Group has announced several developments for the next six months:

• In Brazil, Madem SA has completed a new plywood plant, representing a US$8,000,000 investment. The plant, located in southern Brazil will produce 70 containers per month of plywood reels flanges.

All machinery was custom developed for Madem and the special plywood will be in the market by October 2008. Madem SA has three plants in Brazil, 800 employees, 30,000 acres of renewable pine forests, two sawmills and one recycling operation.

• In the United States, Madem Reels USA Inc in Chattanooga is launching a second shift as well as opening its first warehouse and recycling centre in West Virginia. Another ten warehouses will be opened by 2010. Madem Reels is already servicing eight customers from the Chattanooga plant operation.

• In the Middle East, Madem Gulf WLL, located in Kingdom of Bahrain, has nearly completed a new plant where production is expected to begin by January 2009. Madem is anticipating another new plant project for Middle East region in 2010.

• In Spain, Euromadem Spain SL launched a second shift in September 2008 at its Calaf, Barcelona plant. Already selling in Spain and Portugal, Euromadem is set to penetrate markets in France, Belgium, Switzerland and Germany.

• In Eastern Europe, Madem Romania SRL located in Bistrita, Romania, is anticipating the launch of another production operation projected to start up in December 2008.

Madem is ISO 9000 and ISO 14000 compliant in Brazil and will begin ISO implementation in Spain and USA in January 2009.

"Madem has invested US$45,000,000 in the last five years in new plants, software, quality systems, machinery and warehouses. With our new plants in Bahrain and Romania, Madem will be processing 30,000m$^3$ of lumber per month (750 trucks of lumber/month) and sell our products to over 150 customers in more than 40 countries," said Leandro Mazzoccato, Madem group sales director.

**Madem Reels – Brazil**
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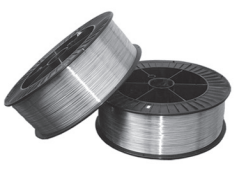
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# Nexans cables at the heart of Beijing airport baggage handling system

Nexans has supplied over 2,500 km of power and control cables to China, for a total value contract of around €2.6 million, to play a vital role in the operation of the baggage handling system in the new Terminal 3 at Beijing International Airport.

Nexans was selected as the sole cable supplier for this project, for several reasons. Firstly, the Nexans cables complied with all the relevant standards for airport applications, including flexibility and halogen-free insulation. Moreover, Nexans was able to supply all the different types of cable – power, control and optical. Nexans was also able to provide a fast response delivery to meet a truncated construction timescale – where most major projects of this type take around five years, the Beijing Terminal 3 baggage handling system progressed from initial design stage to commissioning in just three years.

The system, installed by Siemens and Inter Roller, is believed to be one of the world's largest and most modern, with the capacity to sort and transport up to 19,200 bags per hour. Beijing Airport's new Terminal 3, which opened in March 2008, has more than doubled the previous capacity of the airport from 30 to 66.5 million passengers per year. Some 330 check-in counters are connected to a 68 km, high-speed, tray-conveyor system. Bags are transported through a 2.2 km tunnel at a speed of 36 km/hour from the check-in counters in Terminal 3A to the loading carousels in International Terminal 3B.

▲ *Baggage handling system at Beijing Airport*

A wide variety of power supply, control, data transmission cables were required to ensure the correct operation of the baggage system, consisting of a combination of high-speed tray conveyors, conveyor belts and tilt-tray sorters, all controlled by a material flow computer.

The copper cables were manufactured at Nexans' plants in Germany, and the optical cables were manufactured by Nexans' Opticable factory in Belgium.

**Nexans – France**
**Fax**: +33 15669 8484
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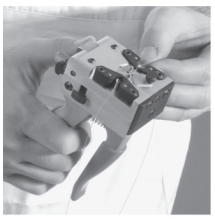
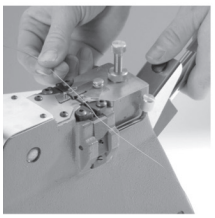
**Website**: www.nexans.com

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# Meltech's new operations manager

Wire and coiling equipment specialist, Meltech Engineering Ltd has appointed Duncan Prince as operations manager at its Blackburn manufacturing facility. With increasing global demand for the company's products in the wire, cable and offshore markets, Mr Prince will be responsible for production planning and project communications.

Formerly director of one of the Hyde Group's Aeroproducts Division companies in Manchester, Mr Prince has 20 years experience of production planning and project management. He joins Meltech Engineering as the company prepares to develop its next generation coiling systems for the offshore industry, and a range of energy efficient, electrical heat treatment furnaces for the wire and aerospace sectors.

"Meltech Engineering has a reputation for developing and manufacturing bespoke engineering equipment that has to be tightly integrated within a customer's production processes. Duncan Prince's experience will strengthen our capabilities in this critical area, as we respond to increasing sales demand from customers," said Peter Drever, sales and marketing director, Meltech Engineering Ltd.

**Meltech Engineering – UK**
**Fax**: +44 1254 691488
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**Website**: www.meltech.co.uk

# Reelex adds new R&D wing

Reelex Packaging Solutions has added a new wing to its facility devoted to research and development of the Reelex® packaging system.

"Tangle-free packaging has benefits for thousands of products beyond just LAN and coaxial cable, and this new wing illustrates our enthusiasm for creating complete packaging solutions for those products," said Frank Kotzur, Reelex's VP of research and development.

"With this new facility, we will be developing our packaging technology for a wider range of products including fibre optics, steel cable, building wire and more."

The new facility features a full machine shop for creating unique on-demand parts as well as a state of the art 3D printing machine for fabricating rapid prototypes.

"Because we are the only company developing the Reelex package, we must have the ability to try new designs and adapt our technology to the unique characteristics of various products in a rapid manner," Mr Kotzur said. "We are positioning ourselves to meet as many packaging demands as possible."

**Reelex Packaging Solutions – USA**
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# It pays to learn with IWMA

The International Wire and Machinery Association (IWMA) funds an Educational Trust Scheme that amongst other things offers the Walter Niehoff Scholarship, in memory of one of the past presidents of the association.

The scholarship provides a financial award every 2 years of up to $24,000 to be paid to an institute, training organisation, university, college or similar establishment for the benefit of an individual trainee, student or apprentice engaged in study, research or training activities related to the wire, cable or wire product industries.

Awards can also be made to industry institutions or establishments that offer training in the wire and cable sector.

It is now in a position to make a further award of a Walter Niehoff Scholarship under this scheme for 2008/2009 and invites applications. Applicants may be employed by a company or be students, apprentices, individuals at colleges, institutions, universities or other places of research and learning who are introduced by an IWMA member and are committed to the study and future employment in the field of engineering applicable to the wire, cable or wire product industries.

The IWMA considers that one of its primary functions is to promote new technology, education and growth in the industry. Its conferences and educational seminars provide an international forum for the exchange of technology, regular focused meeting places for the industry and excellent reference sources from its library of past papers. The Educational Trust offers another very important educational route.

Through both the IWMA's Educational Trust Fund and its Travel Award scheme the association actively encourages the gaining of new skills and experience for future rising stars in the industry.

**IWMA – UK**
**Fax**: +44 1926 314755
**Email**: info@iwma.org
**Website**: www.iwma.org

## New technology for global markets

The next major biennial conference jointly organised by the Wire Association International (WAI), Associazone Costruttori Italiani Macchine Per Filo (ACIMAF) and the IWMA will take place in Istanbul 2nd-3rd November 2009.

There are important and developing industries in the wire and cable sectors, which should result in a healthy local attendance, notwithstanding the anticipated high level of interest from other countries in the region.

Since 2003 these three key wire and cable associations have successfully collaborated in organising high quality conferences in Stresa, Prague and Bologna.

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**Website**: www.iwma.org

## Distributor for rail cables

Huber+Suhner has appointed Anixter as a franchised distributor for a range of rolling stock cables.

Huber+Suhner has extensive experience in designing, developing and manufacturing railway cable, interconnect, harness and wireless solutions. Anixter stocks Huber+Suhner's Radox RSE and Radox 4GKW ranges and supplies 3GKW and 9GKW cables. Both over and underground applications are available.

Mark Fordham (MIEEIE), Anixter technical manager, said, "This range of flexible insulated and sheathed 1,800- and 3,000-volt rated cables, in addition to being ozone and weather resistant, offers outstanding oil resistance with excellent thermal properties (–40ºC to +120ºC). They meet the requirements of BS6853-1a and have low smoke, low toxicity and halogen-free performance combined with an excellent level of flame retardance."

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# Director of global sales & marketing

LaserLinc, manufacturer of non-contact, precision laser and ultrasonic systems for measuring inside and outside diameter and wall thickness for wire, cable, fibre and many other industries, has announced the appointment of Mr Jeff Kohler as the director of global sales and marketing.

▲ *Jeff Kohler of LaserLinc*

Mr Kohler is co-founder and a member of the board of directors of LaserLinc with over 22 years of experience in non-contact measurement.

Before co-founding LaserLinc, he was with Techmet (now Beta LaserMike), which he joined in 1986.

**LaserLinc Inc – USA**
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**Website**: www.laserlinc.com

# Olympic cables contract for Prysmian

Prysmian Cables and Systems completed a high value project for the Beijing 2008 Olympic games, developing the high voltage power grid to supply energy to the Olympic village. Prysmian commissioned 20km of high voltage cables at 220kV to supply energy to the village that covers over 66 hectares of land.

Prysmian's stamp was also on the International Broadcasting Centre, from which RAI Television, Italy's premier television company, transmitted footage from the Olympics. The group cabled RAI's entire broadcasting centre, providing connections of a high technical level capable of ensuring the highest quality of transmissions.

Prysmian supplied all the passive media and LAN cables under RAI's specifications, including: broadcasting cabling and connectors for media transmission; audio cabling and connectors; UTP CAT 5E & CAT 6 cabling for LAN connectivity; MMF fibre cabling for broadcast backbone and broadband transmission, and RF radio frequency cabling and connectors.

Prysmian has five manufacturing plants in China, located in Tianjin (special cables for industrial applications), Baoying in Jiangsu Province (high voltage cables and systems) and Wuxi, also in Jiangsu, (optic and copper cables for telecommunications) together employing over 1,000 staff. Prysmian Shanghai Trading imports and distributes Prysmian's cable accessories for MV and HV cables.

Prysmian has recently opened a new plant in Beijing and aims to achieve growth of about 50% of its Chinese business by 2010. The total value of Prysmian's investments in China is said to be over €100 million.

**Prysmian Cables & Systems – Italy**
**Website**: www.prysmian.com

## Sikora's 500th celebration

Sikora AG has produced its 500th X-Ray 8000 in Bremen. The jubilee measuring system of the X-Ray 8000 NXT series was delivered to a customer in Russia at the end of August.

On the occasion of the jubilee, all Sikora employees and families met for an open-air summer party at the Sikora premises in Bremen on 11th July, where activities with musical and culinary accompaniment and attractions such as a bouncy castle and a Rodeo simulator contributed to the successful event.

"I am proud that our measuring device has proved reliable in production lines for high voltage cables for 15 years," said Harry Prunk, chairman of Sikora.

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# Transatlantic Cable

## The economy

### A summit of financial titans generates very little in the way of encouragement

The 2008 edition of the annual symposium hosted by the Kansas City Federal Reserve took place 22nd and 23rd August at Jackson Hole, Wyoming. As expected, it drew prominent central bankers, finance ministers, academics, and financial market participants from around the world. Also as expected, it disappointed those who sift the reports out of this meeting for at least a few grains of comfort.

The Kansas City branch of the Fed is one of 12 regional banks in the system, located in major cities across the country and acting as fiscal agents for the US Treasury. Each year since 1978, this midwestern branch has convened a symposium on an important economic issue facing the US and world economies. Among those addressing this year's topic, Maintaining Stability in a Changing Financial System, was Federal Reserve chairman Ben S Bernanke, who reached the bad news by sentence two of his speech to the gathering. "Although we have seen improved functioning in some markets, the financial storm that reached gale force some weeks before our [2007] meeting has not yet subsided," Mr Bernanke said. "And its effects on the broader economy are becoming apparent in the form of softening economic activity and rising unemployment. Add to this mix a jump in inflation, in part the product of a global commodity boom, and the result has been one of the most challenging economic and policy environments in memory."

Mr Bernanke, whose talk was entitled "Reducing Systemic Risk," saw two means to this end: increasing the resilience of the global financial system by strengthening its infrastructure; and a systemwide approach to more effective government regulation and supervisory oversight of financial institutions. None of his colleagues and counterparts resisted the Bernanke prescription. But nor do they expect near-term improvement in the global financial picture.

Mario Draghi, governor of the Bank of Italy, told the conference, "More than a year into the most challenging financial crisis of our times we now face a complex and interlocking combination of rising inflation, declining growth, tightening credit conditions and widespread liquidity tensions." Mr Draghi, who is also a member of the governing council of the European Central Bank, said it would take a few years for the financial markets to recover their confidence, and warned of tough times coming up: "These adjustments will not be painless, and ensuring that they take place in an orderly manner will pose substantial challenges for policymakers."

- These views were echoed at the outskirts of the conference. "[We are] in the middle of a financial crisis, with the economy sliding into recession, with monetary policy at maximum easing, and fiscal transfers impotent," Reuters was told by Harvard economist Martin Feldstein, until recently head of the US National Bureau of Economic Research.

John Lipsky, first deputy managing director of the International Monetary Fund (IMF), told Reuters correspondents Alister Bull and Mark Felsenthal that the US economy might contract slightly in the second half of the year, even if it manages to evade the generally accepted rule of thumb for a recession: two consecutive quarters of contraction. He warned of a sluggish period ahead, with the IMF forecasting growth of 1.3% for 2008 and 0.8% in 2009. Mr Lipsky detected "greater clarity" at this year's "more sombre" conference. "A year ago there was a real sense of uncertainty and confusion," he said. "People were perplexed by the turmoil that had come on quite suddenly." By now, presumably, the world's leading fiscal managers are more or less accustomed to the turmoil. The question is, are they any closer to putting an end to it?

### Two-thirds of US corporations avoided federal income taxes over the period 1998-2005

Two out of three American corporations paid no federal income tax for the seven years through 2005, according to the Government Accountability Office. A GAO report released 12th August also said that some 68% of foreign companies doing business in the US avoided corporate taxes over the same period. According to the GAO estimate, taken together the two sets of companies reported trillions of dollars in sales.

The GAO study was requested by two senators, both Democrats. It did not address why corporations had not paid federal income taxes or corporate taxes and it did not identify any corporations by name. It noted that companies might escape such taxes if they have suffered operating losses or taken tax credits. The findings also suggest that corporations file their tax returns under tax codes they consider more beneficial to them. As reported by the *Chicago Tribune* (13th August), an outside tax expert, Chris Edwards of the libertarian Cato Institute in Washington, said increasing numbers of limited liability corporations (LLCs) and 'S' corporations pay taxes under tax codes for individual payers. [S corporations are similar to LLCs in that they provide owners with limited liability protection while offering the tax structure of a partnership.] "Half of all business income in the United States now ends up going through the individual tax code," Mr Edwards told the newspaper.

The Tribune pointed out that the GAO study did find that the percentage of large US companies paying at least some federal tax grew to 75% in 2005. This was the highest level of tax payments by large companies since 1998, when 78% paid at least some tax, the GAO said. The results for 2005, when corporate profits were surging, compares with 62% in 2001, when the country was in recession, the report said.

***Of related interest . . .***

- The Internal Revenue Service (IRS) has offered to permit some 45 American corporations to settle disputes over certain tax shelters that have been used to defer paying billions of dollars in taxes. The agency said on 7th August that corporate users of the shelters may keep 20% of their claimed tax losses through 2007 if they agree to get out of the shelters by December 2010 at the latest. Corporations that agree would not have to pay steep penalties, typically 20% of the taxes owed.

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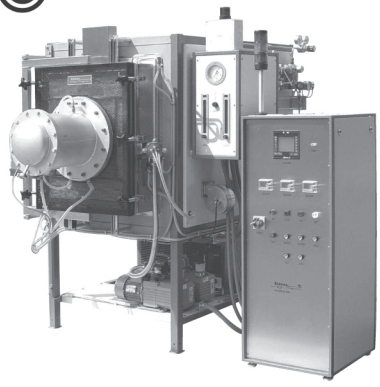

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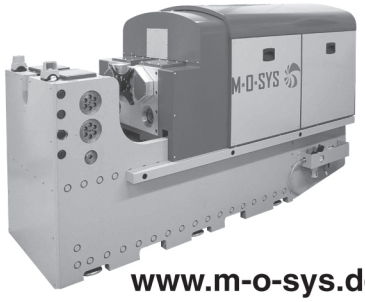


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# Transatlantic Cable

The shelters, known as LILO (Lease-In/Lease-Out) and SILO (Sale-In/Lease-Out), enable corporations to lease infrastructure, often overseas, on paper only – then lease the infrastructure (such as subways or bridges) back to the owners or operators. Recently, lawmakers and regulators have been questioning the purpose and legitimacy of these leveraged-lease transactions that essentially transfer depreciation rights from tax-exempt entities to taxpaying corporations. As explained by the financial research firm Moody's, companies have used the timing differences associated with claiming these accelerated tax deductions to reduce income tax payments to the IRS in the early years of the transactions. They have also benefited from the relatively high rates of return on the transactions during the early period.

## Manufacturing

### China is set to top the US as world's largest manufacturer

The rapidly weakening American economy has accelerated the timetable for China to overtake the US as the world's largest producer of manufactured goods, by four years. In 2007 the US was still easily in the top slot, accounting for a fifth of the global total, while China was second with 13.2%. But according to the economics consulting firm Global Insight (Waltham, Massachusetts), China will in 2009 account for 17% of global manufacturing value-added output of $11.8 billion; the US, 16%.

The estimates, prepared for the *Financial Times* (London), were made public in midsummer. As recently as 2007, wrote FT's Peter Marsh (10th August), Global Insight economists saw the US retaining the top position until 2013. But a large downward revision in likely output for 2007 and 2008 is expected to cause the US to slip more quickly.

John Engler, president of the National Association of Manufacturers (Washington, DC), appeared to take the projections in stride as an "inevitable" effect of China's size. He told FT.com, "This should be a wholesome development for the US, for it promises both political stability for the world's largest country and continuing opportunities for the US to export to, and invest in, the world's fastest-growing economy." Mr Marsh observed that the data underline the surge of China's manufacturing-led economy over the past 20 years. He noted that, in 1990, before the country's economic reforms began to work, the Chinese contribution accounted for a "meagre" 3% of global manufacturing.

Putting the expected change in historical perspective, Mr Marsh pointed out that it will end more than a hundred years of US dominance: "It returns China to a position it occupied, according to economic historians, for some 1,800 years up to about 1840, when Britain became the world's biggest manufacturer after its Industrial Revolution." The value-added data compiled by Global Insight are arrived at by subtracting "inputs" – such as purchases of materials, parts, and services – from raw "gross output" as measured by the sales of individual companies. The *Financial Times* pointed out that the projected American position improves if adjustments for inflation put the numbers in constant prices, because inflation in the US is predicted to be lower than China's over the relevant period.

## Steel

### ArcelorMittal enlarges its footprint in the Americas

After three months of negotiations, ArcelorMittal, the world's largest steel producer, and the United Steelworkers agreed on a tentative four-year contract that would cover more than 14,000 union workers and tens of thousands of retirees.

The agreement, reached 29th August, affects hourly workers at plants in Indiana, Ohio, Pennsylvania, New York, South Carolina, West Virginia, and Minnesota. The 18,000 people that Luxembourg-based ArcelorMittal employs at 17 facilities in the US make up almost 6% of its 320,000-strong workforce in more than 60 countries.

The agreement, hammered out amid talk of a strike by the workers, provides for a $3 billion capital investment in ArcelorMittal's US plants, an increase in the company's contribution to pensions for current workers and higher payments to retirees and fixed health care contributions through the life of the contract. But the contract's pay provisions – a one-time lump sum of $6,000 plus a $1 hourly increase in the first year and 4% increases in each of the following three years – indicate a weakening of the ability of powerful unions to dictate terms to big steel companies.

ArcelorMittal, which produces 10% of the world's steel, has said it plans to increase shipments by more than one-fifth by 2012 in response to global demand. The United Steelworkers union represents 850,000 workers in the United States and Canada. Its members work in the rubber, chemicals, paper, and oil industries, as well as in metals.

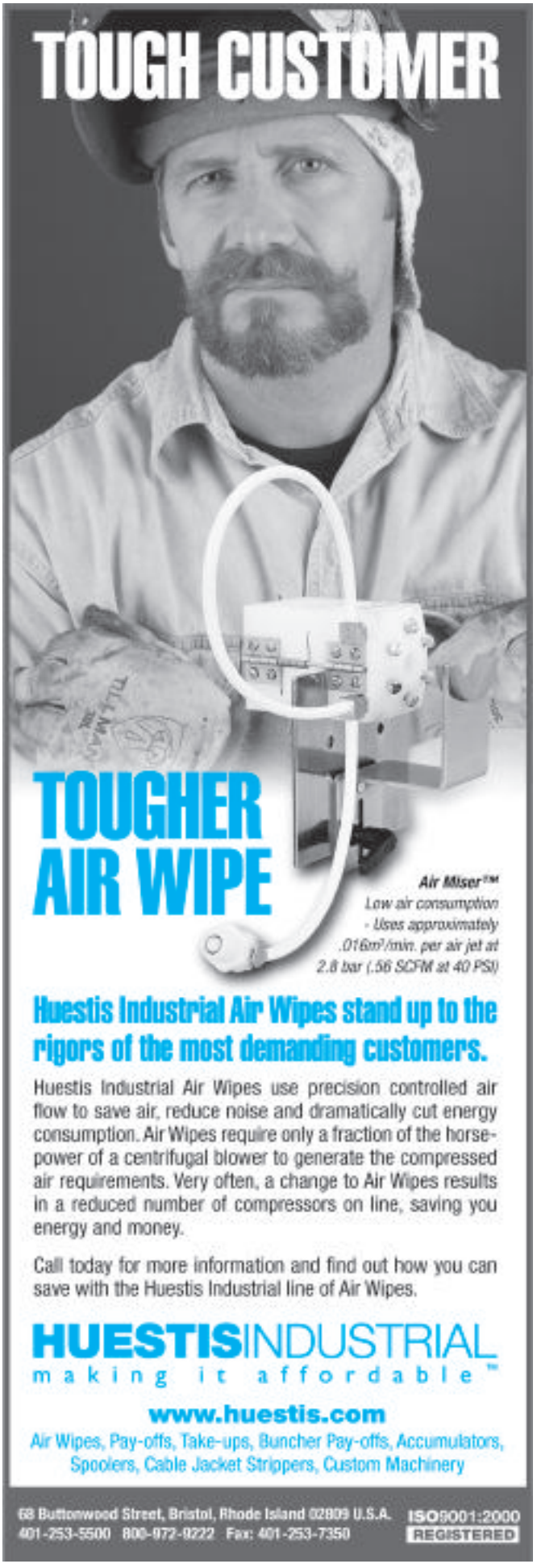
In other news of ArcelorMittal, on 20th August, to increase its self-sufficiency in the vital raw material of steel making, the company announced an agreement to buy the Brazilian iron-ore unit of London Mining Plc for about $810 million. London Mining Brasil, located in the state of Minas Gerais, was acquired by the British company only in May 2007, the owner said in a statement. The exploratory and production unit is currently expanding its yield of concentrate and lump ore to 3.2 million metric tons per year (mtpy), from 1.4 million tons. ArcelorMittal intends to raise output to more than 10 million mtpy with an investment of up to $700 million.

News of the acquisition came two weeks after ArcelorMittal announced plans to invest $1.6 billion to increase its steel production in Brazil by two-thirds. Recently, London Mining reported iron-ore resources of 598.8 million tons at its Brazilian mine, up from an earlier estimate of 266.3 million tons. Iron-ore prices have gained for a sixth straight year, and the cost of coking coal has surged to record highs.

***Elsewhere in steel . . .***

- Russian steel giant OAO Severstal has said it will buy PBS Coals Corporation (Somerset, Pennsylvania) for about $1.3 billion in cash. The plan, announced 22nd August, reflects the trend among international steel companies seeking to guarantee their access to raw materials. The US coal industry had dwindled by the 1980s, and domestic steel makers who spun off their coal operations have lagged their overseas counterparts in buying up coal reserves.

  Severstal said PBS Coals commands at least 228 million tons of in-place coal reserves. PBS operates six underground and six surface coalmines near Severstal's North American production centres. The mines have production capacity of more than 4 million tons of metallurgical coal per year, Severstal said in a statement announcing the planned acquisition.

# Transatlantic Cable





## Nucor will start steel bar production in Arizona by the second quarter of 2009

Nucor Corporation (Charlotte, North Carolina) has announced that it will revive its idle rolling mill in Kingman, Arizona, at a cost of about $30 million, and that steel bar production will resume there by April of next year. The company said on 26th August that initial annual output of straight-length rebar, coiled rebar, and wire rod should be about 250,000 tons. Production capacity may later be raised to double that total. Nucor makes more steel at home than any other US company, and is already North America's largest rebar producer.

Nucor acquired the idled Kingman steel mill from North Star Steel in 2003 for approximately $35 million. In 2004, it was decided not to restart the melt shop and Nucor recorded a $13 million impairment charge for the shop's assets, but the rolling mill assets have been held available for restart when market conditions warranted.

According to Nucor, that time has arrived. The decision to roll rebar and wire rod products at Kingman was driven by growing demand in the south-western US market from both outside customers and the company's expanding downstream rebar fabrication business. The restart announcement asserted that Kingman's "very attractive" capital cost for rolling steel would be leveraged by excess low-cost melting capacity at existing bar mills.

❋ In other news of Nucor, the company announced plans to install a heat-treating facility at its plate mill in Hertford County, North Carolina. With an estimated annual capacity of 120,000 tons, the line will produce heat-treated plate from $^{3}/_{16}$" to 2" thick. Total cost of the project is expected to be approximately $110 million.

The plate mill was started up in 2000, and annual capacity is approximately 1.6 million tons. Together with the Nucor plate mill in Tuscaloosa, Alabama, the Hertford County plant brings the company's current annual plate production capacity to approximately 2.8 million tons.

## Automotive

## In a surprise move, Ford will revive an engine plant in Canada

On 4th September, Ford Motor Company announced that it is reopening the Essex Engine plant, in Windsor, Ontario, where production had been shut down for about a year. The news followed an announcement by Canada's prime minister, Stephen Harper, that his government would provide up to C$80 million (about US$75 million) in assistance. Ford plans to spend C$420 million (US$394 million) on the project. The decision to help with the reopening represents a sharp turnabout for the Ottawa government. In January, the federal finance minister was quoted as saying that providing support to the plant reflected "the kind of old-fashioned thinking that's proven to be a failure of short-term, Band-Aid fixes for specific companies."

Ford had already reopened part of the factory this year after it received C$17 million (about US$16 million) from the province of Ontario. Whether or not the reversal at the federal level derives from Canadian politics, "This is not money being thrown around on the eve of an election," Mr Harper said. The reopening of the plant suggests optimism on the part of Ford. The company is well along in a retrenchment in response to the slowdown in the North American auto industry.

It is not known what will be produced at Essex, although rumours favour 4-cylinder engines, possibly running on diesel fuel. The plant, which opened in the late 1970s, had made 6- and 8-cylinder engines for several Ford units, including Jaguar, and employed about 900 workers.

The reactivated plant will build about 215,000 engines a year and employ some 500 people. Production could grow, the Canadian government said, to a level that would "create or sustain" 757 jobs.

***Elsewhere in automotive . . .***

- General Motors has said it will spend $500 million on production of a compact car that is a critical element in its effort to return to profitability. Some $350 million of that will go toward retooling the Detroit auto giant's Lordstown plant, in Ohio, to turn out the new car. Lordstown opened 42 years ago and is the highest-volume plant in the world with a single assembly line.

  Responding to a collapsing market for big trucks and sport utility vehicles, GM is closing four North American truck plants and resting its hopes on the Cruze, which promises to go 46 miles on a gallon of gasoline. The new compact was introduced at the Paris Motor Show in October. It will go on sale in Europe and Asia in 2009, a year before its North American debut.

## Energy

### 'American small businesses are not prepared for power outages'

According to the results of a recent survey commissioned by a unit of Emerson Electric Co (St Louis, Missouri), the small business owners of the US will be very much in the dark if the lights go out. Emerson Network Power released its findings in conjunction with the fifth anniversary of the Great Blackout, which began on 14th August, 2003. The largest power outage in North American history left 50 million people in the North-eastern United States and Canada in the dark – some for days – and cost the economy an estimated $6 billion in productivity.

Statistics published by Emerson in August 2008 include these:

- of the small business decision-makers surveyed, 79% experienced at least one power outage in 2007
- of the small businesses that experienced outages in 2007, 42% had to close down during the longest spells without power
- some 67% of respondents expected to experience outages again over the next 12 months
- while small business owners consider power outages a greater threat than fire, weather damage, theft, employee turnover, and government regulation, only 39% of them have back-up power systems, leaving 61% vulnerable to the negative business impacts of outages

"Keeping the lights on, the computers running, and employees working during a power outage is important for any business, but particularly for small businesses," said Ed Feeney, head of the Emerson Network Power systems business, which provides back-up power technologies. "Their margin for error is thinner and the competition's tighter, so even a brief outage can do significant harm."

An independent authority – Steve Strauss, nationally syndicated business columnist and author of The Small Business Bible – commented, "Emerson's survey findings are alarming, considering that more than 99% of all American businesses are small businesses, with these companies generating 45% of the total US payroll.

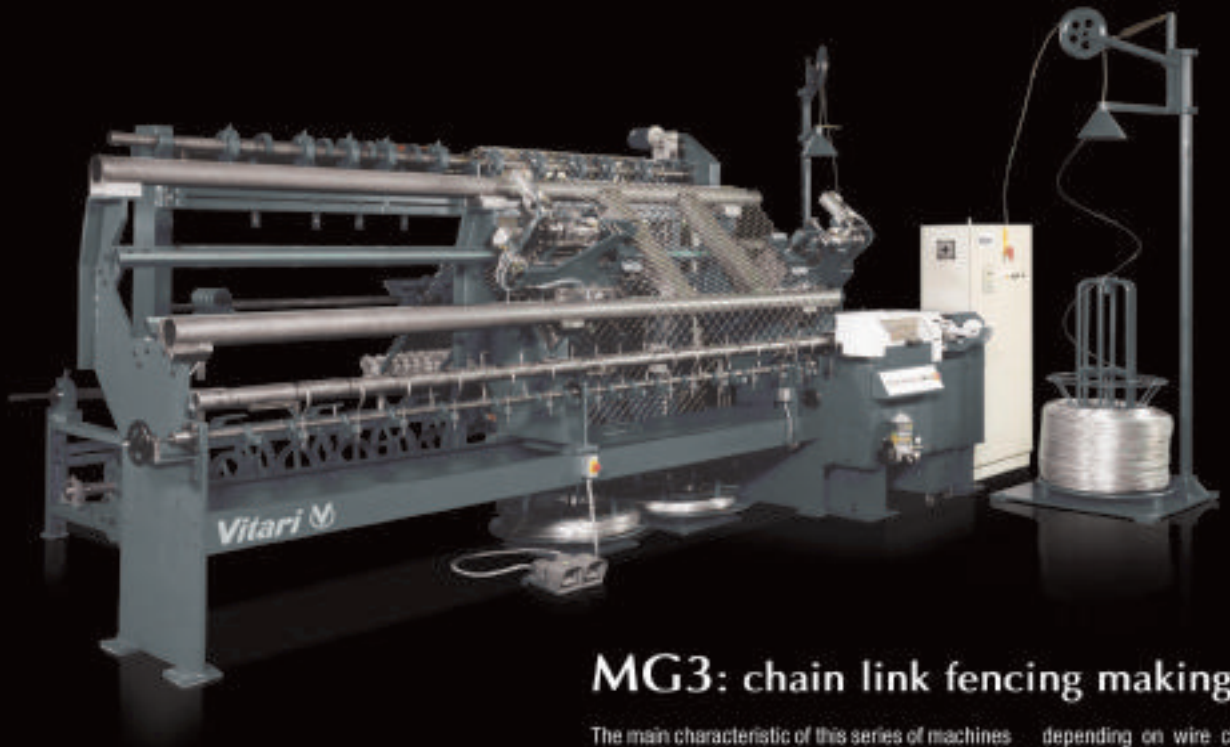
It is critical that small enterprises have a business-continuity plan that includes back-up power systems to keep the business running when the main power source goes down."

**Dorothy Fabian**
**USA Editor**



EUROLLS GROUP

# Impossible is nothing




## MG3: chain link fencing making machine.

The main characteristic of this series of machines for manufacturing galvanized or coated wire chain link fencing is the high productivity. Very simple machine data loading complete with display of the required parameters. It is also possible to programme or modify the data while the machine is working. The blade speed and the spiral length are electronically programmable depending on wire characteristics and type of netting to produce. The blade speed can vary from 20 to 1000 revolutions/minute and can also vary during spiral forming process. The cutting mechanism is controlled by an independent motor and it quickly reaches the maximum machine productivity. The netting ends can be closed with standard bending tooling or barbs.

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Vitari

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# New puller range with heavy duty haul-offs

▲ *New Gillard machine has longer belts for less pressure on extrusions*

Gillard has enlarged its range of precision caterpillar haul-off/take-off machines.

The new machines are extra long belt versions of the Gillard 'work-horse' range. The extended belts are now available in lengths of either 1,500mm or 1,800mm. Belt widths are either 225mm or 300mm.

Gillard claims that these longer belts enable higher tractive efforts to be achieved with considerably less clamping pressure on the extruded products. This avoids distortion and damage, particularly to thin-wall products.

The new caterpillars also feature an updated drive package with direct drive AC servomotors to power the belts. Two digital servo drives are used in a master/slave configuration for optimum speed control.

The top belt is designed to 'float' over any lumps or bumps created during the start-up of the extrusion line. The entire top boom is suspended on two air cylinders at either end. This allows the belt to automatically raise and lower itself over the lumps whilst still maintaining an adequate grip on the extrusion.

The machines are fully guarded to the latest CE standards. Gillard offers a wide range of options to enable users to customise their machine to their needs.

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## Replacing zinc phosphate in cold forming applications

Condorcoat K75 is believed to be the only finish that replaces traditional multi-stage zinc phosphate in cold forming. The process is straightforward and safe, extremely bonding and efficient even for extreme deformation.

Condoroil's research for an alternative product to zinc phosphate has been carried out in order to propose a short and efficient process and, above all, a harmless product.

With Condorcoat K75 the required steps for the material preparation, pickled or sand blasted, are reduced from the traditional four (activation, phosphating rinse and calcination) to just a single step and is easily integrated with the cold forming process itself.

No rinse nor final neutralisation are required; this makes a water purification plant unnecessary, while the different nature of the conversion product eliminates the need for either a filtering or sedimentation plant in the phosphating tank.

This means a reduction in the plant and management costs for water treatment and sludge disposal.

The chemical reaction with the metal makes the product bond, even in cases of extreme deformation, unlike a deposit that is bonded only physically to the material, such as in the case of non-reactive salts, which cannot stand the tensions related to the most extreme deformations especially on steel with a high carbon content.

The product is stable towards the acid drag outs from the previous pickling tanks. The drag outs cause balance problems in the acidity ratio in a phosphating bath (and even more in a bath with non-reactive salts) and determine the formation of a defective coating.

The product leaves a rough surface finish that promotes the adhesion of the soap and lubricating oil.

The dry deposit provides excellent corrosion resistance, important for applications where working does not follow immediately after the treatment.

The deposit, when dry, is stable to humidity: a deposit that is too sensitive to humidity can hydrate, causing rust problems as well as reduction of die performance due to the interaction of water with oils and lubricating oils.

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# High-capacity wire rod mill with FRS® technique

ArcelorMittal Hochfeld GmbH has placed an order with SMS Meer for the supply of a complete high-capacity wire rod mill with FRS® technique for high-grade steels.

The mill's annual capacity will be 690,000t. Of this, the major portion of the products is expected to be cold heading steel grades. The mill will be designed for producing wire rod in high-grade steels and will be in production in August 2010.

The SMS Meer contract includes a walking-beam furnace, the mechanical and electrical equipment of the mill train, all of the supply systems, the finishing facilities for the wire-rod coils, the entire rolling and cooling equipment, and the erection and installation.

The walking-beam furnace for billets up to 155mm square will reach an output of 120t/hour.

The wire rod outlet comprises a cooling and equalising section in a loop arrangement, a six-stand wire rod block and a four-stand FRS® (Flexible Reduction and Sizing) block – both in UHD (Ultra-Heavy Duty) arrangement.

The wire-rod block and the FRS® block are each followed by a water-cooling line.

The core component of the mill is the FRS® block together with the cooling and equalising section. The supply scope therefore also includes the 104m long LCC® (Loop Cooling Conveyor) for forced and retarded cooling, a total of three water cooling lines and the CCT® (Controlled Cooling Technology) system developed by SMS Meer.

These facilities allow wire rod to be produced over the entire dimensional range of 5.5mm to 25mm by means of temperature-controlled rolling. Ultra-fine microstructures can be achieved especially for cold-heading grades by thermomechanical rolling.

The maximum rolling speed for 5.5mm wire rod will be 120m/sec.

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## Temperature measurement guide

Cropico has published an illustrated guide on temperature measurement, explaining some common causes of error and how to avoid them.

The guide features a series of resistance and thermocouple tables for user ease of reference, while a convenient Glossary of Terms provides an explanation of terms relating to temperature measurement; these include ANSI (American National Standards Institute), IPRT (Industrial Platinum Resistance Thermometer) and SPRT (Standard Platinum Resistance Thermometer).

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# PS semi-automatic coiling and spooling lines

▲ *PS 80 semi-automatic coiling line*

In 1960, PS Costruzioni Meccaniche Srl began manufacturing cable take-ups and payoff stands for Italian cable manufacturers, later adding semi-automatic coiling/spooling lines (PS 80 MBN and PS 85MBN) and rewinding lines. Despite the evolution of the PS product range, the sturdily built PS 80 MBN and PS 85 MBN continue to be a significant part of the business.

These flexible machines can process a wide range of products, even the most delicate such as telephone, computer and category 5 cables, onto either coils or spools as needed.

The PS 80 can process multiple insulated flexible cables with a diameter of between 1mm and 6mm, or multiple insulated solid cables with a diameter of 1mm to 4mm. It will produce 0.75 to 1.5 coils or spools at 100m per minute, according to the ability of the operator and the wire type. Minimum section of flexible cable is 3 x 0.75mm$^2$, and the maximum section of semi-solid cable is 1 x 50mm$^2$.

The PS 85 can process multiple insulated flexible cables with a diameter of 4mm to 15mm, multiple insulated solid cables with a diameter up to 10mm (size 35mm$^2$) or 16 x 7 flat cables. It can wind 0.75 to 1.5 coils or spools at 100m per minute, according to operator skill and the wire type.

Minimum section of flexible cable is 3 x 0.75mm$^2$, and the maximum section of semi-solid cable is 1 x 50mm$^2$.

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## Force tester races ahead in motorsport wiring

▲ *The Mecmesin MultiTest 1-x force testing system*

Designer and manufacturer of motorsport electrical wiring systems, Cyprium Motorsports has chosen a Mecmesin MultiTest 1-x force testing system to perform quality control assessments on electrical harness terminals.

Cyprium designs and produces customised wiring harness systems for sports cars, including Formula 1, Le Mans Prototype, Grand Touring and rally cars.

The company required a fast and accurate force testing solution to ensure wires connected to the electrical harness terminals were securely crimped together.

Mecmesin worked closely with Cyprium to develop a solution, comprising a MultiTest 1-x console-controlled test system, fitted with a 1,000N loadcell and specialised fixtures for testing crimps.

The MultiTest 1-x is used to perform pull tests at a controlled speed on the electrical harness terminals, to determine that the load at which they fail is above a recognised value. Tests are performed to a guide supplied by Mecmesin conforming to industry standard BS 5G 178: Part 2.

To facilitate quick testing and ease-of-use the MultiTest 1-x has been set up with stored programs to test specific wire sizes and give an immediate pass/fail message to the operator. These automated test procedures and calculations reduce test times, leading to considerable costs savings both in man-hours and rework.

Nigel Barber, senior engineer at Cyprium said "We have been very satisfied with our purchase of the Mecmesin MultiTest 1-x, it has become an essential part of our quality control system and allows us to calibrate our tooling and ensure our product is as reliable as possible in the severe environment of motorsport."

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# Water–saving DSD


▲ *Team Meccanica's direct synchro drive (DSD) drawing machine*

The DSD machine represents the latest generation of drawing machines developed by Team Meccanica.

DSD is a traditional multi-hole dry drawing machine, straight through type, with tilted blocks and sensing arms (tuner type) for speed synchronisation, but with a driving system that uses direct coupling of AC motors and drawing capstans without gear-boxes or pulleys.

The advantage of this system lies in the reduced maintenance of rotating parts as well as in improved mechanical efficiency and consequent power saving.

The capstan cooling system was completely redesigned in order to improve the wire cooling. Nozzles spray high-pressure water directly onto the internal surface of the capstans. It uses four times the amount of water, compared to traditional narrow-gap systems, but the water is recycled in a closed system for efficient heat transfer.

The capstan motors are cooled in a closed circuit system using glycol solution through a water/coolant heat exchanger.

The electric cabinet is integrated into the structure of the machine with a 'Plug & Play' control system.

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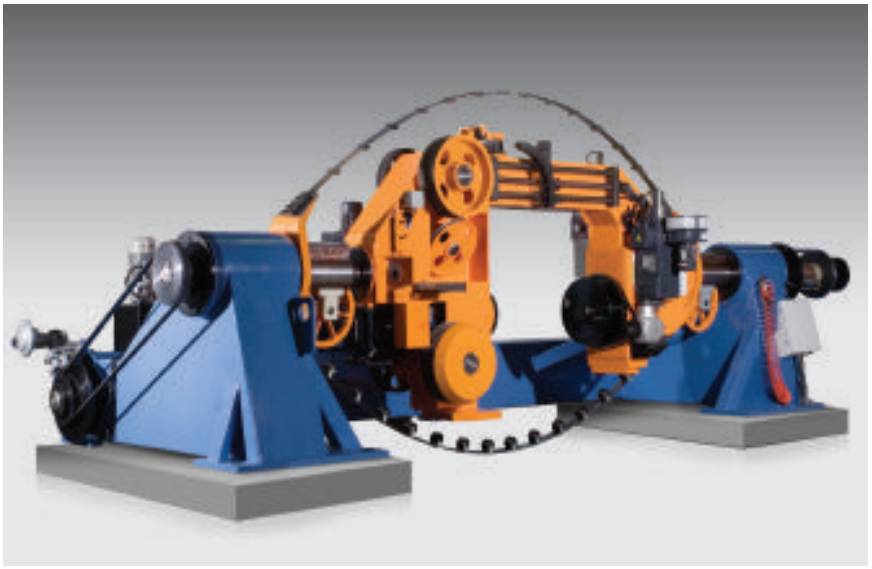
**Website**: www.teammeccanica.it

# Bunching, stranding and laying-up machine



▲ *Double twist machine from Cortinovis Machinery*

Cortinovis Machinery offers a wide range of double twist machines for a wide range of products, including double twist machines for bobbins of 630mm, 800mm and 1,000mm, designed for reliability, low maintenance and high volume production. The machines are typically used with copper or aluminium for bunching and stranding of conductors at very high speed with payoff from multi-wires or single wires with driven bobbins; flyers payoffs for static bobbins. Tension equalisers ensure regular strands for multi-wires, bunches or single wires.

Double twist machines are also available for bobbins of 1,250mm, 1,600mm and 2,000mm for stranding round or sector conductors in copper, aluminium or aluminium alloy.

The machines can be used for stranding flexible bunches or multi-wires for flexible conductors class 5 or 6 and for laying-up of up to seven insulated conductors.

A range of suitable payoff systems is available to suit stem packs with an automatic changeover, or from bobbins with driven or braked payoffs, or with flyers.

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# JIANGSU JINTAILONG



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website: www.jsjintai.cn

# Cleanliness in high-voltage cable production

Absolute cleanliness is essential in high-voltage cable production. With the CSS 2 for real time control and detection of contamination in the polymer melt, Sikora believes it can offer the technology to guarantee process stability and product quality at the production line.

The CSS 2 camera system detects contamination particles in XLPE-materials. With super clean PE-material, higher voltage insulation strength with identifiable wall thicknesses and no defect charges can be achieved.

Contamination can be caused by material handling. Shavings can be created by wear of the extruder screw or the cleaning of the extruder screw can leave dust particles that bring tiny pores or inclusions into the material.

Contamination in the form of combustion particles such as amber and scorches, which occur during the long-term operation of the line, are also a risk.


▲ *CSS 2 detects contamination in XLPE-materials*

The CSS 2 system ensures real-time, online quality assurance, removing the need for time-delaying laboratory analysis. 100% inspection of the XLPE-melt in the flow channel allows immediate intervention in the production process. The flow channel between the extruder and the crosshead includes sight glasses and an optical CCD-camera system, which transilluminates the insulation material.

The CCD-colour camera detects particles of 20µm in the PE-melt and the identified constituents are classified with regard to their size. Particles that exceed the specified tolerance value are analysed and their colour, situation, vertical and horizontal dimensions are displayed. Besides the graphical display of the detected particles, monitor pictures show a live image of the complete material flow.

In contrast to granulate control the system actually detects contamination in the material before the cable is produced.

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**Website**: www.sikora.net

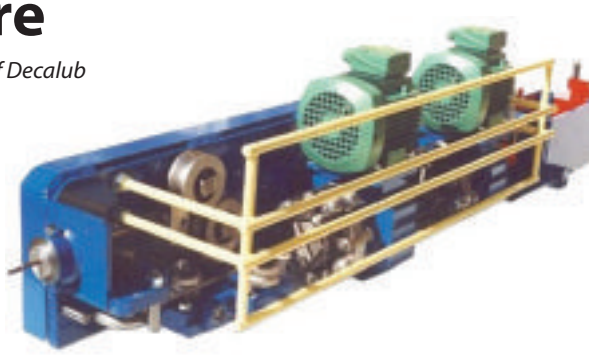
# Frictionless drawing of steel wire

*Advertorial on behalf of Decalub*

Rod dry cleaning and preparation by the DCCD system enables in-line direct drawing of mechanically descaled high and low carbon rod, up to 0.88%C, without wet pre-coating chemicals and without rod speed limitation. The process incorporates the new LVC/PDH rod dry coating technology that enables an automatically controlled fusion of lubrication compounds.

Such a liquefied substance eliminates completely traditional wet pre-coating chemicals and provides an adherent and consistent residual coat, automatically adjustable in weight at all speeds.

The DCCD processed 5.5mm (0.218") 0.83%C rod is dry coated and drawn directly, in-line, without wet pre-coating, to 1.85mm (0.073") at 13.5m/s (2,700ft/min) with virtually zero friction - exiting wire temperature not exceeding 45°C.



▲ *Rod dry preparation by DCCD system*

A recent application of the DCCD process is for 5.5mm (0.218") 0.78–0.85%C rod, dry cleaned and surface prepared in the first draft, in-line, with zero consumables cost and with virtually zero energy consumption, with an output of 2.2 tons/hour.

The system offers immediate substantial cost savings in production of quality wires, including spring, rope, bead, PC strand and galvanised H/C or L/C.

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# High frequency connector range

Johnson®, a subsidiary of Emerson Network Power Connectivity Solutions, has introduced a line of SMP Blind-Mate connectors that can handle frequencies up to 40GHz. This precision connection interface is a micro-miniature, slide-on/snap-on interconnect system designed for high-density packaging. The system is extremely flexible since it can correct axial and radial misalignment and is compatible with all SMP and GPO® connectors.

Johnson offers several configurations of its SMP Blind-Mate connector to meet a variety of needs in high frequency applications. Johnson's new line of SMP Blind-Mate connectors includes 26 different connectors, adapters and mounts and nine new assembly tools.

The company also provides detailed assembly instructions and makes use of industry standard tooling whenever possible for customer convenience and compatibility.

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**Website**:
www.emersonnetworkpower.com/connectivity

▲ *EVM automatic spooler from Teurema*

# Automatic spooler

Teurema's automatic spooler, EVM is designed for the production of precision laid wire coils with spools with a capacity of up to 5 tons.

This double automatic spooler is composed of two spool-working stations; the wire collection station and the wire strapping/unloading/loading station. It is complete with all necessary devices to ensure an automatic handling of the wire, the cutting and subsequent threading of the wire, and the securing of the wire tail. All these operations improve line efficiency, especially when operating with large diameter wires. The combination of these factors is said to guarantee a drastic reduction in the down times – often present during a spool changeover cycle.

All parameters required for the formation of the pattern laid coil, as well as production information, are set on the spooler control pulpit.

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**Website**: www.teurema.com




## EDM wires – topas® plus D

The new patented topas® plus D EDM wire from bedra has been developed for all machines which require straightened wire for automatic threading. The high tensile strength of 800 N/mm$^2$ allows automatic threading and avoids wire breakage; two important factors when used for unmanned operation at night.

Its outstanding resistance to wire breakage as well as the high thermal and electrical capacity ensures a high degree of process stability, thus making this electrode suitable for speed cutting as well as for contour precision cutting.

As with the other electrodes of the topas® plus family, topas® plus D allows a better exploitation of the performance potential of modern generators.

A significant increase in performance can be achieved, even under unfavourable flushing conditions, and processing times can be considerably reduced.

**bedra – Germany**
**Website**: www.bedra.com

www.kiswire.com

# Wire connects the world

As the cars move you through the day, as an elevator connects you to the building, as a bridge connects you to the road and as a ship connects you to the ocean...
Kiswire connects the world through a safe and simple place to live through a new and high technology.




Oil Tempered Spring Wire/Steel Tire Cord & Bead Wire/Steel Wire Rope/High Carbon Steel Wire Products/Guy & PC Strand

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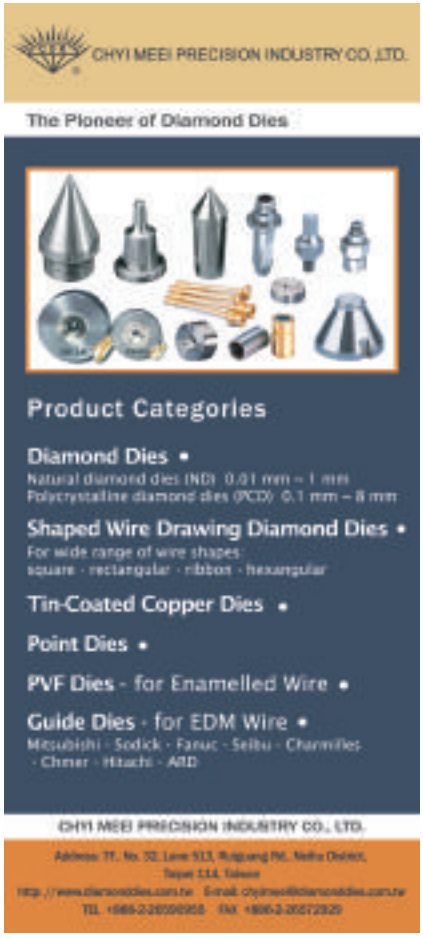



## Display, control and report


▲ *Ecocontrol 600: a lean processor system with strong performance*

Ecocontrol 600 from Sikora is the smallest of the company's processor systems, adapted to individual line conditions for highest productivity within the wire and cable production.

Ecocontrol 600 offers one serial interface for the connection of a Sikora measuring device such as Laser 2000, Centerview 8000, CV-Intube 6000 or LED 8025 XY. Digital contacts also allow readings from the lump and neckdown detection system, Lump 2000 and spark tester, Spark 2000.

There are graphical length-related trend diagrams for all values combined with a graph of the distribution of the single values (statistical distribution curve) and a statistic with the minimum, maximum value, the mean, standard deviation, Cp and Cpk values. The operation is menu-driven via touch screen.

Sikora combines the Ecocontrol 600 with a Laser 2000 for the measurement of the hot or cold diameter in two or three measuring planes, or the Centerview 8000 for an 8-point-eccentricity, 4-axis diameter, and 8-point ovality measurement. Where stringent quality control is required, Ecocontrol 600 can be used with the CV-Intube 6000, for diameter measurement within CV-lines, or the LED 8025 XY for accurate measurement of the eccentricity of transparent products.

Data can be transferred to a line PC via an Ethernet-interface or a USB flash drive, while a printer provides a hard copy of the production quality. It can be configured in several languages.

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## Six spools per minute

Windak has announced that its new generation high speed SW6 spooler has successfully achieved 6 x 100m spools per minute. The SW6 fully automatic spooler has been designed for a maximum output of 6 spools/min (100m) with a guarantee of 5 per min (100m) according to Urban Bollo, managing director of Windak Sweden.

"To the best of our knowledge, the SW6 is the fastest 100 metre cable spooler in the world," stated Mr Bollo.

An obstacle to achieving 6 x 100m spools per minute has been the loading/unloading cycle time. Windak's new dual lift system allows for cycle times of less than 10 seconds.

With short cycle times, and a stop time of less than one second, the SW6 is optimised for in-line production of spools 165mm (6.5") OD x 90 – 200mm (3.5"- 8") wide.

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# Cable twister from Queins

▲ *Queins' bow twister on show at wire Düsseldorf*

Germany's Queins & Co GmbH is offering a new range of bow twisters for products that include steel ropes, subsea cables, power cables and speciality cables.

The new machines are built for a payoff range between 630mm and 2,000mm.

The photo shows a bow twister for 2m payoff reels, displayed at wire Düsseldorf 2008. It is believed to be an ideal closing machine for round conductors with cross sections up to 750mcm/240mm$^2$.

This design is used for insulated conductors, for steel strands and for bare aluminium conductors. It is capable of high line speeds, faster than traditional closing machines.

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

# Feeders for round and flat wire

AL6 and AL12 feeders for round and flat wires are among Cometo's range of mechanical and electronic equipment for the spring and wire industry.

AL6 feeders are suitable for wire from 1.5mm to 7mm, while the AL12 can handle wire between 6mm and 20mm.

According to production needs, the AL models can be equipped with manual or automated operation, suitable for motors up to 4.5 kW and reaching a working speed of 200m/min.

The transmission system is composed of tempered and refaced gears. The rollers are made of X205Cr12KU steel, hardness 62HRC, and have polished grooves; for particularly fragile materials, rollers can be made of plastic and the grooves can be lathed. The opening and closing of rollers can be hydraulic, pneumatic or eccentric. Up to three AL feeder modules can be combined. Traction is achieved via an extremely resistant toothed belt, protected by a pig-iron support.

As standard, Cometo supplies the machine ready to use with manual control, the ratiomotor shaft and the flange; the ratiomotor can be supplied for an additional cost and automation can also be provided if requested.

▲ *Cometo's AL6 wire feeder*

**Cometo Snc – Italy**
**Fax**: +39 0341 260927
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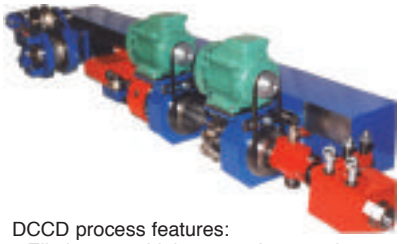

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# Marta modular system

MARTA system is GEM's fully automated two-axis welding machine, in sizes up to 4,800 x 1,500mm.

The rigid machined frame ensures high accuracy, absence of vibrations during working and resistance to external stresses. The modular design meets individual requirements and improves manufacturing flexibility for frequent product changes.

The welding gun is of the C type, with two opposed cylinders in the standard version, fitted with electrode bars in order to weld several crosses at the same time. The machine can be fitted with a rotary welding head to follow irregular shapes, and a lower NC axis for changing the electrode height so that it is possible to weld components with different working levels.

The C gun can have more cylinders, working individually or two by two. The electrodes can be mounted at 90° or side by side, in order to speed up the production.

▲ *The MARTA system from GEM*

A medium frequency inverter (1,000 Hz) is available on request for high welding quality.

The steel linear slides are of the re-circulating ball type while a Siemens brushless motor coupled with pinion and precision rack provides the system drive.

The machine is fitted with two working stations, side by side. This system increases the productivity of each operator as the machine welds while the operator unloads/reloads. The constant current welding control will store up to 63 different welding programs.

The CNC is connected to an ergonomic terminal, which is used to manually operate the machine, especially for the teach-in programming.

**GEM Srl – Italy**
**Fax**: +39 011 9241002
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# Hypertherm furnaces for AZ coatings

Safal Group, a leading supplier of metal coated roofing in Africa, has chosen Tenova Hypertherm as the furnace supplier for two new strip processing lines to be set up in Tanzania and South Africa.

The two furnaces, installed in Dar-es-Salam and KwaZulu-Natal (Durban) plants respectively, are now in an advanced phase of construction.

The Dar-es-Salam facility is expected to be commissioned in the 4th quarter of 2008 and the one at Durban in the 1st quarter of 2009; both furnaces will be used for the production of aluminium-zinc (AZ) coated product

The horizontal non-ox based furnaces of Safal Group will be equipped with cutting edge low temperature strip heating technology developed by Tenova Hypertherm to reduce energy consumption and is expected to result in substantial savings for Safal Group.

The two contracts mark the entry of Tenova Hypertherm into the coveted and as yet untapped market of AZ coatings.

**Tenova Hypertherm – India**
**Fax**: +91 22 2847 7703
**Email**: tenovahypertherm@hyperthermgroup.com
**Website**: www.tenovagroup.com

## Control cable family for the machine tool industry

▲ *Oil-resistant control cable family Chainflex® CF77/CF78*

Energy chain and accessory specialist igus® has a new family of control cables for use in energy chains across the machine tool industry.

The oil-resistant Chainflex® cables CF77 and CF78 have been developed for dynamic applications with high cycle rates under high loads.

The new family unites some of the advantages of the Chainflex® cable series into a single design, so making cable selection easier. This is especially important when considering international standards, material approvals and service lives.

Bundle stranded, flame-resistant and halogen-free CF77 and CF78 are twisted in layers for 7 or less wires (nominal voltage U0/U 300/500 Volt) and stranded in bundles for 12 or more wires (U0/U 300/300 Volt).

The cables are stranded in bundles around a strong tensile rope core to avoid corkscrews and broken cores. The outer diameter of the control cables is as slim as comparable types that are only stranded in layers. The highly abrasion- and bend-resistant outer sheath, which is made of PUR extruded under pressure into all the gaps and gussets of the cable, ensures additional stability and is flame-retardant as well as halogen-free.

The oil-resistant series has UL/CSA approval and is DESINA conforming.

**igus UK Ltd – UK**
**Fax**: +44 1604 769514
**Website**: www.igus.co.uk

## Longer lasting friction linings

▲ *Wear parts made from Kevlar composite material*

Tribco Inc offers a 100% Kevlar® fibre composite lining for parts used on wire and cable machinery. Patented as Braketex® and Clutchtex®, Tribco linings are said to last up to five times longer than standard linings, decreasing maintenance costs and downtime.

The asbestos-free linings are non-abrasive, won't scratch rotors, drums or flywheels and are suitable for braiding, drawing and spooling machines.

Custom parts can be fabricated to order. Along with longer wear life and no mating surface damage, Tribco's 100% Kevlar fibre composite linings engage more smoothly and eliminate the dirty, damaging dust created by moulded graphitic linings.

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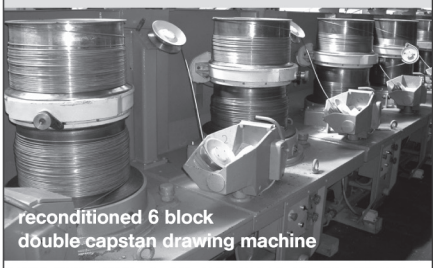


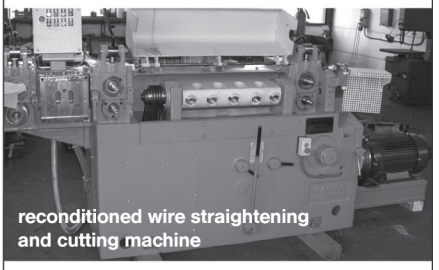


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# Double power and control with fibre lasers

SPI Lasers claims that its latest products will double in power and control capability, enabling customers to cut and weld materials with faster process times and with more advanced control options than ever before.

SPI has increased its air-cooled lasers from 100 to 200W power and water cooled from 200 to 400W power, whilst also creating unique laser control functions offering direct application benefits across a wide range of laser machining applications.

"The power, versatility and control capabilities of SPI's R4 Platform Products make them the most advanced high power fibre lasers on the market today, enabling ground breaking process improvements", said Andy Appleyard, product line manager for high power laser systems.

New features on the R4 laser platform include XPR (Extended Performance Range) and PSE (Pulse Shape Equalisation).

The new features build upon SPI's traditional market leading performance in CW laser stability and superior modulation rate (CW to 100 KHz). XPR allows a high power laser to be switched to operate at average powers down to <1% of the maximum rated output power.

The PSE feature overcomes the traditional laser problem of first pulse over or under-shoot, ensuring the first pulse is as useable as any other in the pulse train.

SPI's trials in its US applications laboratory and also at advance customer sites indicate significant process improvements in a number of key cutting, welding and engraving laser applications.

The SPI design team set out to enable their global customer base to achieve lower TCO (total cost of ownership) and a faster return on investment, something that the manufacturing industry strives for in all sectors.

David Parker, CEO of SPI Lasers, welcomed the releases; "It is clear that the fibre laser is now an accepted tool of choice in many applications. The 400W laser enables SPI to participate in a wide number of new fields, notably in the welding arena. The new features are designed to further enhance end user product quality and processing yields."

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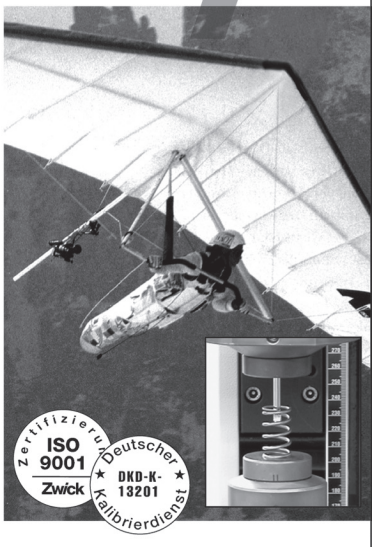
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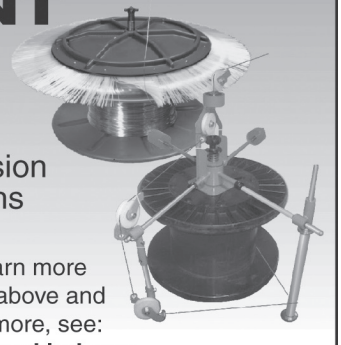
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## Successful start-up of 'Dream Steel' rolling mill for rebars and plain rounds

Stefana SpA, a manufacturer of bars and wire rod, awarded a contract to SMS Meer in 2005 for the supply and installation of a complete bar mill for 120 t/h (140 t/h with hot charge).

The objective of the project, named "Dream Steel" was to significantly boost production of straight bars and spools. With an annual capacity of 700,000t, this new plant has one of the highest productivities in southern Europe.

The product mix of the bar mill includes rebars and plain rounds with diameters from 8 to 16mm produced with the two-slit rolling method, and with diameters from 18 to 40mm produced in a single line.

The SMS Meer scope of supply included a walking-hearth furnace, the rolling line, the finishing section and two VCC® (Vertical Compact Coiling) lines. The walking-hearth furnace is designed for heating 160 x 160mm square billets with lengths of 16 m. With its dimensions, this unit ranks among the world's largest for reheating of starting material for long-product rolling mills.

When planning the layout of the mill, space was allowed for the installation of a billet welder for endless rolling operation and a possible expansion for the production of wire rod.

SMS Meer acted as system integrator, supplying all the electrical and electronic equipment, controls and software for the mill automation.

**SMS Meer – Germany**
**Fax**: +49 211 881 4386
**Email**:
thilo.sagermann@sms-group.com

## Inline stretching unit

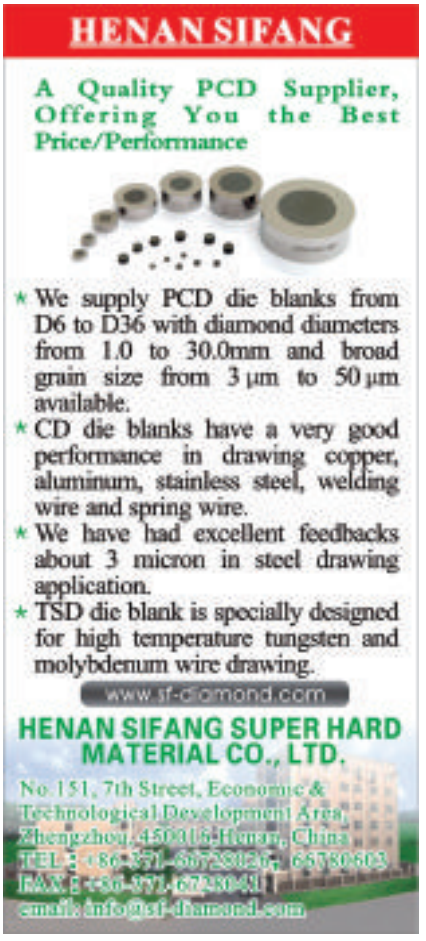

▲ *Inline compact stretching unit from Eurolls*

Eurolls' inline compact stretching unit, LSO 500, is designed for the production of high resistant/high yield wire in accordance with the latest European standards.

The insertion of this unit into an existing production line, to produce cross wires in mesh line or longitudinal wires in lattice girder lines for example, permits inline production of high resistant/high yield wire, ready to be successively processed into its final welded or bent format.

**Eurolls – Italy**
**Fax**: +39 0432 79650 1821
**Email**: info@eurolls.com
**Website**: www.eurolls.com

| Technical specifications | |
|---|---|
| Type of entry material | Low carbon ribbed rod (C = 0.20% C max) with UTS ≤ 500 N/mm² |
| Inlet wire rod diameter | Diameter 5.5mm to diameter 10mm |
| Finished wire | Ribbed stretched |
| Working Coil Weight | 0.8 t/h – 3.3 t/h |
| Working speed | Max 6 m/sec |




# Faster, cleaner splicing

Sonobond Ultrasonics claims that its MS-5010B Foil Splicer™ modular system can provide a faster, more efficient weld than ever before; the result of a new solid-state power supply that features automatic frequency control. In addition to the new, improved solid-state power unit, the Foil Splicer™ features a rotating head with a circular welding disk.

The Sonobond Foil Splicer™ is gaining popularity with manufacturers of solar panels. Ultrasonic welding offers numerous advantages in the production of the photovoltaic (PV) solar cells used to make up solar panels. For example, the bonds have essentially the same strength and structure as their base metals.

The welding process is also neat, clean, and economical. Ultrasonic bonding does not require excessive heat, fluxes, filler metals, tapes or other consumables.

Solar panel manufacturers use the Foil Splicer™ to weld aluminium strips to the thin conductive metal layer deposited onto the photovoltaic modules.

The Sonobond unit creates an ultra-reliable, solid-state metallurgical bond without cracking the glass panels in the photovoltaic cells. The resulting interconnections between the cells produce an array that has sufficient voltage and current to produce a practical source of electrical power.

The Sonobond MS-5010B Foil Splicer™ can also be used for fast, clean splicing of aluminium and copper foils.

In ultrasonic welding, high frequency ultrasonic energy is directed via a welding tip to the surfaces of the metals to be welded. The energy disperses the oxides and surface films between the work pieces in order to create a true metallurgical bond without melting the materials. Ultrasonic welding is environmentally friendly, produces no waste, and is economical to use.

**Sonobond Ultrasonics – USA**
**Fax**: +1 610 692 0674
**Email**: info@sonobondultrasonics.com
**Website**:
www.sonobondultrasonics.com

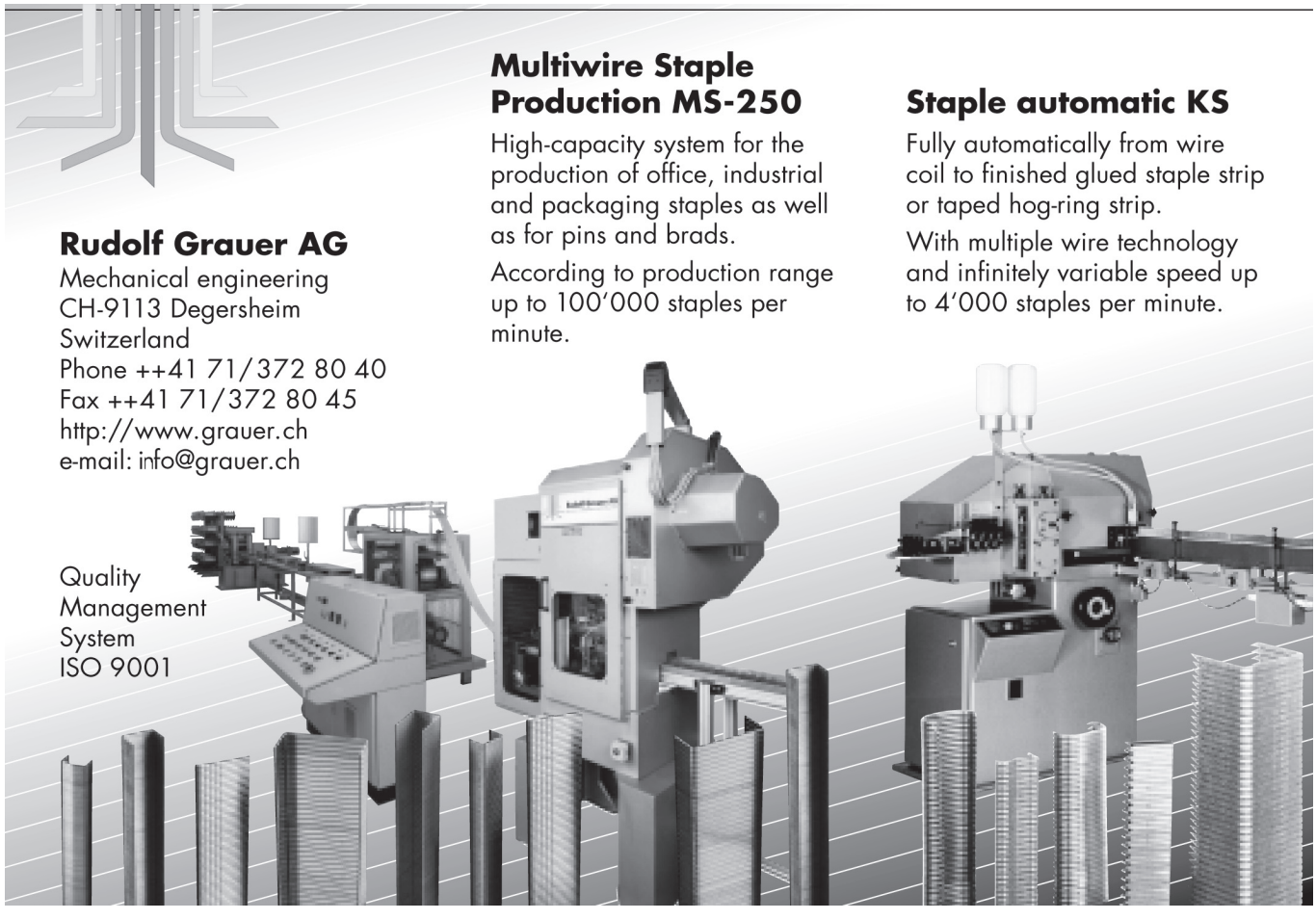
## 250,000 km of BendBright-XS

Draka Communication has announced that it has surpassed the 250,000 km (150,000 miles) mark for sales of BendBright-XS, its bend-insensitive optical fibre, since its introduction in 2006. For perspective, 250,000 km is enough optical fibre to encircle the earth six times.

Demand for BendBright-XS is said to have been driven mainly by large-scale deployments of FTTH access networks by the major telecommunications providers in both the US and Europe.

BendBright-XS uses a "trench-assisted" index profile to achieve the highest level of bend performance, meeting the stringent industry standard for bend-insensitive fibre, ITU-T G.657.B.

**Draka Holdings NV – Netherlands**
**Fax**: +31 2056 89899
**Email**: info@draka.com
**Website**: www.draka.com

## Alpha Wire Company extends Xtra-Guard® range

Alpha Wire Company has extended its Xtra-Guard® product range with the addition of flexible motor supply cables. The latest addition will complement the existing, high-performance, variable frequency drive (VFD) product line and is designed for motor and drive applications requiring small outer diameter, flexibility and ease of handling as well as superior EMI/RFI shielding options using the company's Suprashield®.

Smaller, more flexible and less expensive than the VFD cables, the new motor supply range features a round geometry to facilitate environmental sealing, while the symmetrical design improves the electrical performance allowing the cable to exhibit uniform bending characteristics.

The cables also employ Alpha's Suprashield® and have PVC nylon tape, four symmetrical drain wires and a specially formulated oil-resistant PVC jacket for extreme durability in the most demanding of environments.

As part of the Xtra-Guard range the motor supply cables incorporate Xtra-Guard's hazard matched, extreme performance characteristics with an operating temperature range of –20°C to +90°C for static applications. The cables are available in gauge sizes from 16 AWG to 6 AWG, with larger custom cables available on request.

The new range is RoHS compliant, and meets the required safety and installation ratings, including:

- UL Standard 1277, Type TC-ER, 90°C, 600
- UL Oil Res I
- UL Exposed Run (-ER)
- CSA AWM I A/B II A/B
- UL Standard 1063, Type MTW, 90°C, 600 Volt
- CSA FT4 Flame test
- UL Direct burial
- UL 1581 Vertical tray flame test
- UL Sunlight resistant

"Typically the new motor supply range will be used for AC drives and servo motors in applications such as medical, robotic, packaging, welding and conveying, although they are ideally suited to all types of automation environments," commented Dave Watson, director of engineering at Alpha Wire Company.

**Alpha Wire Company – USA**
**Fax**: +1 908 925 6923
**Email**: info@alphawire.com
**Website**: www.xtraguard.com

## Economic energy supply to IT cabinets

As part of its infrastructure solutions for server and computer centres, Dätwyler Cables offers its Ecobus flat-cable safety system for a comprehensive, flexible energy supply to IT cabinets.

The Ecobus system can be easily integrated into all cable conduit systems. The energy can be supplied to or tapped from the flat cable at any point, without the cable being interrupted. Changes can be made while the cable is live. The fuses offer good selectivity and are positioned directly at the end-user terminals.

For new installations and extensions, cabling costs are estimated to reduce by up to 80%. By replacing the many single cables with the Ecobus system, the power supply is far more effective and durable. A star topology power supply to IT cabinets, using a number of individual cables, can be untidy and difficult to modify.

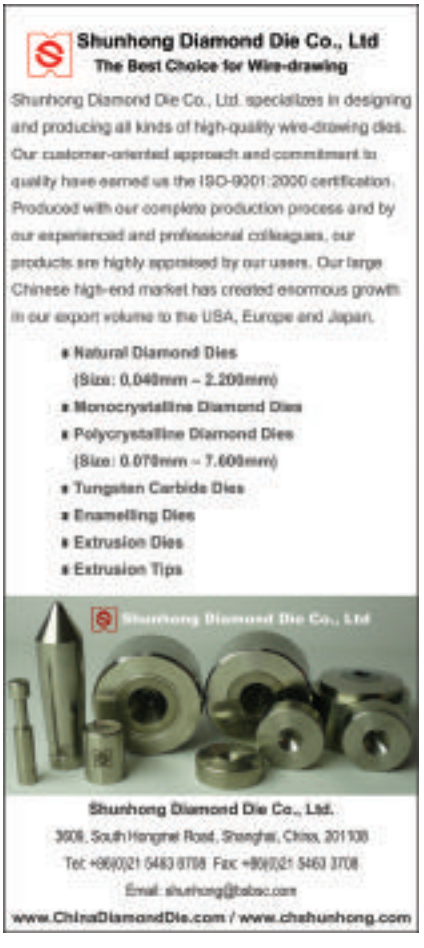
In addition, the cables are usually heaped and tend to get hot, adversely affecting their carrying capacity and causing them to age more quickly.

The Ecobus flat-cable safety system, on the other hand, can be used to create a very neat, flexible, long-term infrastructure for standard power supply as well as UPS.

The system can be attached to the cable conduit systems above the racks using cable clamps. Depending on the energy supply required, Dätwyler offers cables with diameters from 2.5mm² to 16mm².

The energy can be supplied to or tapped from the flat cable at any point by the means of special adapters, without the cable being interrupted. Connections can be realised via screw or plug type, and wiring can take place even while the cable is live.

**Dätwyler (UK) Limited – UK**
**Fax**: +44 1793 89 84 01
**Email**: paul.cattell@datwyler.co.uk
**Website**: www.daetwyler-cables.com

# The drive for future proof cabling standards

*Martin Rossbach, director of product management and new market development at Nexans Cabling Solutions, looks at a current industry dilemma.*

Cabling and Ethernet standards have rarely been controversial. When the industry in general has had its fair share of standards wars, there have been fewer debates around the progression from Cat3 to Cat5 and Cat 5e, or from Ethernet to Fast Ethernet to Gigabit Ethernet. Now the industry is being tested because it is caught between two trends: the desire for more – 40G and 100G Ethernet – and less, as developments in green computing drive innovation in Energy Efficient Ethernet for the first time.

What this means is that whether in the data centre or the network, purchasers of infrastructure are making important, far-reaching decisions that they may regret if they get them wrong.

Everywhere we look, demand is mushrooming. An example: global subscriber access traffic shows growth that, if we assume 50 million IPTV subscribers in 2011, IPTV will consume more bandwidth than internet and phone traffic combined. Put all three together and by 2011 that's traffic of almost 300 million Terabytes every year, five times the volume in 2007.

At the server level, demand will continue to grow. Intel and Broadcom show figures of x86 server units at fewer than 10 million in 2008, almost all of which use Gigabit Ethernet. By 2015 those numbers will have doubled, and the overwhelming networking technology is 10G Ethernet, with the rest 100G.

That timescale is well within the lifespan of today's cabling, and that means that anyone installing cabling today has to be mindful of the way the data centre will evolve. The demands of 10G Ethernet dictate Cat6A cabling as a practical minimum standard, but in the world of 10G Ethernet, that cabling will need to be put in before we settle on the likely dominant technology.

While there's an overwhelming desire to see the 10G Base-T standard ratified, it's not a success. The complexity of the project has created what is probably the most power-consuming chipset ever created. In an era when the wasteful power consumption of IT is being questioned – IEEE calculates that the total energy consumption of network equipment is 13 terawatt hours per year – 10GBase-T is not a successful project at the moment.

Out of these technological challenges comes innovation, and there's much better progress for the working group on Energy Efficient Ethernet (EEE). What would have been seen as a pointless exercise a few years ago is now an exciting area of innovation: by stepping down the power consumption of the chip set during its idle time – most of the time it is in operation – it can reduce the waste of energy. In simple terms, if the chipset is idle 90% of the time, the ability to step down power consumption to 10% or even 0% will save 90% of the energy supplied.

EEE has the aim of defining a mechanism to reduce consumption for 100Base-TX, 1000Base-T, 10GBase-T, 10GBase-KR and 10GBase-KX4 among others, and has widespread industry support.

As we solve one problem another comes racing towards us. Away from the data centre and copper cabling, we constantly have to upgrade our own expectations. As service providers begin to create services to supply IPTV and video on demand to the home, it stretches the boundaries of what can be supplied over IP networks. For the home user, 30 minutes of TV uses the same network capacity as 30 days of Internet surfing. When HDTV and VoD are the main business driver for service providers, the largest cable TV supplier in the US, Comcast, predicts that per user traffic demand, currently 3.5 million, will explode to 19 million in the HDTV era.

The demand for 40G Ethernet is urgent, and yet the predictions for the uptake of service show that 40G Ethernet may not be enough. To satisfy likely user demand in the near future, service providers will need to provide 100G Ethernet on their networks. The lesson from this is that whatever the network, we are at the beginning of an explosion in demand that will tax our infrastructure, and our ability to ratify standards and commercialise them, to the limit. For anyone responsible for specifying and installing infrastructure today, short-termism isn't the answer.

**Nexans Cabling Solutions – Belgium**
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**Website**: www.nexans.be

## Commuter rail cable contract for Nexans

Nexans has secured an €8.9 million contract from the Istanbul Transportation Authority (IETT) to provide 988km of specialised rail cables for an extension of the city's Metro and Light Rail systems.

Nexans will supply to Gulermak-Dogus JV, the overall project contractor, 72km of low voltage and 262km of medium voltage power cables which will be used for power distribution and DC systems for a 5.3km Light Rail Transport (LRT) line and a 15.6km metro line expected to carry 67,000 passengers an hour.

Nexans, involved in an earlier expansion of the Istanbul Metro, will also provide lighting cables for use in 20 new stations. All these cables will have a Halogen Free Flame Retardant (HFFR), sheath, meaning that they are preventing the propagation of fire, while providing low toxicity, low corrosivity and low smoke density, thus reinforcing the safety of people and equipment on board.

The total installation is scheduled for completion by the end of 2009. All the cables will be manufactured by Nexans plants in Germany.

**Nexans – France**
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# IWCS/Focus 2008

The 57th International Wire and Cable Symposium will take place at the Rhode Island Convention Center, Providence from 9th to 12th November 2008. For over 50 years, the symposium has provided a forum for the presentation of new wire and cable technologies and trends. A blend of professional development courses, keynote speakers and authoritative papers, not to mention the exhibition area and all-important networking opportunities, offers something for everyone throughout the industry.

Tuesday's Executive Forum, hosted by Robert Willis, president of ECA, the electronic components sector of the Electronic Industries Alliance (EIA), will focus on markets and economics with presentations by key industry analysts and market experts.

Engineers and scientists from major companies will present their latest research and developments in two formats, as formal lecture-style sessions are complemented by the popular poster sessions that allow for one-to-one exchange between author and attendee.

IWCS has experienced high demand for exhibition space this year, and has responded by extending the available space – twice – so there should be plenty to see. The exhibit floor, featuring dozens of leading suppliers of materials, accessories and machinery, will be open from 1.30pm 'til 6pm on Monday (10th), 10am 'til 6pm on Tuesday and 9am 'til 12 noon on Wednesday.

The IWCS website, www.iwcs.org, will have the latest news about any changes to the programme that were not available at time of going to press.

Photo credit – BigStockPhoto.com Photographer – Ricci Photos

# Alphabetical list of Exhibitors

(Exhibitors list correct at time of going to press)

| Company | Booth |
|---|---|
| 3N International, Inc | 305 |
| AGC Chemicals Americas Inc | 310 |
| AKSH Optifibre Ltd | 329 |
| AlphaGary Corp | 417 |
| Amaral Automation | 112 |
| American & Efird Inc | 335 |
| American Electronic Components Inc (AECI) | 130 |
| Arkema Inc | 230 |
| Ashland Distribution | 438 |
| ASI/Silica Machinery LLC | 201 |
| B&H Tool Company Inc | 307 |
| BASF Corp | 423A |
| BASF SE | 418 |
| Beta LaserMike | 128 |
| Boockmann GmbH/Slover Group | 236 |
| Borealis Compounds LLC | 400 |
| Breen Color Concentrates Inc | 415 |
| Buss Inc USA | 327 |
| Caballe | 114 |
| Cable Components Group LLC | 324 |
| Carris Reels | 216 |
| Cary Compounds | 302 |
| Cersa-MCI | 210 |
| Chengdu Centran Industrial Co Ltd | 300 |
| Chromatics Inc | 303 |
| Commission Brokers | 401A |
| Composite & Wire Machinery Inc | 403 |
| Conductix Wampfler-Delachaux | 425 |
| Conneaut Industries | 213 |
| Copperweld Bimetallic Products | 100 |
| Corning Optical Fiber | 233 |
| Cortinovis America LLC | 212 |
| CRU North America Inc | 414 |
| CWB Electronics | 603 |
| Daikin America Inc | 229 |
| Davis-Standard LLC | 206 |
| DCM Industries Inc | 500 |
| Delta Ulbrich Precision Metals | 504 |
| DeWal Industires Inc | 113 |
| Dow Wire & Cable | 119 |
| Draka Comteq Optical Fibre | 125 |
| DSM Desotech Inc | 101 |
| Dyneon LLC, A 3M Company | 413 |
| E-BEAM Services Inc | 306 |
| ECA – Electronic Components, Assemblies & Materials Association | 606 |
| Estane® Engineered Polymers | 406 |
| EuroWire Magazine | 605 |
| Fiber-Line Inc | 223 |
| Fil-Tec Inc | 134 |
| Fisk Alloy Conductors | 137 |
| FSP-one | 204 |
| Fusion UV Systems Inc | 409 |

The Rhode Island Convention Center

| Company | Booth |
|---|---|
| Gauder Group Inc | 120 |
| Gem Gravure Company Inc | 319 |
| Gotex SA | 501 |
| Guill Tool & Engineering Co Inc | 219 |
| Halopolymer | 234 |
| Heraeus Quarzglas GmbH & Co KG | 600 |
| Huber Engineered Materials | 131 |
| Huestis Machine Corp | 336 |
| Indore Composite Pvt Ltd | 423 |
| Inhol BV/ PTL | 124 |
| Intertek | 507 |
| j-fiber GmbH | 207 |
| Jiangsu Zhongtian Technologies Co Ltd | 313 |
| King Industries Inc | 404 |
| Kinrei of America LLC | 326 |
| Lantor BV | 419 |
| LaserLinc Inc | 314 |
| Leoni Wire Inc | 424 |
| Lloyd & Bouvier Inc | 407 |
| LyondellBasell | 429 |
| Madem Reels USA Inc | 411 |
| Maillefer Extrusion | 205 |
| Mathiasen Machinery Inc | 139 |
| MGS Group (MGS-Hall-Northampton), The | 115 |
| Miltec UV | 601 |
| Mossberg Reel LLC/ Boxy Group | 126 |
| MYTecSoft Inc | 338 |
| Nabaltec AG | 607 |
| NEPTCO | 104 |
| Niehoff Endex North America Inc | 339 |
| OFS | 111 |
| Okroglica Tekstilna Tovarna | 436 |
| OptEM Engineering Inc | 311 |
| PE.fiberoptics Ltd | 428 |
| Photon Kinetics Inc | 211 |
| Photonium Oy | 203 |
| Pittsfield Plastics Engineering Inc | 135 |
| Plymouth Wire Reels & Dies | 401 |
| Pressure Welding Machines | 112 |
| PrintSafe Inc | 110 |
| PVC Compounders LLC | 228 |
| REELEX Packaging Solutions Inc | 410 |
| Rio Tinto Minerals | 138 |
| ROBLON A/S | 325 |
| Rosendahl Nextrom Technologies | 315 |
| S&E Specialty Polymers LLC | 337 |
| Saint-Gobain Performance Plastics Corp | 328 |
| SAMP USA Inc | 421 |
| Shang Hai Wang Xun New Material Co Ltd | 434 |
| Shenzhen Delifeng Trading Co Ltd | 412 |
| Shenzhen Unigel Telecommunication Co Ltd | 312 |
| Sheaves Inc | 502 |
| Sikora International Corp | 116 |
| SMEETS SA | 231 |
| Solvay Solexis | 301 |
| Sonoco Products | 200 |
| SSCP USA | 304 |
| Stewart Group, The | 127 |
| T & T Marketing Inc | 331 |
| Teijin Aramid USA Inc | 224 |
| Teknor Apex Company | 215 |
| Tensor Machinery | 426 |
| Thermoplastics Engineering Corp | 238 |
| Wardwell Braiding Machine Co | 334 |
| W Gillies Technologies LLC | 136 |
| Weber & Scher Mfg Co Inc | 402 |
| Windak Inc | 506 |
| Wire & Cable ASIA Magazine | 605 |
| Wire & Cable Technology International/WCISA | 503 |
| Wire & Plastic Machinery Corp | 214 |
| Wire Association | 405 |
| Wyrepak Industries Inc | 330 |
| Yangtze Optical Fibre & Cable Co Ltd | 430 |
| Zumbach Electronics Corp | 105 |

## Amaral Automation Associates.....Booth 112

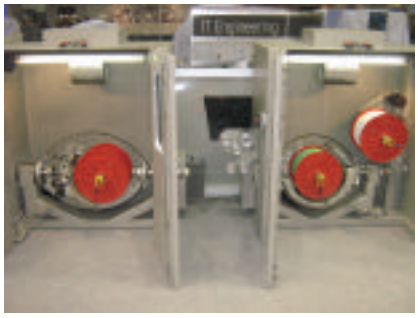
Located at booth 112, Amaral Automation is the New England representative for PWM, Zumbach, B & H Tool, Huestis, W Gillies/Diagraph, Tulsa Power, Powertec, Bardac, Engineered Control Systems (ECS), Vulcan, Yield Management, Rosendahl/ Nextrom, and Una-Dyn.

With its broad product range Amaral Automation offers solutions to all extrusion, material handling and other production needs for the wire, fibre optic and plastic industries.

**Amaral Automation Associates – USA**
**Fax**: +1 774 203 3078
**Email**: joe@amaralautomation.com
**Website**: www.amaralautomation.com

## Gauder Group.....Booth 120

Gauder Group will be promoting its extensive range of bunchers, stranders and cablers and the Pourtier range of high voltage cable machines and SETIC LAN cable equipment.



▲ *Gauder's Triple Twist machine for cat 6/6e LAN cables up to 6000tpm*

Gauder will also be presenting its Gauder Group Explorer dedicated software for sourcing second-hand equipment.

Gauder Group also offers a range of services to improve performance and extend equipment life, including machine upgrades, bows, spare parts and consultation.

**Gauder Group Inc – USA**
**Fax**: +1 336 856 8117
**Email**: sales.usa@gaudergroup.com
**Website**: www.gaudergroup.com

## Huestis Industrial ...Booth 336

In the present industrial and economic climate, with a focus on lean manufacturing and Six Sigma, it is crucial to minimise manufacturing losses through efficient processes, including re-work processes.

▲ *Huestis' Cable Jacket Stripper in action*

There are many reasons for scrap occurrences in cable manufacturing, and there are many stripping units in the marketplace – including many commercial strippers that utilise fixed knives or blades to cut the jacket or insulation as it is pulled by a cater puller or take-up.

These machines have a common setback in that they do not follow the variations in jacket thickness because the blade height is fixed. Thus, the core is not protected from the cutting surface and, when variations occur, the conductor surface is scored, cut or damaged.

The Huestis Cable Jacket Stripper allows for variations in the thickness of the jacket material and protects the core product by means of a stripping shoe that separates the core from the material as it is being cut or stripped.

The machine is versatile, it can be customised for specific applications, and is solid in design with a history of performance and reliability. When used in conjunction with a pay-off and a take-up, it will handle a variety of size ranges.

There are many successful applications on single and stranded (bare metal or cable core) as well as flat, shielded and fibre optics. It is available in bench and floor models and can be set up in a cell with various custom operations such as wash and reprint, strip and print, and braiders.

**Huestis Industrial – USA**
**Fax**: +1 401 253 7350
**Email**: sales@huestis.com
**Website**: www.huestis.com

## LaserLinc.....Booth 314

LaserLinc, on booth 314, manufactures non-contact, precision laser and ultrasonic systems for measuring OD, ID, and wall thickness for wire, cable, fibre, hose, tube, and many other industries.


▲ *LaserLinc's UltraGauge+ system*

The interface for the measurement hardware is LaserLinc's sophisticated, yet operator-friendly measurement/data processing software package Total Vu™, run on any Windows-based PC.

Total Vu software provides in-process tolerance checking, trending, SPC, feed-back control, data logging, recipes, defect detection, and other features. These tools reduce scrap, save material, increase production efficiency, and improve quality.

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Please contact: Mr Michel Landman
E-mail: michel.landman@wiresteel.be
Website: www.wiresteel.be

Options are available for monitoring other variables, such as pressures, temperatures, loads or speeds, to provide a complete view of the process, identify problems and to facilitate improvements.

Systems are available in a variety of configurations and sizes, with laser scan micrometers of one, two, and three axes, plus a new ultrasonic wall thickness measurement device, the UltraGauge+. LaserLinc's line of scanners covers a wide range of product diameters, from 0.035um (0.0014") to 120mm (4.7"), and includes very 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 UltraGauge+, wall thickness can be measured at up to eight positions with over 2,000 measurements per second.

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

## Lloyd & Bouvier ...Booth 407

At booth 407, Lloyd & Bouvier will display a shaftless take-up in a traversing reel design with pneumatic reel lifting.

The 36" unit is fabricated new from 2"x 4" steel box tubing. Manual pintles are easily adjustable, allowing for various reel widths.

Take-up is driven by AC variable speed motors and drives, and controlled by a pneumatically loaded catinary arm dancer with reducer for controlling product tension and take-up reel speed. Other sizes are available to fit various customer requirements.

◀ *Davis Electric 96" shaftless traversing reel take up*

The Lloyd & Bouvier booth will show a digital display of new and rebuilt equipment.

**Lloyd & Bouvier – USA**
**Fax**: +1 978 365 9700
**Email**: sales@lloydbouvier.com
**Website**: www.lloydbouvier.com

## MGS Manufacturing Inc (The MGS Group-MGS-Hall-Northampton).....Booth 115

The MGS Group, consisting of MGS Manufacturing, Hall Industries and Northampton Machinery Co, is an international supplier of automation and technology solutions for product handling and twisting systems.

▲ *18" fully automatic take-up from MGS*

Products featured at the IWCS/Focus Conference will include a fully automatic take-up with a robot handling system for depalletising and palletising – the Northampton triple twist twinner – plus the standard product range of accumulators, payoffs, take-ups, dancers, capstans, length counters, air wipes, swage tools, electric bazers, double twist bunchers, twinners, and single twist cablers.

**MGS Manufacturing – USA**
**Fax**: +1 315 337 4502
**Email**: sales@mgshall.com
**Website**: www.mgshall.com

## Pressure Welding Machines .....Booth 112

PWM will be exhibiting its manually operated cold pressure welders at the IWCS Focus Conference 2008 exhibition in Rhode Island.

The machines will be exhibited by Amaral Automotive Associates (booth 112), PWM's exclusive distributor in the United States and Canada.

PWM's selection of manually operated cold welders includes hand-held, bench and trolley-mounted machines. Clean, 'green', and easy to use, all PWM welders use the multiple upset technique to create a reliable, permanent bond on non-ferrous wire and strip.

Ideal for welding fine wire quickly and economically, PWM's hand-held M10, M25 and M30 models are comfortable to hold and simple to operate. Welding capacities range from 0.1mm to 1.8mm (0.0039" to 0.071") diameter copper/aluminium wire.

The bench-mounted BM10 and BM30 models will also weld most non-ferrous materials within the range 0.1mm to 1.8mm (0.0039" to 0.071").

Both machines are robust and easy to maintain, due to the low number of component parts.

The largest manually operated cold welder on show, the M101 model, is a strong, heavy-duty machine which can be either bench or trolley-mounted to enable the operator to take the machine to the weld area.

One of PWM's best-selling machines, the M101 has a capacity of 1mm to 3.6mm (0.039" to 0.041") diameter copper and 1mm to 5mm (0.039" to 0.197") EC aluminium.

▲ *The M30 hand held, manually operated cold welder has a capacity of 0.3mm to 1.8mm (0.0118" to 0.071") diameter copper/aluminium wire*

PWM's full range also includes air/hydraulic, electro/hydraulic pneumatic and electro/pneumatic machines, with capacities up to 25mm (0.984") copper and 30mm (1.181") aluminium.

**Pressure Welding Machines – UK**
**Fax**: +44 1233 820847
**Email**: pwm@btinternet.com
**Website**: www.pwmltd.co.uk

## Teknor Apex .....Booth 215

Three business units of Teknor Apex Company will exhibit at IWCS, booth 215, and all three will introduce new products, as follows:

The Vinyl division will exhibit indoor/outdoor FireGUARD® low-flame, low-smoke plenum compounds designed to reduce installation costs in plant or campus data networks by allowing continuous indoor/outdoor (I/O) optical fibre cables.

The I/O formulations provide the required UV resistance and anti-microbial properties for outdoor exposure without tradeoffs in the physical, electrical, and flame and smoke properties.

The new formulations are available for all FireGUARD compounds used as jackets in optical fibre cable applications.

▲ *Optical fibre cables jacketed with new FireGUARD® indoor/outdoor plenum compounds*

The Thermoplastic Elastomer division will introduce a new class of thermoplastic elastomer (TPE) compounds, fully RoHS compliant and meeting stringent UL criteria for fire retardance while providing flexibility and toughness over a broad temperature range.

The new additions to the Elexar® product range are available with hardnesses from Shore 56A to 90A.

These new additions are suited for insulation, jackets, and moulded parts for flexible cords, coil cords, and cables in applications such as power tools, industrial robots, welding equipment and lighting systems.

All grades meet UL94 V-0 flame test requirements and are formulated to pass a UL-1581 continuous rating of 125°C.

The latest product from the Teknor Color Company is a new series of concentrates for engineering-grade co-polyester TPEs, including a wide range of colour choices, all of them fully compliant with the EU's RoHS directive.

The company recommends the new colours for use with high-performance TPEs such as DuPont™ Hytrel® thermoplastic polyester elastomers.

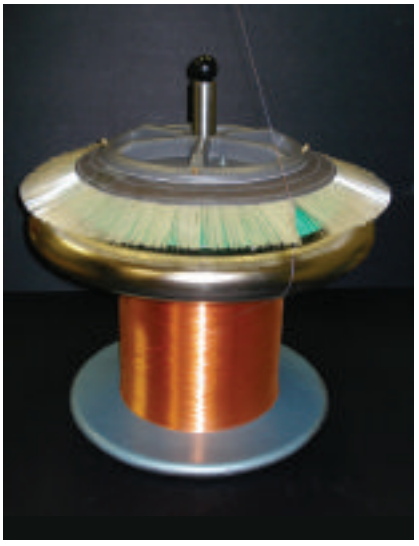
Potential applications suggested by Teknor Color include wire and cable insulation, jackets, and fibre optic buffers.

Full details of these new products, plus photography, will be available at the show.

**Teknor Apex – USA**
**Fax**: +1 401 729 0166
**Email**: info@teknorapex.com
**Website**: www.teknorapex.com

## Wyrepak Industries .....Booth 330

Wyrepak will display its line of rotating cap and brush assemblies, designed to pay-off wire at speeds up to 3,000 ft per minute.



▲ *A spool cap and tension brush payoff*

If more tension is required, a manual or electronic tension capstan can be added.

Also featured will be Wyrepak's expanded line of guide pulleys.

**Wyrepak Industries Inc – USA**
**Fax**: +1 860 632 5775
**Email**: sales@wyrepakind.com
**Website**: www.wyrepakind.com

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The IWCS Conference™ is in the final planning stages. Here are some of the highlights with full details of the schedule and technical content available on the IWCS website. The IWCS Conference™ is the premier event in the wire and cable industry, and now is expanding the Conference to include connectivity and data/communications infrastructure technology.

In 2008, the IWCS launches a major initiative to add value to the Conference for a broader audience. Traditional attendees involved in the development, design, manufacture and application of electrical and electronic cables, fibre optic cables, cable harnesses and assemblies, conductors and related materials will be joined by their counterparts in connector technology, infrastructure systems design and end to end connectivity solutions. To achieve these objectives, IWCS is joining forces in 2008 with the Communications Cable and Connectivity Association (CCCA) and the International Institute for Connector and Interconnect Technology (IICIT).

PROFESSIONAL DEVELOPMENT COURSES

Within the programme of the IWCS Conference an opportunity is presented to advance the knowledge and education of industry participants through Professional Development Courses, led by industry experts. The offerings include basic concepts in core courses related to copper, fibre and materials. Additionally, courses are offered in the latest technology issues facing the industry, allowing participants to be fully briefed on current issues. For the fifth year, IWCS will present the core courses of Copper 101, Fibre 101 and Materials 101. Over time, students completing those courses, along with two electives, will be presented with an IWCS Professional Development plaque. Please check the IWCS website for further or changed offerings in the curriculum, www.iwcs.org.

The Courses will commence on Sunday, 9 November 2008 at 8.00am with four concurrent sessions. Four more concurrent sessions will continue at 1:00pm. The Professional Development Courses will conclude prior to the opening of the IWCS Technical Symposium, allowing attendees to participate both in the Courses and in the Symposium. Lunch will be provided to registrants of the courses on Sunday. Organisation of the courses will allow for the maximum potential for taking two courses.

SUNDAY, 9 NOVEMBER 2008 – 8:00 AM – 5:00 PM
Instructors, titles and times to be Finalised
8:00 am – Noon
1 CU101: Fundamentals of Copper Conductors & Metallic Cable Design & Applications
2 MA209: Polymer Degradation, Stabilization and Failure Mechanisms
3 FO206: Bend-Resistant Fibers
4 MA201: The Art & Science of Extrusion for Wire and Cable I
1:00 pm – 5:00 pm
5 FO101: Fundamentals of Optical Fibers & FO Cable Design & Application
6 MA101: Selection & Use of Materials in Wire & Cable
7 MA202: The Art & Science of Extrusion for Wire and Cable II
8 FO203: Fundamentals of Broadband and FTT(x)

EXECUTIVE FORUM
TUESDAY, 11 NOVEMBER 2008 – 8:30 am – 3:30 pm
HOST: **Robert Willis**, President, ECA, the Electronic Components Sector of the Electronic Industries Alliance (EIA), Arlington, VA
MARKETS AND ECONOMICS
**Rob Daniels**, CRU – *World Wire and Cable Markets*
**Patrick Fay**, KMI Research – *Fiber Optic Markets and Prospects*
**Dr Robert Fry**, DuPont – *The Economic Environment for Wire & Cable*
KEYNOTE SPEAKERS
**Marty Curran**, Corning Optical Fiber – *'Perspective on Global Optical Fiber Market'*
**Brian Monks**, Underwriters Laboratories Inc – *'Counterfeit Products'*
**Dale Reed**, Emerson – *'Bandwidth Demand'*
**Vincent DeGiorgio**-Factory Mutual – *'Increased Safety in Cables and Transit Systems in Data Centers'*
**Cary Eskow**, Avnet Electronics Marketing – *'High Brightness LED Technologies, Impact on cables and connectors'*

At time of going to press the programme is still subject to change. Please check the IWCS website, www.iwcs.org, for the latest information.

# Springs & spring making

Embedded as it is in the broader context of wire-making, spring-making takes for granted the operator's command of a staggering number of basic procedures including feeding, forming, coiling, cooling, air cleaning, edge conditioning, slitting, winding, straightening, and paying off.

The spring-maker also needs a sure understanding of material properties, and a grasp of the subtly different behaviours exhibited in the course of a given procedure by, for example, brass strip, phosphor bronze strip, beryllium copper strip or low-carbon steel strip. Again, where the list stops is arbitrary.

The spring-maker may not be a graduate in metallurgy, but he is still a metallurgist. He also has to be a master of finishes. In addition to all of which, parts collection, parts storage and spring quality control are all essential and challenging to manufacturers who produce springs so tiny that 100,000 will fit into a square inch, or springs so large they will withstand pressures in the tons.

The vital suppliers to this sector are the companies represented in this section of EuroWire.

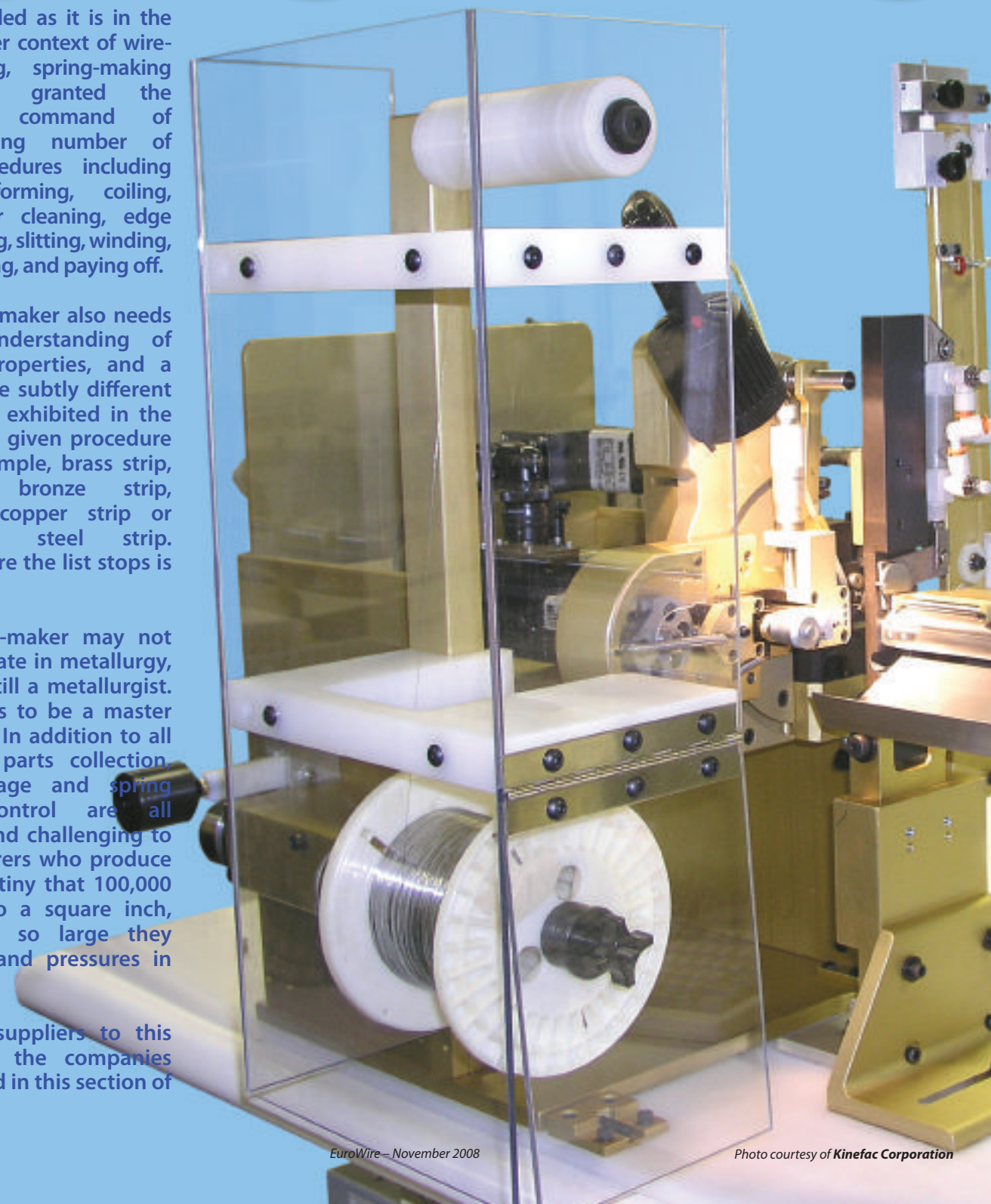
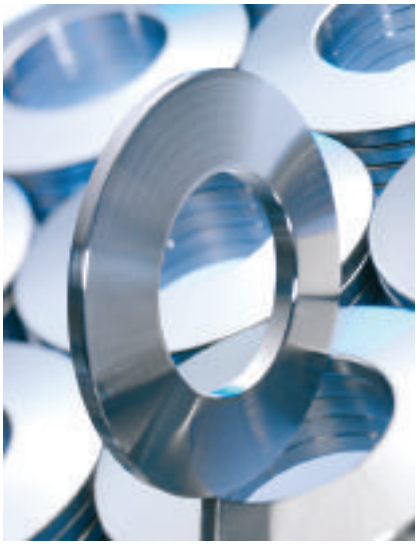


Photo courtesy of **Kinefac Corporation**

# Disc springs – the largest force in the smallest space

Founded 100 years ago as a workshop for cutting and stamping tools, Schnorr has grown into an international company in the field of disc spring and screw locking devices. The company currently has a global network of 39 branch offices and partnerships with industrial companies and groups including ABB, BorgWarner, Bosch, Daimler, Mahle, Siemens, ZF Sachs and VW.



▲ *Disc springs from Schnorr*

Schnorr disc springs support a number of dynamic processes in various applications and sectors, often in extreme conditions of stress, including pre-securing, securing, creating axial force, resetting, balancing play or holding in critical moments, for the automotive industry, mechanical and plant engineering or in aerospace technology.

Where the challenge is to control "the largest force in the smallest space" Schnorr disc springs are characterised by an optionally linear, digressive or progressive spring characteristic. The use of high quality materials helps secure a long service-life at dynamic stress. For new fields of application, increased performance requirements or specific materials a dedicated test and development department develops tailor-made solutions with the customer, specifically geared to individual requirements.

Schnorr is certified in accordance with ISO/TS 16949-2002.

**Adolf Schnorr GmbH & Co KG – Germany**
**Email**: mail@schnorr.de
**Fax**: + 49 7031 302 122
**Website**: www.schnorr.de

## Multi-axis CNC coilers

Simplex-Rapid presents the series of CNC machines, type MC-X.

This is the latest development in the field of the multi-axis CNC coilers for the production of compression springs, even those with complicated form and pitch variations.

Main features:
- modular concept for flexible machine configuration
- versions with 4 up to 13 axes
- software with 2D and 3D functions
- fully digital electronic system with high-definition absolute transducers increases the output rate, precision and ease of use (Motion Control Technology)
- SPC software integrated with measuring systems through video camera
- presetting for connection to LAN, WAN, VPN.

▲ *MC-15 for diameters of 0.25mm - 1.5mm*

**Simplex Rapid Srl – Italy**
**Fax**: +39 02982 81738 **Email**: info@simplexrapid.it **Website**: www.simplexrapid.it


## A large variety of springs and metal parts

Hang Cheong Metal Factory began business in Hong Kong in the 1970s. In 1996 the production line was moved to Hong Sheng Industrial Town and now occupies a 2,000m$^2$ facility. Hang Cheong Metal Factory is ISO 9001:2000 certified. All products meet international quality standards, for example Japan (JIS), USA (ASTM) and Germany (DIN) and also pass the RoHS test report.

The company operates the following plant and machinery: computerised spring former, length inspection machine, forming machine, wire cut machine, heat-treatment machine, temper furnace and sleeker.

▲ *Springs and metal parts from Hang Cheong Metal Factory*

Hang Cheong Metal Factory specialises in all kind of precise spring (compression spring, extension spring, torsion spring), wire formation products (from wire diameter 0.04mm up to 12mm), pin, axles, iron shafts (drill pointing, thread rolling, heading), metal fittings and parts. Products are mainly supplied to foreign businesses with factories in China, but also to Hong Kong, Europe, USA, Japan and other countries.

**Hang Cheong Metal Factory – China**
**Fax**: +86 852 24818903
**Email**: sales@spring.com.hk
**Website**: www.spring.com.hk

# High speed coiler

SPX Precision Components, FENN Division offers a range of Torin Z type CNC high-speed spring coilers using a combination of high torque servomotors and state-of-the-art motion control technology for the high-speed production of springs. Additionally, the system mechanics are specifically engineered to reflect the lowest inertia possible. This high torque to inertia ratio provides the greatest degree of coiler responsiveness and is critical in the production of springs at high rates.

▲ *Z12 6-axis CNC high speed spring coiler*

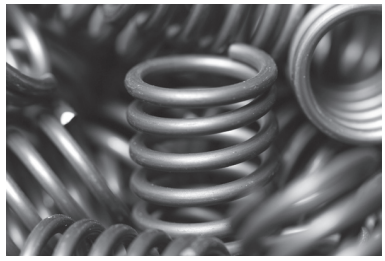
Another feature contributing to high-speed production is the servo rotary cut system on most models with left and right hand cutter shafts as standard. Fully computer controlled using powerful, specially developed software with an easy to use operator interface reduces set up times and provides on-the-fly adjustment of spring parameters. Changeover time is greatly reduced due to a new tooling concept where one set of feed rolls and wire guides cover the full wire range.

Most models are available with up to six-axis covering torsion and lateral coiling point increasing the product range and flexibility of the machine.

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

# Springs from Sweden

Scandinavian spring supplier, Spinova AB specialises in compression springs, torsion springs and wire forms. Within compression springs the focus is on difficult springs, such as hot pre-set compression springs as needed by the hydraulics sector. All compression springs are customised and are available in sizes from 0.10mm to 13mm. The wire material is usually oil-tempered, music wire, or stainless, but can also be in special alloys and round, square or flat. The compression springs are available ground or un-ground, as required.



▲ *Compression springs*

Customised extension springs can be manufactured in spring wire, stainless steel wire or other special alloys, in wire dimensions ranging from 0.10mm to 13mm and in various hook designs.

Spinova can also supply torsion springs, single or double coils with various shaft designs. Established in 1975, Spinova is part of the European industrial conglomerate Indutrade AB, present on most European markets.

**Spinova AB – Sweden** **Fax**: +46 486 101 80
**Email**: info@spinova.se **Website**: www.spinova.com

## Heat treatment of springs and small parts

ILES Srl presents its new 'Combinat' range. The basic equipment provides the following standard plants:

- electric hardening furnace, for treatment under protective atmosphere
- electric pre-heating and tempering furnace, with forced air circulation
- dynamic quenching tank
- washing machine with alkaline solutions

The various plants are connected by an external structure, on which runs a shuttle to transfer the charge.

**ILES Srl – Italy** **Fax**: +39 0373 750 110 **Email**: info@iles.it **Website**: www.iles.it

▲ *Heat treatment Combinat range from ILES Srl*

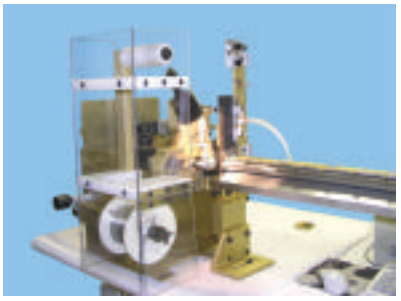
# High speed flat wire coiling

For catheter, medical device and other manufacturers who require continuous flat wire coils for casings and other applications, Kinefac Corporation has developed a new 3-point high speed precision deflection coiling process and the related wire and coil handling which greatly simplify the tooling, setup and operation of its Micro-Coilers.

On this unique new flat wire Micro-Coiler system both the radial and vertical tool elements are full CNC controlled along with the wire feed and, where necessary, pitch. The new system includes an extended coil support unit capable of handling coils up to 96" long, and an integrated wire de-reeling unit. The overall coil length is controlled by an adjustable sensor in the output trough and the coils are cut off by a pneumatically actuated shear.

With this 3-point tooling system continuous flat wire coil can be produced at up to 3"/second. Diameter tolerances of ± 0.0002" are not uncommon. Coils with variable diameters can be automatically produced. In addition, by using 2-point coiling tooling a full range of round wire and open pitch flat wire coils can be produced.

The flat wire Micro-Coiler can coil wire 0.001" x 0.0025" to 0.004" x 0.012" into continuous coils with an index from 3.5 to 12.0. The coiling points are now surfaced with a diamond structure which decreases the coiling friction and enables the user to form coils from some types of coated wire.



▲ *The flat wire Micro-Coiler*

**Kinefac Corporation – USA**
**Email**: sales@kinefac.com
**Website**: www.microcoiler.com

## Spring Tooling

For almost 35 years, Spring Tooling has manufactured precision tooling in high speed steel and tungsten carbide for use on spring and wire forming machinery.

Over the last two years the company has invested in three further CNC form grinding machines and a micro grooving machine, capable of producing wire grooves in steel and carbide down to 25 microns (0.025mm).

Spring Tooling supplies a diverse range of customers, specialising in precision springs and wire shapes for almost every industrial sector from micro springs for the electronic and medical industries, precision valve springs for vehicle engines and the aerosol can industry, to manufacturers of fencing and mattresses.

Several leading spring and wire forming machinery manufacturers have worked with Spring Tooling for prototype tooling and bespoke tooling for customers around the world. Spring Tooling has customers in over 50 countries.

Spring Tooling works to ISO 9001:2000.

**Spring Tooling Ltd – UK**
**Email**: sales@spring-tooling.co.uk
**Fax**: +44 1527 876412
**Website**: www.spring-tooling.co.uk

## Split rings are springs

The only real split ring is a double coil of wire with a crank – so that it lies flat – and with an angle cut at each end to nest against the crank. A typical application for these rings is to hold keys. In reality, this simple piece of wire is made to exacting standards to give trouble free operation; for a split ring to be effective it must have reliable and consistent spring.

Berkeley & Co's manufacturing process calls for spring steel wire, formed to shape on special purpose machines. The heat treatment process ensures the correct and consistent spring and polishing and electro plating brings out the final product.

Sizes range from 6mm to 76mm diameter. While the most identifiable use is as a key ring there are many other applications that vary according to the size and strength of the joining requirement. These can range from fishing tackle to chain assemblies. However, whatever the purpose, the need is for a reliable spring, and Berkeley has over 100 years of experience in achieving reliable springs for every application.

**Berkeley & Co Ltd – UK**
**Email**: sales@berkeley.ltd.uk
**Fax**: +44 1952 290094
**Website**: www.berkeley.ltd.uk

## New spring grinding machine

Kamatech has a new solution for spring grinding. The new machine, G66TH1A, can grind springs of up to 6mm diameter wire in only one pass. G66TH1A has two working heads with a central loading unit. With this arrangement it is possible to grind, press and then grind for finish.

▲ *Kamatech's G66TH1A with two working heads and central loading unit*

Vertical spring end grinders have vertically installed grinding spindles. Springs can be loaded manually or automatically. Kamatech will design and build entire lines for spring production, including coiling, grinding, press and heat treatments. Lines can be automated, including loading, to suit the needs of the user and are easily managed via an industrial PC using a graphic display.

**Kamatech Srl – Italy**
**Fax**: +39 0342 691043
**Email**: info@kamatech.it
**Website**: www.kamatech.it

# Lubricants

**The major challenge for lubrication in wire making has always been to facilitate the longest possible die life even as ever-higher drawing speeds are achieved. The use of tungsten carbide and diamond dies delivered phenomenal increases in productivity, but greatly compounded the friction and wear concerns that posed a challenge even in the era of chilled iron and steel dies. Every advance in wire making practice has been accompanied by improvements in drawing lubricants – or the advance would not have taken place.**

**Future developments will depend on improving lubricants still further; on propounding the best film barriers for new-generation metals, on balancing the demands of extreme pressure and extreme temperature and on satisfying increasingly stringent environmental and disposal requirements.**

**At the same time, these harder-working lubricants will themselves demand more care all the time. A patented apparatus for cleaning a lubricant for dry-type wire drawing is a marvel of driving motors, support plates and rotating and cleaning members. Someday, it will have to be an even greater marvel.**

**Fortunately, on past performance, wire makers may be confident that developments in lubrication engineering are proceeding in parallel with those in wire making. The products and services on review in this section of EuroWire provide ample evidence of this beneficial reciprocity.**

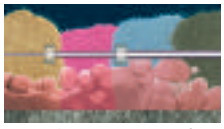
*Photo courtesy of **Lubrimetal***

# Wet and dry lubrication for drawing

Pan Chemicals is a producer of wire drawing lubricants, supplying worldwide.

Products include:
- Panlube® S – dry drawing lubricants for low carbon steel wire, plating quality wire, welding wires, FCW and CHQ wires, high carbon steel wire, drawing after galvanising, stainless steel and non ferrous wires
- Panlube® L– wet drawing lubricants: soluble lubricants, neat oils and greases
- Pancover® F – phosphate coatings
- Pancover® S – non-reactive pre-coatings for stainless steel, carbon steel and alloys, including borax free pre-coating for high speed drawing of stainless steel
- auxiliary products for degreasing, surface treatment, fluxes for galvanising and zinc-aluminium coating

Equipment:
- sanding belt descaler
- mechanical descalers
- rotating pressure die boxes
- borax - coating and drying equipment
- die reconditioning equipment



▲ *Lubricants/coating from Pan Chemicals*

Pan Chemicals' most recent developments include borax-free products (calcium or sodium based) and lubricants for extra-high drawing speeds; wet and dry lubricants for rolling technology and lubricants for extra-clean wires.

**Pan Chemicals SpA – Italy**
**Email**: info@panchemical.com
**Fax**: +39 0359 77288
**Website**: www.panchemical.com

## Keeping pace with legislation

Traxit manufactures wire drawing lubricants based on calcium, sodium, potassium or a mix of some or all of these.

Traxit products keep pace with national and international regulations, such as the European Adaption To Progress (ATP) that governs the classification and labelling of chemical substances. Regarding REACH, Traxit has a dedicated team working with raw material suppliers and, in accordance with the spirit of the new legislation, with other similar substance manufacturers to ensure full and timely compliance.

Within the Traxit range are over 250 different lubricants for multiple applications, for example spring wire, psc wire, clad wire, welding wire, CHQ wire and nail wire. They can be used on low or high carbon, stainless steel and non-ferrous materials.

Traxit also stays informed about developments within wire drawing and wire preparation machinery so as to be able to offer the optimum product from its traditional range or expanding range of new generation lubricants, designed for low consumption, environment-friendly handling and improved drawing properties.

In particular, calcium soaps with low consumptions and sodium soaps free of any boron compounds are already on hand and in use for a range of applications.

**Traxit International – Germany**
**Fax**: +49 2336 919 101
**Email**: info@traxit.com
**Website**: www.traxit.com

# Taking lubricant technology to India

Peddington Lubrimetal Pvt Ltd India is a member of Lubrimetal Group, among the largest wire drawing lubricant manufacturers in the world. Peddington Lubrimetal Pvt Ltd India is a leader in India for the production of special wire drawing lubricants (dry and wet), special additives and coatings, pre-drawing carriers, inhibitors, phosphating agents and copper coating additives, including:

**PL 2000 – PL 9001– PL 1025**
New strong dry drawing lubricants for mechanically descaled wire rod during the production of galvanised wire for fences, barbed wire, baling wire and mig wires.

**PL 52 – PL 3173 and PL 705**
High performing dry drawing lubricants for PC wire and strand production.

**PL 7080 – CS 7070 – PL 3700**
High performance sodium-based lubricants for high carbon steel (spring and steel cord) and stainless steel wire drawing.

**LP 790/5**
A high performance oil for stainless steel wire wet drawing.

**LP 348 – LP 750 – LP 600 – LMZ 10**
New emulsifiable oils for wire wet drawing for the production of mig wire, spring, galvanised wires and steel cord.

**LP 55 – LP 390 – LP 550**
Copper wire drawing oils for break-down and multi-wire machines.

**Steel for ITS 2 – ITS 3-7030**
Non-hygroscopic salts for the pre-drawing preparation of stainless steel and carbon steel wire (batch and in line treatments).

**Applilub 50 and Applilub 100**
New lubricant applicators.

**Peddington Lubrimetal Pvt Ltd** – India
**Fax**: +91 22 2261 0254
**Email**: info@peddingtonlubrimetal.com
**Website**: www.peddingtonlubrimetal.com

# Lubricants with REACH in mind

Since its foundation in 1854, Condat has specialised in designing, producing and commercialising special chemical products including industrial lubricants.

Condat's Vicafil® products are used across the world for wire drawing applications.
The Vicafil range covers all the industrial needs in the field of rod wire, cold rolling, wire drawing, drawing of bars and tubes as well as cold heading and offers:
- surface treatments with non-reactive surface coatings and reactive soaps for steel and stainless steel applications
- dry lubricants with calcium and sodium soaps
- soluble lubricants for all wet drawing applications and a special range for copper applications
- oils, greases and pastes for all forming applications
- anti-corrosion and protection products
- degreasing products and cleaners

The advantages of the Vicafil range include:
- reduced waste and soap consumption
- in line cleaning
- higher speeds
- chemical compatibility
- stronger adhesion on smooth surfaces
- higher drawing capability

▲ *Condat's pellet formulation of Steelskin®*

In addition, Condat offers special ranges developed for specific needs, such as:
- Steelskin: among this range of specific soaps, a unique technology called "Pellets" presents the lubricant as granules which provide a dust free environment in workshops, a low soap consumption during drawing and a consistent lubricant supply in the die cone
- Extrugliss: a special range for cold heading applications
- Galvasmooth: a range of wiping products for the hot dip galvanising process of wires

Condat offers lubricants that meet the most recent environmental and health & safety legislations:
- low dust in workshops
- european legislations on chemicals
- eco-friendly lubricants, free of boron and barium

**Condat AS – France**
**Fax**: +33 47807 3885
**Email**: info@condat.fr
**Website**: www.condat.fr

## Beaded lubricants for wire drawing

Blachford has been in business since 1921 developing, manufacturing and marketing technically advanced dry and wet wire drawing lubricants and supplying them to the leading wire manufacturers throughout the world. Blachford works closely with individual customers to improve processes and products and to reduce net costs.

Blachford is among leading manufacturers of beaded lubricants. These products are found to be effective for reducing or eliminating dust and die starvation (tunneling) caused by higher quantities of lubricant fines. Blachford offers an assortment of bead sizes and the ability to tailor the lubricant chemistry to optimise pickup in the die. The combined physical and chemical characteristics of beaded lubricants also result in reduced lubricant consumption.

Blachford currently manufactures more than 200 technically advanced wiredrawing lubricants with a variety of chemistries, particle morphologies and colours.

**Blachford Corp – USA** **Fax**: +1 815 464 2112
**Email**: blachford@urbancom.net **Website**: www.blachford.com

## Lubrication from Lubrimetal

The use of an advanced top performance drawing lubricant is key to the production of high quality finished wires. Lubrimetal manufactures an established range, including its well-known trademarks Fosfil® and Steelfor® phosphating agents, coatings and carriers. Steelfor ITS/5 is a new borax-free salt coating for steel wire rod and wire pre-drawing preparation for batch and in-line treatments.

▲ *A range of lubricants from Lubrimetal*

For dry drawing, Lubrimetal's Lubrifil® range includes:

- Lubrifil VA 2007 – VA 2001 – strong drawing lubricants for mechanically descaled wire rod (production of galvanised wire for fences, barbed wire and baling wire)
- Lubrifil VA 3173 and VA 705 drawing lubricants for PC wire and strand production
- Lubrifil VA 6001 – VA 7001 – VA 7090 borax-free sodium-based lubricants for high carbon steel (such as spring and steel cord) and stainless steel wire drawing

The Lubriol® range of wet drawing lubricants for ferrous metals, mild steel, high carbon and stainless steel includes:

- Lubriol V 688 for mig wire
- Lubriol LMZ 10 for steel cord
- Lubriol CU lubricants for copper wire drawing (breakdown, intermediate, fine and superfine wire drawings)

Lubrimetal has factories in Italy (Lubrimetal SpA) and in India (Peddington Lubrimetal).

**Lubrimetal – Italy** **Fax**: +39 0341 422386
**Email**: info@lubrimetal.com **Website**: www.lubrimetal.com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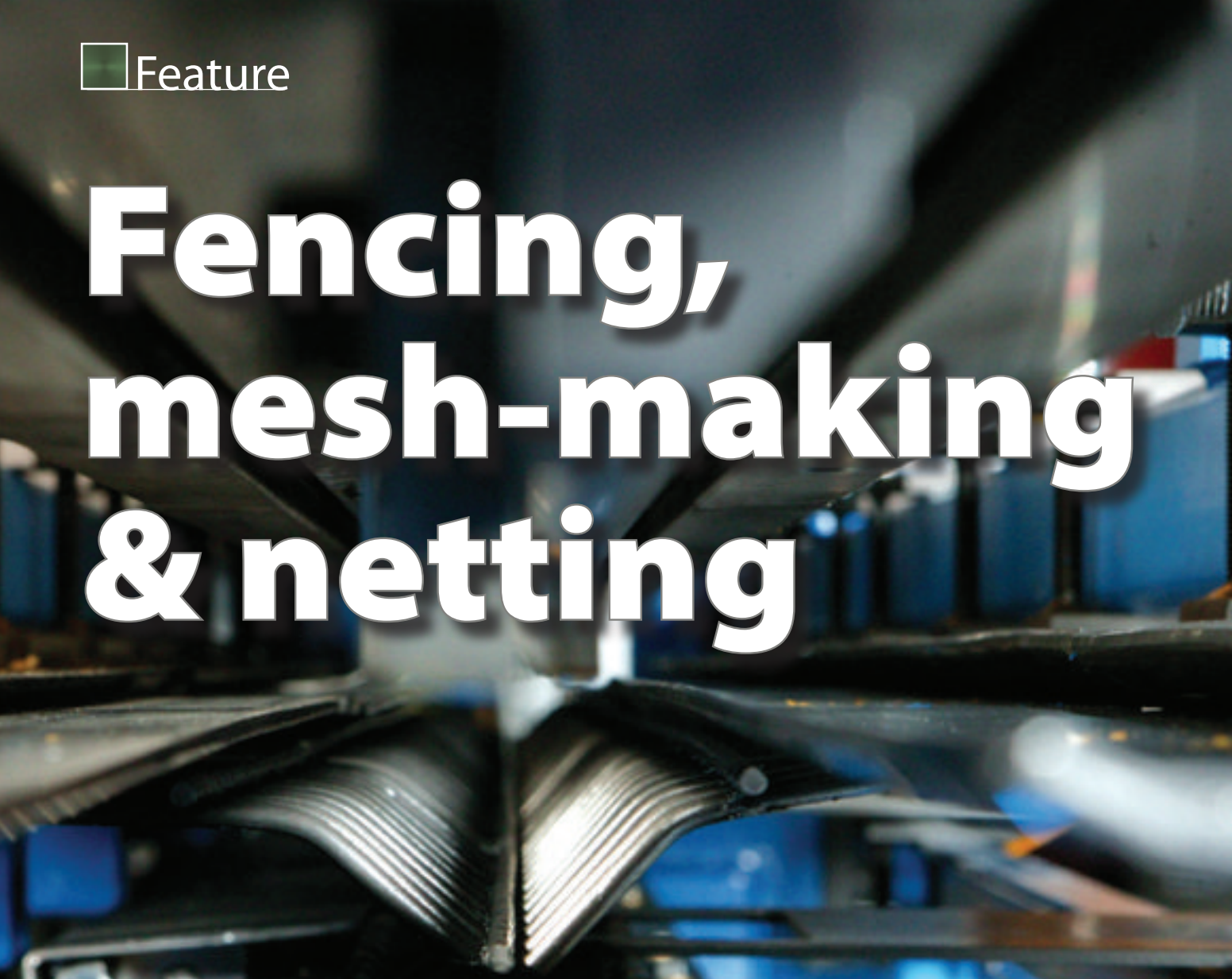
## EuroWire – More News, More Features, More Readers

# Fencing, mesh-making & netting



**These specialities lead double lives: public and private. Stainless steel hex mesh is beautiful as well as utilitarian in a fireplace guard. In a plainer setting, it holds in place the mineral wool blankets encasing vessels and pipes in refineries, power plants, and refrigerated warehouses. An ornamental fence of wrought iron and galvanised welded wire encloses a classic garden. A fixed-knot fence manufactured from 12-½ gauge, high-tensile, Class 3 galvanised wire is admired, if it is, by grazing livestock. NASA-certified, 99% pure copper netting shields the windows of spacecraft. Steel netting supplies the reinforced inlay in a common concrete pavement.**

**What these versatile products provide, in all their manifestations, is quality. They must. Metal is most vulnerable where it is bent, and a panel of fence, mesh, or netting incorporates many dozens or even hundreds of bends. Every one of these is a point of potential failure. Any breach is an opening to possible danger, great or small.**

**In this context – whether the application is netting to cover greenhouse seedbeds or fencing for zoo enclosures – the term 'weakest link' takes on special meaning. Fortunately for buyers and users of these superb products, it is a meaning very well understood by the companies profiled in these pages of EuroWire.**

Photo courtesy of **Ravni Technologies**

## Steel mesh for any application

Established in 1975, BRC Manufacturing specialises in the manufacture of steel welded mesh for the construction, mining, civil engineering and general industrial markets. BRC can offer medium to high volume production of bespoke or standard welded mesh sheets supplied, to specification, as ready-to-use product.

▲ *BRC specialises in steel welded mesh*

BRC has invested in computerised and automated machinery, including fully automated welding machines, a new manufacturing bay and ancillary equipment such as nibblers and wire cutters. A dedicated design team is equipped with AutoCad.

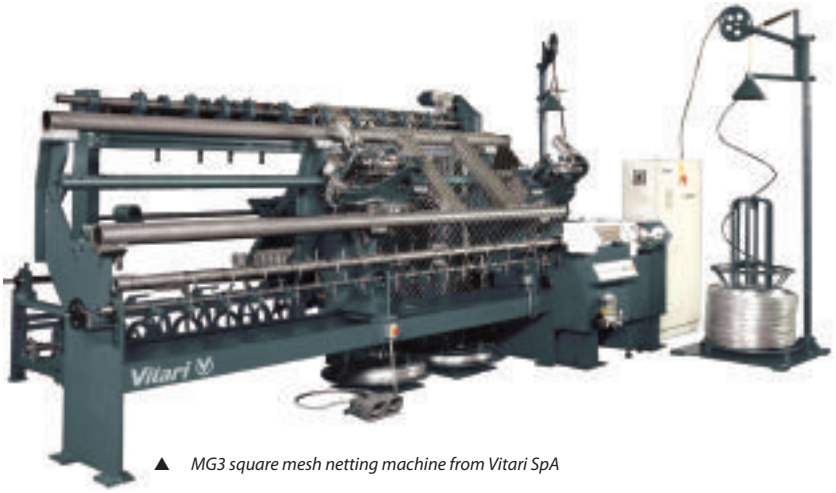
The new equipment allows for an improved product range to high specifications. Products are available in bright wire, hot dipped zinc galvanised or powder coated finishes.

**BRC Manufacturing – UK**
**Fax**: +44 1226 248738
**Email**: industrialmesh@brc.ltd.uk
**Website**:
www.brc-manufacturing.co.uk

# Leading the field in fencing

In the fencing field, Vitari SpA has a comprehensive range that includes machinery for chain-link fencing, suitable for sports field applications, and machines to produce hexagonal mesh for fencing or for mountain rock-fall protection purposes. This hexagonal mesh fencing can also be made into gabions for hill and mountainside consolidation.

The machines for chain link fencing can also produce netting with mesh ranging from 25mm–100mm (1"–4"), using galvanised, stainless steel or PVC coated wire with a diameter of 1.5mm–4.5mm. The netting is produced in a 0.54m width, with an output of 290m$^2$ per hour in normal or compact rolls. The wire spiral length, which determines the netting width, is electronically controlled via a brushless motor. There are three machine models to produce hexagonal wire mesh of 13mm (½") to 51mm (2") widths, and two models available that make double torsion netting (suitable for gabion production) in sizes ranging from 60mm x 80mm to 120mm x 140mm.




▲ *MG3 square mesh netting machine from Vitari SpA*

By replacing specific tooling, all the machines can produce different mesh sizes while productivity and output remains constant. When producing hexagonal mesh it is important to purchase a wire spiral-making machine. If, however, the main requirement is for gabion production it is necessary to add a machine for winding the gabion mesh edges around the steel frame as well as a small straightening machine for cutting the bar frame to the given length.

**Vitari SpA – Italy** **Fax**: +39 035 528 999
**Email**: vitari@vitari.com **Website**: www.vitari.com

# Welded wire mesh machinery

▲ *Wire mesh welding line*

Since 1988, Beijing TJK Machinery Co Ltd has been developing and building machinery for the production of welded wire mesh and for processing rebar.

The company offers a wide variety of technical solutions to meet various requirements in the production of welded mesh, and in processing reinforcing steel.

Beijing TJK Machinery manufactures, sells and services reinforcing mesh welding lines, cold rolling lines, stirrup benders, straightening and cutting machines, rebar shearing lines and other steel and wire processing equipment.

After two decades, Beijing TJK Machinery is the largest manufacturer of rebar processing machinery in China, with machines exported to over forty countries around the world. With stockholding space of 3,000m$^3$ and good logistic management Beijing TJK Machinery can ensure spare parts from stock to meet customer requirements.

**Beijing TJK Machinery Co Ltd – China** **Fax**: +86 10 5165 8353 **Email**: sales3@beijingmaster.com **Website**: www.mm-tjk.com

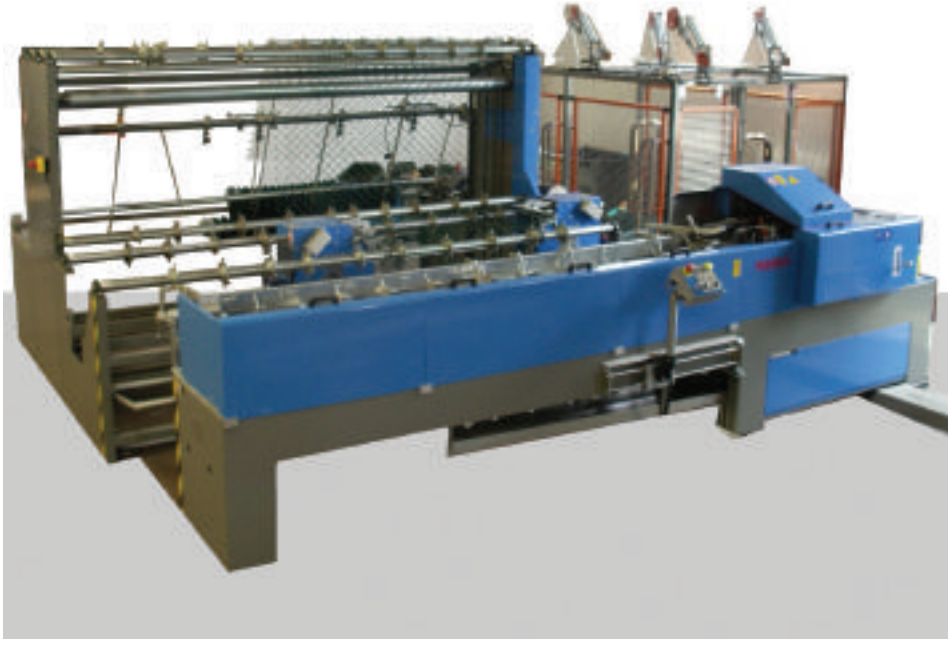
# Four wires, simultaneously, with Angeli

Angeli's machine for processing square mesh fence could provide the ideal solution for manufacturers seeking a high production volume of high quality fence at low cost.

After many years of experience acquired in manufacturing traditional machines, the company has turned all its efforts to the aim of realising a second generation of machines – the new models MG2 and MG4.

The main features of models MG2 and MG4 are:

- computerised operation of all functions
- use of new motors with more sophisticated control systems in order to ensure a higher precision in the realisation of the finished product
- adoption of standardised safety devices, allowing the machine to operate automatically and stop immediately in case of failures
- versatility. The machine can suit the requirements of both big industry and the small craftsman



▲ *Angeli's MG4 will process four wires simultaneously*

Model MG4 is believed to be the only machine in the field which is able to process four wires simultaneously at the desired braiding speed, thus offering an unskilled operator the possibility of working with only two wires, in order to help training.

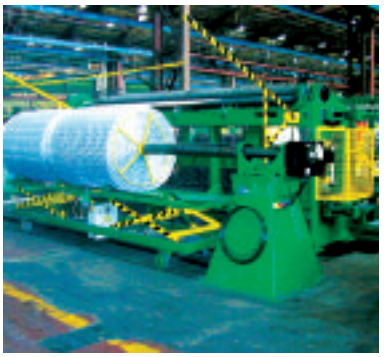
The spindles are driven by an asynchronous motor, having a high torque and speed electronic control. This motor allows to match the spindle speed with the type of wire used. In the second unit, the coiler, the fence sliding on control rollers is processed at the edges by the two closing mechanisms and, always by the rollers, reaches the sector where the rolls are prepared.

The coiler is preset for preparing both the normal and the compact rolls.

**Angeli Srl – Italy**
**Email**: info@angelisnc.com
**Fax**: +39 0546 28852
**Website**: www.angelisnc.com

# Machinery for fencing and gabion mesh

NOVA-S is a producer of chain link fencing and gabion production machinery.



▲ *6HR-80/4 – Gabion mesh weaving machine*

4HR–220 CNC, –320 CNC and –420 CNC are automatic machines for chain link fencing production, able to produce fencing up to 2, 3 or 4 metres in height, using galvanised or PVC-coated wire.

These high-speed machines are driven by an electro-pneumatic system and controlled by the CNC system which enables control of the production speed to suit the wire used and the required mesh size.

Machines can be equipped with either classical roll or the compact roll winding machine.

The 6HR-80/4 gabion mesh weaving machine can produce gabion mesh of up to 4 metres in width, either on rolls (up to 200m length) or directly to a gabion finishing line, which NOVA-S can also supply.

In the event of wire breakage the mechano-electrical system immediately stops the machine.

The motor drive enables the control of the machine speed and provides a smooth start.

**NOVA-S – Slovakia**
**Fax**: +421 3469 48 468
**Email**: novas@novas.sk
**Website**: www.novas.sk

# New and established fencing from New Zealand

South Fence Machinery Ltd manufactures three types of rural fencing machines – fixed knot, stiff stay and hinge joint. All three types have the option of single and dual fence production. Fixed knot fence is well established and its market share is growing rapidly in all areas where a premium fence is required. South Fence Machinery's fixed knot machines produce fences with up to 26 line wires and up to 3m high.

Stiff stay fence is relatively new to the market but the machine's speed and flexibility are said to make it an attractive option for new manufacturers establishing themselves in the market, as well as for established manufacturers, looking to offer a full range of fence types. Stiff stay machines can manufacture fences with up to 25 line wires and 2.5m high.

Hinge joint fence is still the cheapest option and maintains the largest market share of the three fence types. Hinge joint machines can manufacture fences with up to 28 lines wires and 2.5m high.

South Fence also manufactures a barbed staple machine and a coiler machine.

▲ *Dual fence hinge joint machine from South Fence Machinery*

**South Fence Machinery – New Zealand**
**Email**: enquiries@southfence.co.nz
**Fax**: +64 3 349 5022
**Website**: www.southfence.com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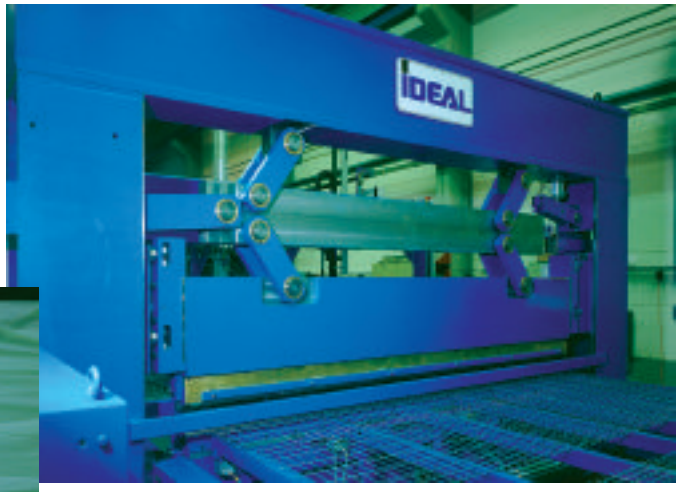
EuroWire MAGAZINE

# Machinery for producing steel wire fencing mesh

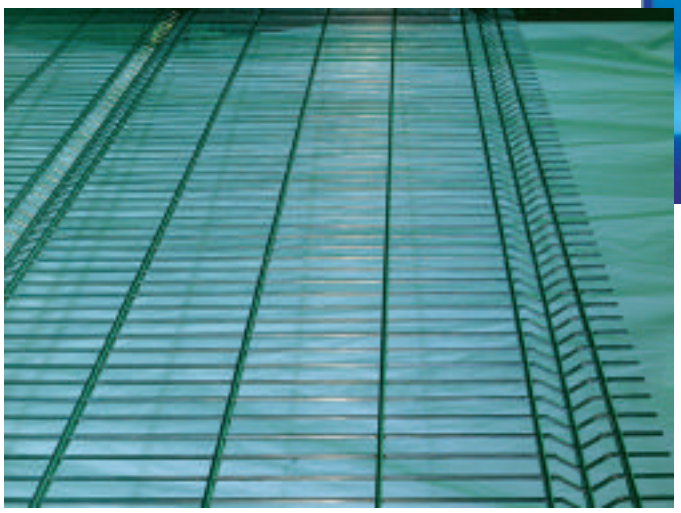
IDEAL-Werk of Lippstadt in Germany offers a wide range of welding equipment for producing wire fences of most types. The most simple machines are made for AC welding with manual loading of the line wires. In the case of double cross wire mesh panels the machines will be fitted for welding in DC current 3 x 300 kVA.

DC welding of heavy mesh panels, such as 8mm + 6mm + 8mm diameter, ensures perfectly flat mesh with a minimum of weld burr at the weld joints.

The machines are equipped with line wire loading devices for automatic feeding of the line wires. They can be fitted with additional pre-loading magazines, for improving the loading capacity of the distributors, and the welding portals can be equipped with double or triple cross wire loading devices adjustable to the customer's required wire diameters.




▲ *IDEAL bending press for fencing mesh*



▲ *Fencing mesh produced on an IDEAL mesh welder*

The welding machine can be equipped with stretching devices for gripping the ends of the cross wires and pulling them to precise flatness, overcoming the distortion produced by heat during welding. The portals can be equipped with cropping shears for cutting the cross wire overhang.

IDEAL–Werk welding machines are equipped with pulling devices to pull the panels from the welding portal into the welding position where V-shaped forming tools produce V-shape pressings to reinforce the mesh panels.

Thus the forming operation is included in the automatic operation of the line. At the end of the process the panels will be pulled out and stacked ready for unloading. For full flexibility, the operator is able to select the necessary operations for the type of panel being manufactured.

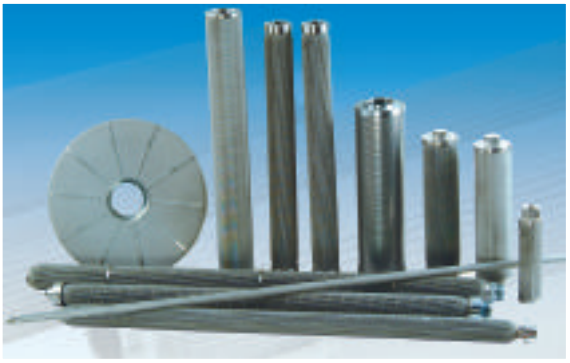
**IDEAL-Werk – Germany** **Website**: www.ideal-werk.com

## Wire mesh and fencing

YKM was established in 1984 in Anping County and is now one of the biggest wire mesh manufacturers and suppliers in China. YKM has wide technical experience, and provides a range of services to over 70 countries under Yingkaimo and YKM brands. YKM has three producing factories and over 200 advanced machine lines, including equipment from RGK in Japan, and Jager from Germany.

In May 2003 YKM was certified to meet ISO 9001:2000 standard and ISO 14001 standard. At the end of 2004, YKM registered AIPPI in the market and set up its office agency in Dubai UAE in the same year.

YKM manufactures and supplies stainless wire mesh, plain steel wire mesh, epoxy coated mesh, slit mesh, iron and galvanised wire, candle type filter, leaf disc filter, layers round filter, filter accessories and test sieves.



▲ *YKM filters show a variety of mesh types*

**Hebei Yingkaimo Metal Net Co Ltd – China**
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**Fax**: +86 318 7535021
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# Fencing mesh bending machines

In parallel with the production of straightening and cutting machines, Ravni Technologies also produces automatic fencing mesh bending machines. These machines can be synchronised with welding machines to create a fully automatic line.

Once the mesh is welded, a numerically controlled feeding device automatically presents it to the bender. Bend depth is programmable on the CNC display and can produce bent mesh of perfect flatness. Ravni bending machines are capable of making four bends, on mesh 2.5 metres long, in 15 seconds.

Cutting devices installed on each side of the bending machine provide the option for a lateral cut if required.

Ravni Technologies delivers all over the world, supplying and installing machinery and training the operators.

▲ *Precision bending of fence mesh with Ravni equipment*

**Ravni Technologies – France**
**Fax**: +33 477 90 58 65 **Email**: info@ravni.com **Website**: www.ravni.com

# Fencing for agriculture and industry

Tornado has been manufacturing and supplying wire fencing products for over 30 years. The company introduced high tensile fencing to the UK, and has continued to develop high-performance solutions for the agricultural, equestrian and industrial market sectors.

▲ *Hi-Tensile Plus fencing from Tornado Wire*

Manufacturing is based in Tornado's Cumbria plant. Quality control is of the utmost importance, from choosing raw materials, to product design, to manufacture, to customer service, to after-sales support – every aspect of the business is governed by rigorous processes and standards.

Tornado products are built for longer life and are often used in extreme conditions by national and international organisations to provide solutions for large, high-profile developments, and the company works closely with professional and conservation bodies to continually refine its products based on the latest information available.

Hi-Tensile Plus® from Tornado represents years of development and refinement.

It offers optimum strength, durability, tautness and ease of installation for a low lifetime cost and effortless maintenance. Its ability to be strained much tighter than mild steel fencing means that fewer intermediate posts are required, saving time and money. Hi-Tensile Plus® is state-of-the-art fencing for modern agricultural applications.

**Tornado Wire – UK**
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Messe Düsseldorf

# New optical fibre coating system optimised for FTTx applications

By Bob J Overton, Draka Comteq, Claremont, North Carolina, USA; and Xavier Meersseman, Draka Comteq, Billy Berclau, France


## Abstract

Fibre to the premises/business/home, or FTTx, brings broadband data transfer technology to the individual end-user and is enjoying an accelerating deployment worldwide.

In this paper, the authors present the key performance characteristics of a new coating system designed for FTTx applications where conventionally robust cable designs are not practical.

The coating system, which may be mated with small-radius bend insensitive fibre as well as G.652 and other designs, provides additional protection against stress-induced micro-bending.

It features a low modulus, very low $T_g$ primary coating for added cushioning against lateral and axial stresses induced by external contacts or by low temperature, and new enhanced colour pigment built into the secondary for improved brightness and visibility without inks.


## 1 Introduction

Fibre-To-The-x installations are making use of innovative, reduced cost system designs to facilitate the spread of the technology.

To illustrate, fibre may be delivered in the last link or links in a form of, for example, a microcable[1], [2], [3].

Air-blown fibres provide another efficient model for delivering the link to the end-use terminus[4]. There continues to be an industry-wide focus on modes of deployment that overcome the economic obstacles in the way of fibre-based broadband solutions for data transmission to the business and to the home.

Proposals for various methodologies are manifold and well known to the reader.

A key deliverable for a successful FTTx system is a low cost. Reduced size for cables, drops and structures for blowing are often critical as well, since putting through conduits for traditional cable designs is often prohibitive in existing infrastructure. Small ducts or tight pathways already present have to be usable for new fibre installations. Low-cost and smallest possible size requirements drive towards minimising protection for the optical fibres, that is, away from conventionally robust, more bulky cable designs.

Glass designs are now available that offer a reduced sensitivity to small bending radius, such as a trench-assisted core design[5] or hole-assisted fibres. Glass designs with lower mode field diameter are less sensitive to micro-bending stresses, but are not compatible with G.652 SMF.

Additional protection against micro-bending is needed to help ensure successful deployment in all applications for FTTx. To this end a new coating system is introduced that is optimised for FTTx, with the extra demands FTTx places on fibre and cable structures.

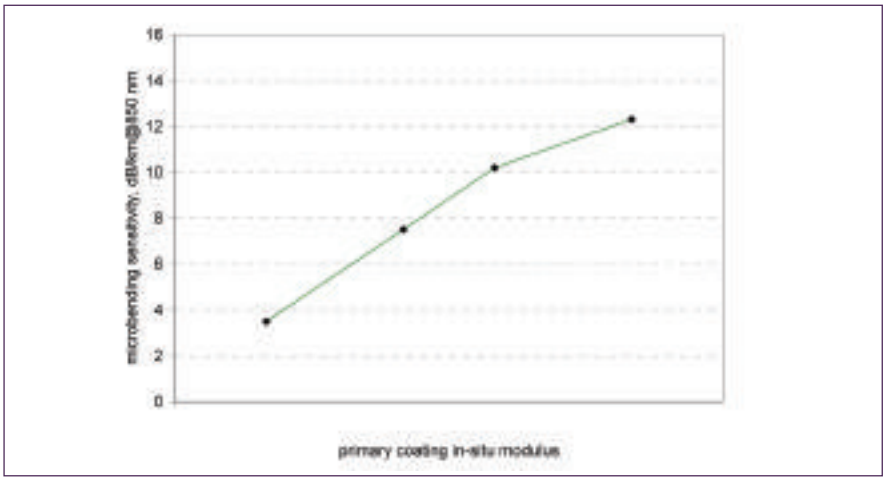
## 2 Coating design

In developing high quality multimode coatings, one of the lessons learned is the benefits of reducing the modulus of the primary coating.

*Figure 1* shows an observed relationship between the on-fibre modulus of primary coatings and the micro-bending sensitivity of the optical fibre. The fibres in this study are 50µ graded index multi-mode. The primary coating modulus is characterised by a method of measuring in-situ, cured on the fibre[6].

The micro-bending sensitivity is obtained using the fixed diameter sandpaper drum procedure[7]. While the lower modulus of the primary coating can be achieved by under-curing on fibre, it is desired to tailor the coating to reach a lower modulus at nearly full cure. The target modulus is 0.3 to 0.4 MPa for minimising the bend sensitivity.

A lower modulus for the primary coating implies a lower crosslink density and thus a lower concentration of the reactive acrylate groups.




▲ **Figure 1**: *Microbend sensitivity versus primary modulus for 50µ multimode fibre*

The acrylate groups respond by crosslinking via the freeradical mechanism of polymerisation, following photo-initiation induced by the UV curing lamps at draw. The kinetics dictates a reduced cure speed during processing, unless steps are taken to modify the process for optimum cure. This is achievable by an understanding of the character of the primary coating curing process.

There are at least two components of the curing process that act to retard the rate of polymerisation of the soft primary coating.

First, the high temperature of the curing coatings induced by exposure to the high intensity UV lamp environment and the exotherm of polymerisation reactions slows the overall observed rate[8].

Second, it has been demonstrated that close proximity of stacked UV lamps create in effect rapidly superposed, repeated photo-initiation periods. The rate of disappearance of acrylate groups under this condition is again retarded.

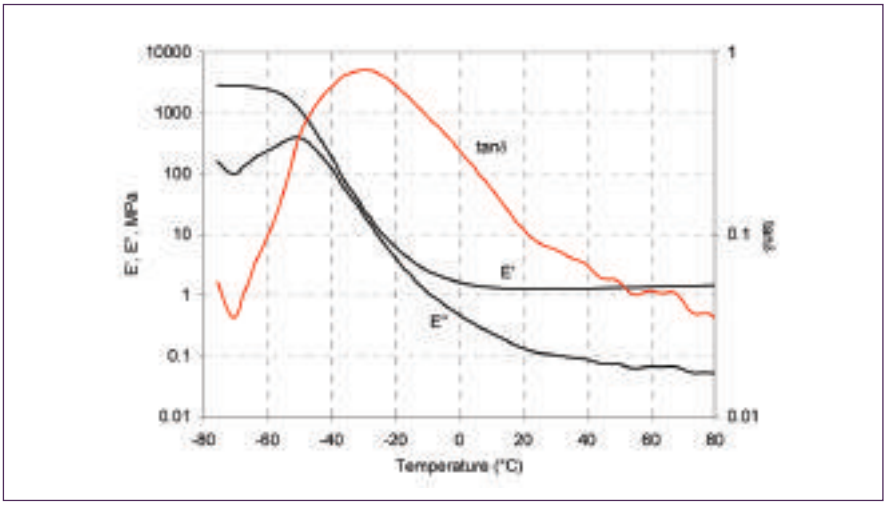
The disposition of UV lamps is such that time is maximised between repeat UV exposures resulting in a significant increase in the coating degree of cure, comparing processes with the same speed and overall UV dose[9], [10]. Thus it is possible to deal effectively with a reduced modulus primary coating and achieve a near-complete cure at required fibre draw speeds.

A second aspect of the primary coating for enhanced micro-bending protection in FTTx applications is the temperature dependence of the modulus. While a low modulus may be a characteristic at room temperature, deployment in the field will find fibre exposed to temperature extremes where microbend-inducing stresses may be present. Therefore, a lowest possible glass transition temperature $T_g$ is required so that the primary coating remains soft and protective in all situations.

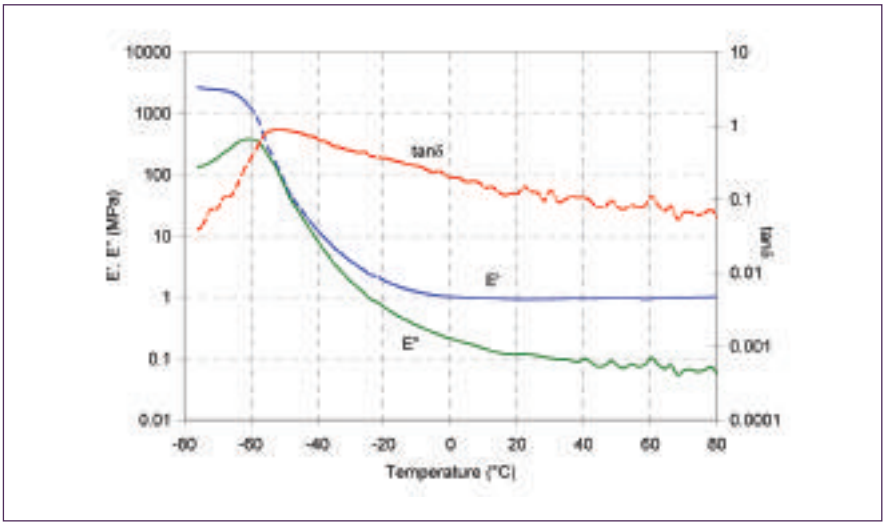
A tough secondary coating is necessary to protect the primary coating and glass from damage during handling and installation. This coating may be designed to be inked as a colour code or it may be colour-inclusive to provide identification without the necessity of a separate inking process.

# 3 Results

A new primary coating, a development based on the commercial graded index multi-mode product's coating, has been adapted for application to single mode fibre designs, particularly targeting extreme deployment environments such as FTTx.




▲ **Figure 2**: *Dynamic mechanical properties of a commercial singlemode primary coating, stress rate at 1 Hz*




▲ **Figure 3**: *Dynamic mechanical properties of the new singlemode primary coating, stress rate at 1 Hz*

The preferred secondary coating protecting the fibre structure features an optimised colouring system inclusive in the bulk, not requiring an extra layer of ink to be added for colour-coding. The new colours are enhanced for brightness and visibility under dim lighting situations, eg in deep shade or in manholes.

### *3.1 Mechanical properties*

The dynamic mechanical properties of a typical commercial primary coating are shown in *Figure 2*.

The data was obtained on a TA DMA at 1 Hz oscillatory stress rate, taking care that the strain is kept within the linear region of stress-strain behaviour.

The sample of coating was cured on polyester in a 75-micron film with a UV dose of 1 J/cm$^2$. The lamp used is a mercury-halide bulb operating at 300 W/inch output. This UV exposure is sufficient to ensure the material is on the plateau of the dose-modulus curve. The data shows the equilibrium modulus to be approximately 1.5 MPa.

On fibre, this coating typically cures well to a modulus of about 0.8 MPa, a level characteristic of most singlemode fibre primary coatings in the industry. The reasons for the discrepancy between the film modulus and in-situ modulus are detailed in references[8] through[10].

The '$T_g$', estimated by the peak in tanδ, is at approximately -30°C. Thus the coating, and other similar formulations, will respond as a glass at extreme low temperatures like -40 to -50°C. (This is an incomplete picture, as there is a time dependency to the stress induced by strain at low temperature, but the '$T_g$' remains a useful metric for comparison).

*Figure 3* shows the dynamic mechanical properties of the new primary, using a film sample made similarly to the above example.

In *Figure 3*, the new primary coating exhibits an equilibrium modulus at just under 1 MPa in the cured film, and on fibre the insitu modulus is typically measured at 0.3 to 0.4 MPa, the target.

With an eye to improving the low temperature protection against stress-induced micro-bending, the glass transition temperature is shifted more than 20°C lower than the typical coating described in *Figure 2*.

A much more rapid relaxation of stresses imposed during temperature excursions is to be expected. The results of tests designed to examine the micro-bending protection are shown in the next section.

### *3.2 Micro-bending sensitivity*

In order to establish a relative comparison of microbend sensitivity between the typical commercial primary coated fibre and fibre with the new coating system, two different methods were used for an evaluation. Both methods are designed to provide aggravated lateral stress conditions (where the second method actually goes well beyond what is normally encountered in the field). After measuring the effect on attenuation at room temperature, the test structures can be temperature cycled to determine the additional loss induced by the temperature excursions.

The first test is a basketweave/temperature cycling procedure. The sample fibre is wound at 50 grams tension on a 300mm diameter quartz cylinder with a 9mm 'lay'. This creates numerous crossovers fibre-to-fibre in the course of winding 50 layers on the drum.

The crossovers can cause added loss at room temperature if the fibre is sensitive enough, but normally little or no added loss is seen at this point.

The drum with fibre on it is temperature cycled, in this experiment through -40°C/-60°C/+70°C/23°C two times while making loss measurements at 1,550nm after one hour at temperature through the cycles.

*Figure 4* shows typical results for samples of the new coating system versus samples of a typical commercial system.

Both coating systems utilise coloured secondaries, but different formulations of secondary. The fibre specimens were chosen to match coating geometry, mode field diameter, and cut off wavelength.

The two different coating systems both give good protection against the micro-bending stresses at 23°C. At -40°C the typical commercial primary is close to its $T_g$ but still provides good protection against micro-bending by stress relaxing in a reasonable time frame.

Only a small added loss is seen at -40°C in the typical primary and none in the optimised primary fibre. At -60°C, the optimised primary is likewise close to its $T_g$, with similar protection still provided, but the typical primary is now well below $T_g$ and the fibres show added loss.

Desiring a more aggressive micro-bending environment, for the second method the IEC sandpaper drum test[7] was modified to provide a harsh micro-bending stress situation strong enough to affect single mode fibre even at room temperature.

To do this, a 300mm diameter quartz drum was wrapped with adhesive backed, 40 grit sandpaper, creating a very rough surface around which a single layer of fibre was wound at 100 grams tension.

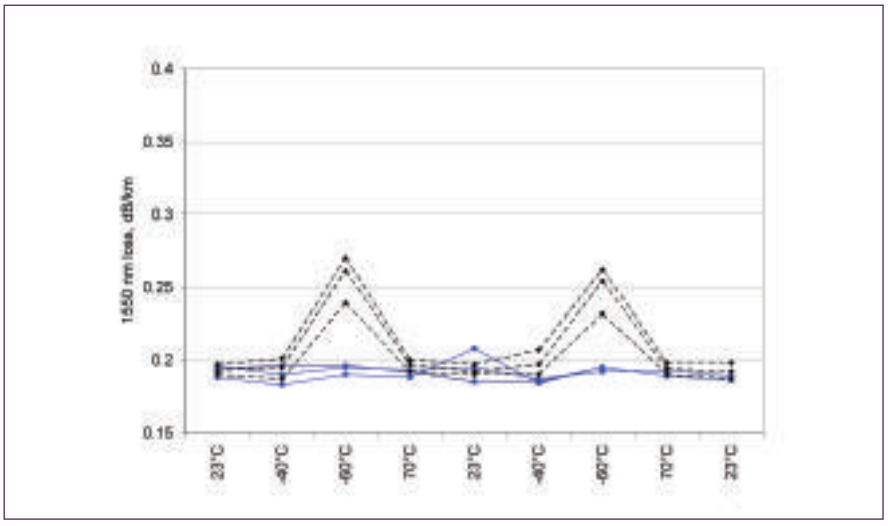
Using matched fibre samples as with the basketweave/temperature cycling test, the 23°C attenuation was measured after winding.

Then the drums were cycled to temperature extremes, this time measuring attenuation at 1,550nm after one hour and again after four hours at temperature. The results are given in *Figure 5*.

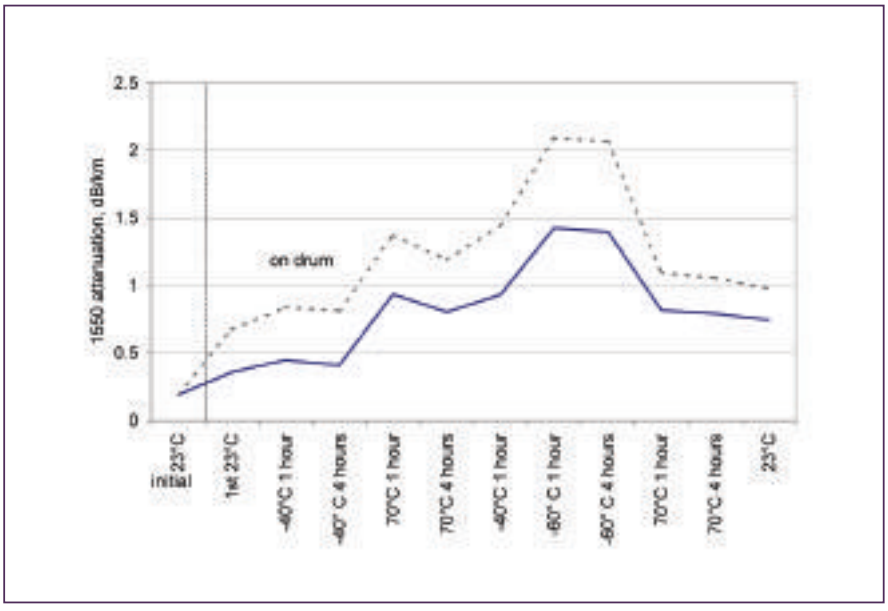
The initial measurement at 23°C taken while the fibre was on the original spools shows similar loss of about 0.19 dB/km for these fibre specimens.

After winding the drums, still at room temperature, the lower modulus of the optimised primary offers significantly better protection than the typical primary, with one third the added loss.

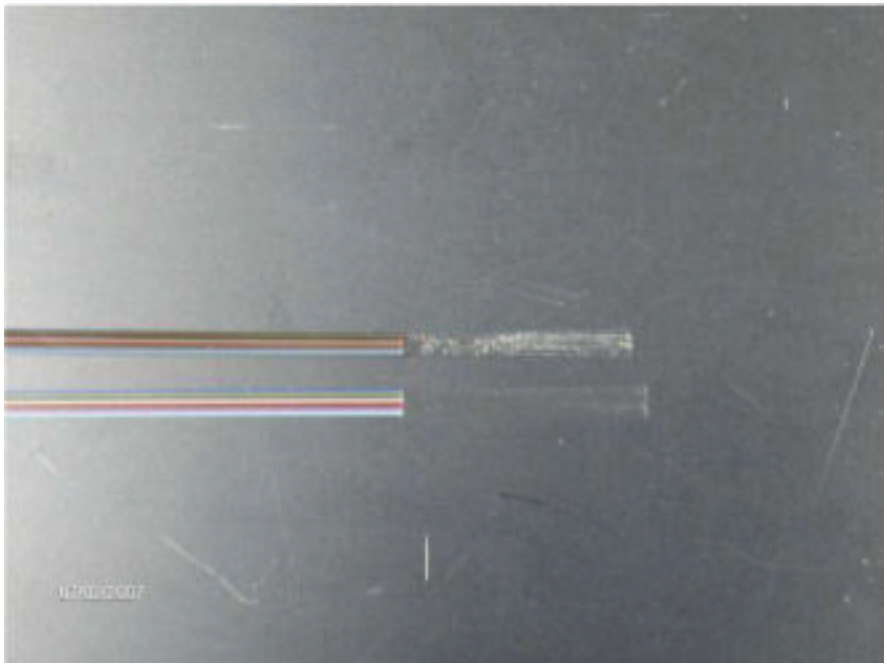
Throughout the very demanding range of temperature and rough drum conditions, the optimised coating fibre shows much lower micro-bending response than the typical commercial system.




▲ **Figure 4**: *Basketweave/temperature cycle results for typical commercial SM coating system (dashed) and the optimised coating system (solid)*




▲ **Figure 5**: *Sandpaper drum/temperature cycle results for typical commercial SM coating system (dashed) and the optimised coating system (solid)*



▲ **Figure 6**: *Ribbon stripping demonstration with optimised coating system (bottom) contrasted with typical commercial coating system in ribbon*

### *3.3 Coloured secondary*

The secondary coating for the optimised system has been reformulated for improved brightness and visibility in all lighting.

The colours are in agreement with Munsell standards for optical fibre colour-coding and are easily distinguished against both light and dark backgrounds.

The enhancements to the colouring required increasing the concentration of the pigment systems in this new secondary, as well as improvement in the curing package provided.

The coating features a surface that provides an excellent interface with ribbon matrix material, so that the matrix easily separates from the coloured fibre but without sacrificing robustness.

The mechanical properties of the coloured secondary are balanced with those of the primary coating so that in heat stripping, the coating/matrix composite separates cleanly from the glass fibres, *Figure 6*.

## 4 Conclusions

An improved single mode fibre dual coating system has been developed, optimised for applications in FTTx.

The new system features a softer primary coating with excellent low-temperature characteristics to protect against micro-bending in any environment and in the toughest physical situations.

A new coloured secondary with enhanced colour strength and vividness is paired with the primary coating.

The secondary provides improved ribbon characteristics for structures that are robust, yet easily entered.

The dual coating is also specifically balanced for superior heat stripping in ribbon, with virtually no residue left behind on the glass, to facilitate fast splicing and terminations.

The improvements in the coating system offer significant advantages for deployment in any FTTx system design. ■

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# Hochbelastbare Raupenabzüge

▲ *Die neue Maschine von Gillard hat längere Riemen, für weniger Druck beim Extrudieren*

Gillard hat seine Auswahl an Präzisions-Raupenabzügen erweitert.

Die neuen Maschinen sind Versionen mit besonders langen Riemen der Hochleistungsbaureihe. Die Riemen stehen nun in einer erhöhten Länge von 1500mm oder 1800mm und einer Breite von 225mm oder 300mm zur Verfügung.

Laut Aussage von Gillard können mit diesen längeren Riemen höhere Zugleistungen erzielt werden, mit einem wesentlich niedrigeren Klemmdruck an den extrudierten Produkten.

Dies vermeidet wiederum Verformungen und Schäden, insbesondere bei Produkten mit dünnen Wänden. Die neuen Raupen bieten darüber hinaus auch eine aktualisierte Antriebseinheit mit WS-Servomotoren mit Direktantrieb um die Riemen anzutreiben. Zwei digitale Servoantriebe werden in einer Master/Slave-Konfiguration für eine optimale Drehzahlregelung eingesetzt.

Der Oberriemen ist dazu bestimmt über jegliche Vorsprünge oder Beulen zu gleiten, die während des Anlaufens der Extrusionsanlage entstehen. Die Obereinheit ist an beiden Enden an zwei Druckluftzylindern aufgehängt. Somit kann sich der Riemen automatisch über die Vorsprünge heben und senken, während ein angemessenes Haften an das extrudierte Material stets erhalten bleibt.

Die Maschinen sind mit Schutzvorrichtungen ausgestattet, entsprechend den aktuellsten EU-Normen.

Gillard bietet eine große Auswahl an Optionen an, damit die Maschinen den Anforderungen der Anwender entsprechend angepaßt werden können.

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## Nexans-Kabel - Kabelvertrag für Flughafen

Nexans hat Energie- und Steuerkabel mit einer Länge von über 2.500km im Gesamtauftragswert von ca. 2,6 Millionen Euro nach China geliefert. Diese Kabel spielen eine wichtige Rolle beim Betrieb des hochmodernen Gepäckfördersystems im neuen Terminal 3 des Internationalen Flughafens von Peking.

Nexans wurde aus verschiedenen Gründen als einziger Kabellieferant für dieses Projekt ausgewählt. Zunächst erfüllen die Kabel von Nexans alle maßgeblichen Standards für Flughafenanwendungen, einschließlich Flexibilität und halogenfreier Isolierung. Darüber hinaus war Nexans in der Lage, alle unterschiedlichen Kabeltypen zu liefern – Energie-, Steuer- und Glasfaserkabel. Der letzte und wichtigste Faktor ist, daß Nexans eine schnelle Lieferung gewährleisten und so den Anforderungen eines verkürzten Bauzeitplans gerecht werden konnte. Die meisten Projekte dieser Größenordnung haben eine Bauzeit von ca. fünf Jahren, das Gepäckfördersystem im Terminal 3 des Pekinger Flughafens wurde jedoch von der anfänglichen Planungsphase bis zur Inbetriebnahme in nur drei Jahren realisiert.

Das von Siemens und Inter Roller installierte System gilt als eines der weltweit größten und modernsten. Pro Stunde können bis zu 19.200 Gepäckstücke sortiert und transportiert werden. Terminal 3 am Pekinger Flughafen, der im März 2008 vollständig eröffnet wurde, hat seine frühere Kapazität von 30 auf 66,5 Millionen Passagiere pro Jahre mehr als verdoppelt. Ungefähr 330 Abfertigungsschalter sind an ein 68 km langes Hochgeschwindigkeits-Behälterfördersystemangebunden.Durch einen 2,2km langen Tunnel wird das Gepäck mit einer Geschwindigkeit von 36km/h von den Abfertigungsschaltern im Terminal 3A zu den Verlade-Karussells des internationalen Terminals 3B transportiert.

Die Kupferkabel wurden in den Nexans-Werken in Deutschland gefertigt. Die Herstellung der Glasfaserkabel erfolgte im Opticable-Werk von Nexans in Belgien.

**Nexans – Frankreich**
**Fax**: +33 15669 8484
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**Website**: www.nexans.com

# Neue Kontrollkabel für die Werkzeugmaschinenindustrie

▲ *Chainflex® CF77/CF78 für den weltweiten Einsatz im Bereich Werkzeugmaschinen*

Der Energieketten- und Zubehörspezialist igus® hat eine neue Familie von Steuerkabeln für Energieketten entworfen, die in der ganzen Werkzeugmaschinenindustrie ihren Einsatz finden. Die ölfesten Kabel Chainflex® CF77 und CF78 wurden für dynamische Anwendungen mit hohen Zyklusraten unter hohen Belastungen entwickelt.

Bündelverseilte, flammwidrige und halogenfreie CF77 und CF78 sind in Schichten verdrillt, wenn sie aus 7 oder weniger Leitern bestehen (Nennspannung U0/U 300/500 Volt) und in Bündeln verseilt, wenn sie aus 12 oder mehr Leitern (U0/U 300/300 Volt) bestehen.

Die Kabel sind um einen sehr zugfesten zentralen Seil in Bündel verseilt, um Windungen und gebrochene Adern zu vermeiden. Der Außendurchmesser der Steuerkabel ist dabei so dünn wie vergleichbare Typen, die lediglich in Schichten verseilt sind. Die hochabrieb- und krümmungsfeste Außenummantelung - die aus PUR ist, das unter Druck in allen Spalten und Winkeln des Kabels extrudiert wird - sichert zusätzliche Stabilität und ist flammwidrig sowie halogenfrei.

Die ölfeste Baureihe verfügt über die UL/CSA-Genehmigung und stimmt mit DESINA überein. Die Kabel eignen sich für Reinraumbedingungen (ISO Klasse 1).

**igus UK Ltd – UK**
**Fax**: +44 1604 769514
**Website**: www.igus.co.uk

## Draka schließt das Kupferdrahtwerk in Llanelli (UK)

Der Vorstand der Draka Holding NV, übereinstimmend mit dem firmeneigenem Programm "Stop, Swap and Share" (dreifaches S), hat seine Absicht bekannt gegeben die Herstellung von Kupferdraht in seinem Kupferdrahtwerk in Llanelli (UK) zu beenden und die Produktion mit denen in anderen Werken in Europa zu vereinigen, wo das Drahtziehen bereits Teil des integrierten Herstellungsverfahrens ist.

Das Werk in Llanelli, das sich mit der der Produktion von Kupferdraht befasst, gehört zur europäischen Divison Energy & Infrastructure und beschäftigt über 135 Mitarbeiter. Die vom Werk in Llanelli geleisteten Drittverkäufe werden vom Standort in Derby (UK) von Draka übernommen.

Die Schließung von Llanelli wurde mit dem europäischen Betriebsrat und gesondert mit dem nationalen Betriebsrat in UK besprochen.

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# Olympischer Auftrag für Prysmian

Prysmian Cables and Systems, eines der wichtigsten italienischen Unternehmen, die in China präsent sind, hat ein hochwertiges Projekt für die olympischen Spiele in Peking 2008 zur Entwicklung des Hochspannungsstromnetz abgeschlossen, welches das olympische Dorf mit Strom versorgt. Prysmian erhielt den Auftrag für ein 20km langes 220kV-Hochspannungskabel, um das Dorf zu versorgen, das sich auf über 66 Hektar Land ausstreckt.

Das Markenzeichen von Prysmian war auch auf dem Internationalen Rundfunkzentrum, von dem aus der italienische Fernsehsender RAI die Aufnahmen der olympischen Spiele sendete. Die Gruppe verkabelte das ganze Rundfunkzentrum von RAI und bot Verbindungen von hohem technischen Niveau an, damit die beste Sendequalität zugesichert werden konnte. Prysmian lieferte alle passiven Ausrüstungen und LAN-Kabel gemäß den Spezifikationen von RAI, einschließlich: Rundfunkkabel und -Stecker für die Fernsehsendungen; Audio-Kabel und -Stecker; UTP CAT 5E und CAT 6-Kabel für den LAN-Anschluß; MMF-Lichtwellenleiterkabel für Rundfunk-Backbone und Breitbandsendung sowie RF Radiofrequenzkabel und -stecker.

Prysmian verfügt über fünf Produktionsanlagen in China, die in Tianjin (Sonderkabel für industrielle Anwendungen), Baoying in der Provinz Jiangsu (Hochspannungskabel und -systeme) und Wuxi, ebenfalls in Jiangsu, (Lichtwellenleiter- und Kupferkabel für die Telekommunikation) liegen und insgesamt über 1000 Mitarbeiter beschäftigen. Prysmian Shanghai Trading importiert und verteilt Sortiment an Kabelzubehör für MS- und HS-Kabel von Prysmian.

Prysmian hat vor kurzem ein neues Werk in Peking eröffnet und beabsichtigt bis 2010 einen Zuwachs von rund 50% seiner Tätigkeiten in China zu erzielen, wobei weitere Investitionen vorgesehen werden, um die Fertigungskapazitäten zu erhöhen. Der Gesamtwert der bereits von Prysmian in China geleisteten und vorhergesehenen Investitionen wird mit über 100 Millionen Euro angegeben.

Prysmian ist auch an anderen wichtigen chinesischen Projekten beteiligt, einschließlich jenem bezüglich der Entwicklung eines neuen Hochspannungsstromnetzes in Shanghai, der Verkabelung der U-Bahn in Peking und der Entwicklung und Installation hochtechnologischer Sonderkabel für zwei Kernkraftwerke, die in den Provinzen von Liaoning und Fujian im Auftrag des chinesischen Kernkraft-Engineering-Unternehmens "China Nuclear Power Company" gebaut werden.

**Prysmian Cables & Systems – Italien**
**Website**: www.prysmian.com


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# Neues Lichtwellenleiter-Beschichtungssystem für FTTx-Applikationen optimiert

Von Bob J Overton, Draka Comteq, Claremont, North Carolina, USA; und Xavier Meersseman, Draka Comteq, Billy Berclau, Frankreich


## Übersicht

Faser bis zum Gebäude/Büro/Haus auch FTTx genannt, bringt die Technologie der Breitbanddatenübertragung zu den einzelnen Endverbrauchern und genießt derzeit weltweit rasant zunehmenden Einsatz. In diesem Artikel stellen die Autoren die wichtigsten Leistungsmerkmale eines neuen Beschichtungssystems dar, das für FTTx-Applikationen entworfen wurde, wo sich herkömmliche robuste Kabelkonstruktionen als ungeeignet erweisen.

Das Beschichtungssystem, das mit krümmungsunempfindlichen Fasern mit engem Radius sowie mit G.652 Fasern und anderen Aufbauten verbunden werden könnte, bietet einen zusätzlichen Schutz gegen Mikrokrümmungen durch Belastungen. Darüber hinaus bietet es einen niedrigen Modul, eine Primärbeschichtung mit sehr niedriger Glasübergangstemperatur ($T_g$) für eine zusätzliche Dämpfung gegen seitliche und axiale Spannungen, die durch äußerliche Kontakte oder Niedertemperatur verursacht werden, und einen neuen erhöhten Farbpigment, der in der Sekundärbeschichtung enthalten ist für eine verbesserte Helligkeit und Sichtbarkeit ohne den Einsatz von Tinte.


## 1 Einleitung

Bei den FTTx-Installationen werden innovative Systemaufbauten mit reduzierten Kosten verwendet, um die Ausbreitung der Technologie zu vereinfachen. Mit anderen Worten, Fasern können bis zur letzten Verbindung oder Verbindungen in einer bestimmten Form gebracht werden, zum Beispiel jener eines Mikrokabels[1],[2],[3]. Luftgeblasene Fasern stellen eine weitere effiziente Methode dar für die Übertragung der Verbindung an der Endstation des Endverbrauchers[4]. Auf Industrieebene beschäftigt man sich dauernd mit der Verlegungsweise, die es ermöglicht ökonomische Hindernisse hinsichtlich faserbasierten Breitbandlösungen für die Datenübertragung zu Büros und in Privathäuser zu überwinden.

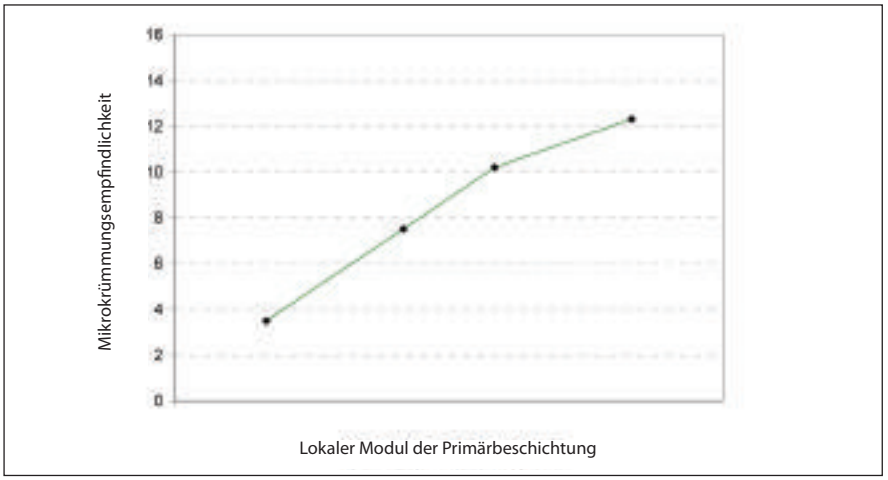
Die Vorschläge für die verschiedenen Methodologien sind vielfältig und dem Leser sicher bekannt.

Ein Schlüssel für ein erfolgreiches FTTx-System besteht in den geringen Kosten. Reduzierte Abmessungen für Kabel, Abzweigungen und Strukturen zum Blasen sind oft ebenfalls kritisch, da häufig für traditionelle Kabelaufbauten das Einfügen durch Leitungen in den bestehenden Infrastrukturen nicht möglich ist.

Bereits vorhandene kleine Leitungen oder enge Seitenwege sollen für neue Faserinstallationen verwendbar sein. Der Bedarf an geringen Kosten und kleinstmöglichsten Abmessungen führt zu einem minimierenden Schutz für die Lichtwellenleiter, was wiederum die Leistungen konventioneller robuster und größerer Kabelaufbauten reduziert.

Derzeit stehen Glasaufbauten zur Verfügung, die eine reduzierte Empfindlichkeit gegenüber einem kleinen Krümmungsradius bieten, wie z. B. mit Nut ausgestatteten (trench-assisted) Kernaufbauten[5] oder mit Loch ausgestatteten (hole-assisted) Fasern.

Glasaufbauten mit niedrigem Modenfelddurchmesser sind zwar gegenüber den Belastungen von Mikrokrümmungen weniger empfindlich, jedoch sind sie nicht kompatibel mit G.652 SMF-Fasern. Ein zusätzlicher Schutz gegen Mikrokrümmungen ist erforderlich, um eine erfolgreiche Verlegung in allen FTTx-Applikationen zu sichern. Dazu wird ein neues für FTTx optimiertes Beschichtungssystem eingeführt, mit den zusätzlichen Anforderungen, die an FTTx bei Faser- und Kabelaufbauten gestellt werden.



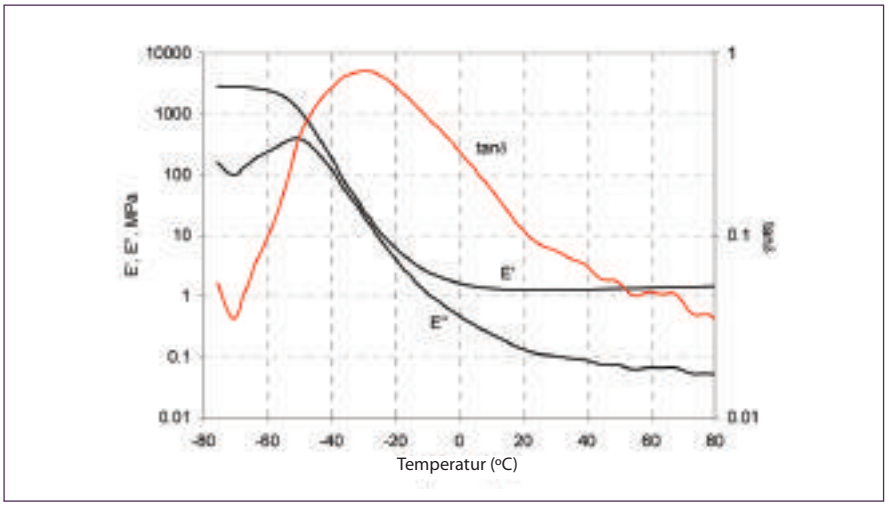

▲ **Bild 1**: *Mikrokrümmungsempfindlichkeit im Vergleich zum Primärbeschichtungsmodul für 50µ Multimodefaser*

## 2 Beschichtungsaufbau

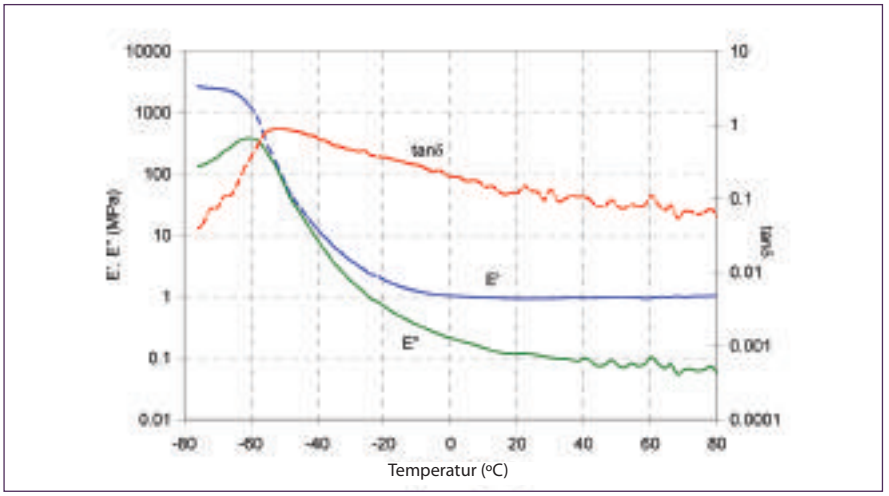
Bei der Entwicklung von hochwertigen Multimoden-Beschichtungen haben sich die Vorteile der Reduzierung von Primärbeschichtungsmoduls herausgestellt. *Bild 1* zeigt ein stellt ein Verhältnis zwischen dem Modul an der Faser der Primärbeschichtung und der Mikrokrümmungsempfindlichkeit der Lichtwellenleiter dar. Die Fasern dieser Studie sind 50µ Gradientenindex-Multimodefasern. Der Primärbeschichtungsmodul charakterisiert sich durch eine Methode der lokalen, an der Faser vulkanisierten Messung[6]. Die Mikrokrümmungsempfindlichkeit wird erzielt, indem das Verfahren der Sandpapiertrommel mit fixem Durchmesser verwendet wird[7]. Obwohl ein niedrigerer Modul in der Primärbeschichtung durch eine reduzierte Vulkanisation an der Faser erzielt werden kann, wird es erwünscht die Beschichtung maßzufertigen, um einen niedrigeren Modul bei einer fast vollen Vulkanisation zu erreichen. Der Zielmodul liegt bei 0,3 bis 0,4 MPa, um die Krümmungsempfindlichkeit zu minimieren.

Ein niedrigerer Modul für die Primärbeschichtung führt zu einer niedrigen Vernetzungsdichte und daher zu einer niedrigeren Konzentration der reaktiven Acrylatgruppen. Die Acrylatgruppen reagieren durch eine Vernetzung über den Freiradikal-Polymerisationsmechanismus, nach der Foto-Initiation, die durch die Lampen zur UV-Vulkanisation beim Ziehen bewirkt wird. Die Kinetik schreibt eine reduzierte Vulkanisationsgeschwindigkeit während der Verarbeitung vor, es sei denn, Maßnahmen werden ergriffen um das Verfahren zu ändern, damit eine optimale Vulkanisation erzielt wird. Dazu ist die Kenntnis der Art des Vulkanisationsverfahrens der Primärbeschichtung erforderlich.

Zumindest zwei Komponenten des Vulkanisationsverfahrens bewirken eine Verzögerung der Polymerisationsgeschwindigkeit der weichen Primärbeschichtung. Zunächst verlangsamt die hohe Temperatur der Vulkanisationsbeschichtungen - die durch die Aussetzung in einer Umgebung mit Hochintensitäts-UV-Lampen und exothermischen Polymerisationsreaktionen verursacht wird - die gesamten beobachteten Geschwindigkeiten[8]. Weiterhin wurde demonstriert, daß die enge Nähe der gestapelten UV-Lampen tatsächlich schnell übereinander geschichtete, wiederholte Foto-Initiationszeiten bewirkt. Die Auflösungsgeschwindigkeit der Acrylatgruppen unter dieser Bedingung wird wieder verzögert. Die UV-Lampen sind derartig angeordnet, daß die Zeit zwischen den wiederholten UV-Belichtungen maximiert ist.




▲ **Bild 2**: *Dynamische mechanische Eigenschaften einer handelsüblichen monomodalen Primärbeschichtung, bei 1Hz Oszillationsfrequenz*




▲ **Bild 3**: *Dynamische mechanische Eigenschaften der neuen monomodalen Primärbeschichtung, bei 1Hz Oszillationsfrequenz*

Dies bewirkt wiederum eine deutliche Erhöhung beim Beschichtungsgrad der Vulkanisation, im Vergleich zu Verfahren mit derselben Geschwindigkeit und der gesamten Dosis der UV-Belichtung[9], [10]. Daher kann wirkungsvoll eine reduzierte Modulprimärbeschichtung behandelt werden und eine fast komplette Vulkanisation bei den erforderlichen Faserziehgeschwindigkeiten erzielt werden.

Ein zweiter Aspekt der Primärbeschichtung für einen erhöhten Mikrokrümmungsschutz in den FTTx-Applikationen besteht in der Temperaturabhängigkeit des Moduls. Während ein niedriger Modul bei der Umgebungstemperatur ein Merkmal darstellen könnte, werden die Fasern bei der Verlegung im Feld Temperaturextremen ausgesetzt sein, wo die durch Belastungen verursachten Mikrokrümmungen entstehen könnten. Deswegen ist die niedrigstmögliche Glasübergangstemperatur ($T_g$) erforderlich, so daß die Primärbeschichtung weich und bei allen Bedingungen schützend bleibt. Eine harte Sekundärbeschichtung ist erforderlich, um die Primärbeschichtung und das Glas von Schäden während der Handhabung und Installation zu schützen. Man könnte diese Beschichtung entwerfen, um sie nach einer farbigen Kennzeichnung einzufärben oder sie könnte die Farbe einschließen, um eine Identifizierung zu bieten, ohne ein getrenntes Einfärbverfahren zu erfordern.

## 3 Ergebnisse

Eine neue Primärbeschichtung - eine Entwicklung basierend auf der Beschichtung eines handelsüblichen Multimodeprodukts mit Gradientenindex - wurde für die Anwendung an Aufbauten von Modomodefasern angepaßt, die sich besonders an extreme Verlegungsumgebungen, wie z. B. FTTx, richten. Die bevorzugte Sekundärbeschichtung, die die Faserstruktur schützt, zeichnet sich durch ein optimiertes zum Material gehörendes Farbsystem aus, bei dem eine zusätzliche Sonderschicht von Tinte für die farbige

Kennzeichnung nicht nötig ist. Die neuen Farben werden in Bezug auf Helligkeit und Sichtbarkeit in verdunkelten Beleuchtungsbedingungen verbessert, z. B. im Schatten oder in Kabelschächten.

### *3.1 Mechanische eigenschaften*

Die dynamischen mechanischen Eigenschaften einer handelsüblichen, herkömmlichen Primärbeschichtung sind in *Bild 2* dargestellt. Die Angaben wurden durch einen dynamisch mechanischen Analysator TA DMA bei 1 Hz Oszillationsfrequenz erfaßt, wobei darauf geachtet wurde, daß die Dehnung innerhalb des linearen Bereichs des Spannungs-Dehnungsverhaltens erhalten bleibt. Die Beschichtungsprobe wurde an Polyester in einer 75 Mikron Folie mit einer Dosis der UV-Belichtung von 1 J/cm² ausgehärtet. Die dabei verwendete Lampe ist eine Halogenglühbirne mit Quecksilberdampf mit einer Leistung von 300 W/Zoll. Diese UV-Aussetzung reicht, um zu sichern, daß das Material auf dem Plateau der Dosis-/Modulkurve ist. Die Angabe zeigt, daß der Gleichgewichtsmodul zirka 1,5 MPa entspricht. An der Faser härtet diese Beschichtung in der Regel gut bei einem Modul von zirka 0,8 MPa, d.h. bei einem Niveau, das bei den meisten Primärbeschichtungen der Monomodefaser in der Industrie typisch ist. Der Grund der Unstimmigkeit zwischen dem Folienmodul und dem lokalen Modul sind in der Literatur von[8] bis [10] im Detail dargestellt. Der „$T_g$"-Wert, der als dem Spitzenwert des tanδ nahe liegend eingeschätzt ist, entspricht ca. -30°C.

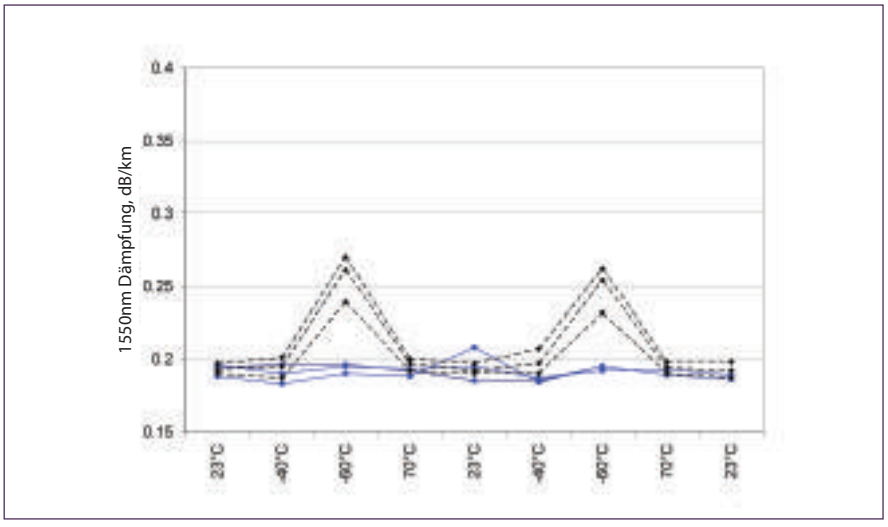
Daher werden die Beschichtung und andere ähnliche Mischungen bei extrem niedrigen Temperaturen, wie z. B. -40 bis -50°C, wie ein Glas reagieren. (Es handelt sich hier um ein unvollständiges Bild, da ein Verhältnis zwischen der Zeit und der Belastung besteht, die durch die Dehnung bei Niedertemperatur verursacht wird, jedoch bleibt die „$T_g$" weiterhin ein nützliches Vergleichparameter.)

*Bild 3* zeigt die dynamischen mechanischen EigenschaftenderneuenPrimärbeschichtung, mit Einsatz einer Folienprobe, die dem oben genannten Beispiel ähnlich ist. In *Bild 3* zeigt die neue Primärbeschichtung ein Gleichgewichtsmodul knapp unter 1 MPa in der gehärteten Folie, und an der Faser wird der lokale Modul in der Regel von 0,3 bis 0,4 MPa, bzw. den vorgesehenen Wert, gemessen. Darauf achtend den Niedertemperaturschutz gegen die durch Belastungen verursachten Mikrokrümmungenen zu erhöhen, wird die Glasübergangstemperatur um über 20°C niedriger als die in *Bild 2* dargestellte herkömmliche Beschichtung versetzt. Eine schnellere Entspannung der Belastungen, die während den Temperaturschwankungen auferlegt werden, ist zu erwarten. Die Ergebnisse der Tests, die dazu bestimmt sind den Mikrokrümmungsschutz zu untersuchen, sind im nächsten Abschnitt dargestellt.

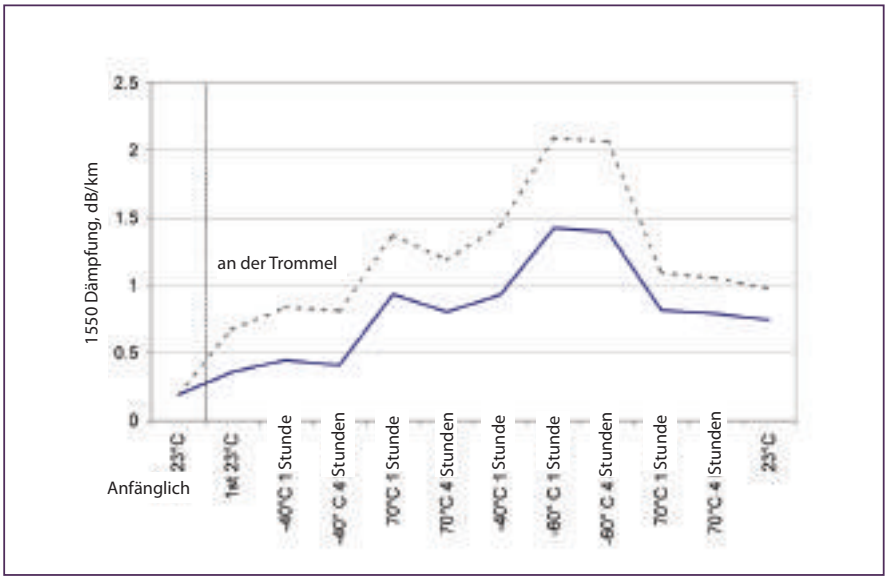
### *3.2 Mikrokrümmungsempfindlichkeit*

Um einen Vergleich hinsichtlich der Mikrokrümmungsempfindlichkeit zwischen herkömmlichen handelsüblichen primärbeschichteten Fasern und Fasern mit einem neuen Beschichtungssystem zu schaffen, wurden zwei verschiedene Methoden für eine Auswertung benutzt. Beide Methoden sind so entworfen worden, daß erschwerte seitliche Belastungsbedingungen geboten werden (wobei die zweite Methode eigentlich weit über die normalen im Feld anzutreffenden Bedingungen hinausgeht). Nachdem die Wirkung auf die Dämpfung bei Raumtemperatur gemessen wird, können die Teststrukturen zyklischen Temperaturbelastungen ausgesetzt werden, um die zusätzliche Dämpfung festzusetzen, die durch Temperaturschwankungen verursacht wird.

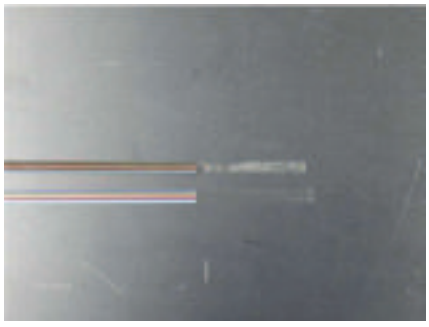
Der erste Test ist ein Trommel-/Temperaturzyklus-Aufwickelverfahren. Die Musterfaser wird mit einer Spannung von 50 Gramm auf einen Quarzzylinder mit einem Durchmesser von 300mm und einem 9mm „Schlag'" gewickelt. Dies führt zu zahlreichen Überkreuzungen Faser zu Faser während 50 Schichten auf die Trommel gewickelt werden. Die Überkreuzungen können eine zusätzliche Dämpfung bei Raumtemperatur verursachen, wenn die Faser empfindlich genug ist, jedoch wird an dieser Stelle in der Regel nur eine geringe oder gar keine zusätzliche Dämpfung beobachtet. Die Trommel auf der die Faser gewickelt ist, wird in diesem Experiment zwei Mal




▲ **Bild 4**: *Ergebnisse der Aufwickelproben an dem Trommel-/Temperaturzyklus-Verfahren bei herkömmlichem handelsüblichen monomodalen Beschichtungsssystem (gestrichelt) und dem optimierten Beschichtungssystem (volle Linie)*




▲ **Bild 5**: *Ergebnisse der Aufwickelproben an dem Sandpapiertrommel-/Temperaturzyklus-Verfahren bei herkömmlichem handelsüblichen monomodalen Beschichtungsssystem (gestrichelt) und dem optimierten Beschichtungssystem (volle Linie)*



▲ **Bild 6**: *Darlegung der Bandabstreifung mit optimiertem Beschichtungssystem (unten) im Gegensatz zu einem herkömmlichen handelsüblichen Beschichtungssystem auf Band*

durch -40°C/-60°C/+70°C/23°C zyklischen Temperaturbelastungen ausgesetzt, während Dämpfungsmessungen bei 1550 nm nach einer Stunde bei der Temperatur der Zyklen durchgeführt werden.

*Bild 4* zeigt die typischen Ergebnisse für Muster des neuen Beschichtungssystems gegenüber Mustern eines herkömmlichen handelsüblichen Systems. Beide Beschichtungssysteme benutzen gefärbte Sekundärbeschichtungen, jedoch unterschiedliche Mischungen der Sekundärbeschichtung. Die Faserproben wurden ausgewählt, um sich der Beschichtungsgeometrie, dem Modenfelddurchmesser und der kritischen Wellenlänge anzupassen.

Die beiden unterschiedlichen Beschichtungssysteme bieten einen guten Schutz gegen die Belastungen durch Mikrokrümmung bei 23°C. Bei -40°C ist die herkömmliche handelsübliche Primärbeschichtung ihrer $T_g$ nahe, bietet jedoch immer noch einen guten Schutz gegen Mikrokrümmung durch die Entspannung der Belastung, innerhalb eines angemessenen Zeitrahmens. Nur eine geringe zusätzliche Dämpfung wird bei -40°C in der herkömmlichen Primärbeschichtung beobachtet, während keinerlei Dämpfung in der optimierten Primärfaser erkannt wird. Bei -60°C ist die optimierte Primärbeschichtung ebenfalls ihrer $T_g$ nahe, mit einem ähnlichen Schutz der immer noch geboten wird, jedoch ist nun die herkömmliche Primärbeschichtung weit unter der $T_g$ und die Faser weisen eine zusätzliche Dämpfung auf. Da eine aggressivere Mikrokrümmungsumgebung erwünscht war, wurde für die zweite Methode der IEC-Sandpapiertrommel-Test[7] geändert, um eine Mikrokrümmung unter harten Belastungsbedingungen zu bieten, die stark genug ist um selbst bei Raumtemperatur eine Monomodefaser zu beeinflussen.

Dazu wurde eine Quarztrommel mit 300mm Durchmesser mit klebendem Sandpapier mit einer Korngröße von 40 gewickelt. Dies führte zu einer sehr rauhen Oberfläche, um die eine einschichtige Faser bei einer 100 Gramm Spannung gewickelt wurde. Durch den Einsatz angepaßter Fasermuster, wie bei der Aufwickelprobe an der Trommel/Temperaturzyklus, wurde die 23°C Dämpfung nach der Wicklung gemessen. Danach wurden die Trommeln bei Temperaturextremen zyklischen Belastungen ausgesetzt, dieses Mal wurde die Dämpfung bei 1550 nm nach einer Stunde und wieder nach vier Stunden bei der Temperatur gemessen. Die Ergebnisse sind in *Bild 5* dargestellt.

Die Anfangsmessung, die bei 23°C erfaßt wurde während die Faser sich auf den ursprünglichen Spulen befand, zeigt eine ähnliche Dämpfung von zirka 0,19 dB/km für diese Faserproben. Nachdem die Trommeln gewickelt wurden - ebenfalls bei Raumtemperatur - bot der niedrigere Modul der optimierten Primärbeschichtung einen wesentlich besseren Schutz als die herkömmliche Primärbeschichtung, mit einem Drittel der zusätzlichen Dämpfung. Durch die sehr anspruchsvollen Temperaturbereiche und erschwerten Trommelbedingungen, zeigt die optimierte Beschichtungsfaser eine viel niedrigere Mikrokrümmungsreaktion als ein herkömmliches handelsübliches System.

### *3.3 Gefärbte sekundärbeschichtung*

Die Sekundärbeschichtung für das optimierte System wurde umformuliert, um bei jeglicher Beleuchtung die Helligkeit und Sichtbarkeit zu verbessern. Die Farben entsprechen dem Munsell-Standard für die farbige Kennzeichnung von Lichtwellenleitern und lassen sich leicht sowohl gegen helle wie dunkle Hintergründe unterscheiden.

Die Verbesserungen der Färbungen forderten eine erhöhte Konzentration der Pigmentsysteme in dieser neuen Sekundärbeschichtung, sowie die Steigerung im gebotenen Vulkanisationspaket.

Die Beschichtung zeichnet sich durch eine Oberfläche aus, die eine hervorragende Schnittstelle mit Bandmatrix-Material bietet, so daß sich die Matrix leicht von der gefärbten Faser trennt ohne jedoch dabei die Robustheit zu opfern.

Die mechanischen Eigenschaften der gefärbten Sekundärbeschichtung gleichen sich mit jenen der Primärbeschichtung aus, damit sich bei der thermischen Abstreifung, die Beschichtung/Matrixmischung perfekt vom Lichtwellenleiter trennt (*Bild 6*).

## 4 Schlußfolgerungen

Ein für FTTx-Applikationen optimiertes, verbessertes zweischichtiges Beschichtungssystem für Monomodefasern wurde entwickelt.

Das neue System zeichnet sich durch eine weichere Primärbeschichtung aus, mit hervorragenden Eigenschaften bei Niedertemperatur zum Schutz gegen Mikrokrümmungen in allen Umgebungen und unter den härtesten physikalischen Bedingungen.

Eine neue gefärbte Sekundärbeschichtung mit erhöhter Farbintensität und -helligkeit wird mit der Primärbeschichtung gepaart. Die Sekundärbeschichtung bietet gesteigerte Bandmerkmale für Strukturen, die robust sind und in die man auch leicht Zugang hat. Die zweischichtige Beschichtung ist auch spezifisch für eine überlegene thermische Abstreifung im Band ausgeglichen, praktisch ohne Reste am Glas zu hinterlassen, um ein schnelles Spleißen sowie Endverschlüsse zu erleichtern. Die Verbesserungen im Beschichtungssystem bieten große Vorteile für die Verlegung in allen FTTx-Systementwürfen. ■

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# Линейка толкателей пополнилась гусеничными протягивающими устройствами для особо тяжелых режимов эксплуатации

Компания «Гиллард» (Gillard) пополнила свой модельный ряд прецизионных гусеничных протягивающих и приемных устройств.

Новые устройства являются модификацией основных моделей «Гиллард» с лентой увеличенной длины. Удлиненные ленты теперь поставляются длинами 1500 или 1800 мм. Ширина ленты составляет 225 или 300 мм.

По заявлению компании «Гиллард», ленты увеличенной длины позволяют обеспечить большее тяговое усилие при значительном снижении прижимной силы, действующей на экструдированный профиль.

▲ *Новая установка компании «Гиллард» оборудована лентами большей длины, позволяющими уменьшить силу давления на экструдированные профили*

Благодаря этому исключается риск нарушения геометрических параметров и повреждения, в частности, тонкостенных изделий.

Кроме того, новые гусеничные устройства оборудованы усовершенствованным приводом с безредукторными сервомоторами переменного тока, приводящими ленты в движение. Для оптимизации регулирования скорости вращения два сервопривода используются в режиме «ведущий-ведомый». Верхняя лента рассчитана на свободное движение над любыми вздутиями или неровностями, возникающими при запуске экструзионной линии. Верхняя траверса целиком подвешена на двух пневмоцилиндрах, установленных по каждой из сторон.

За счет этого лента может автоматически подниматься и опускаться, не касаясь вздутий и обеспечивая при этом соответствующее сцепление с экструдированным профилем.

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## «Драка» закрывает завод медной проволоки в Лланелли (Великобритания)

Правление «Драка холдинг НВ» (Draka Holding NV), руководствуясь осуществляемой компанией программой «3П»: «Прекрати, поменяй и поделись» (Stop, Swap and Share), объявило о своем намерении прекратить производство медного провода на заводе «Драка» в г. Лланелли (Великобритания) и сосредоточить производство на других предприятиях в странах Европы, на которых волочение проволоки уже стало частью интегрированного производственного процесса. Завод в Лланелли, который специализируется на выпуске медного провода, входит в состав европейского отделения компании по энергетике и объектам инфраструктуры и насчитывает в своем штате около 135 сотрудников. Обслуживание агентских продаж, продукция для которых поставлялась с завода в Лланелли, будет переведено на предприятие компании «Драка» в г. Дерби (Великобритания).

Закрытие завода в Лланелли обсуждалось с Европейским производственным советом (European Works Council) и отдельно с британским Национальным производственным советом.

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# Кабели «Нексанс» – в сердце комплекса обработки багажа пекинского международного аэропорта

Компания «Нексанс» (Nexans) поставила в Китай свыше 2500 км силовых и контрольных кабелей в рамках контракта на общую сумму порядка 2,6 млн. евро. Эти кабели играют важную роль в работе созданного по последнему слову техники комплекса обработки багажа нового терминала №3 в пекинском международном аэропорту.

Компания «Нексанс» была выбрана в качестве единственного поставщика кабеля для этого проекта по нескольким причинам. Во-первых, кабельная продукция «Нексанс» удовлетворяла всем требованиям соответствующих стандартов для использования в аэропортах, в том числе по коэффициенту жесткости и наличию безгалогенной изоляции. Кроме того, компания «Нексанс» могла поставить все виды кабеля, которые были необходимы – силовые, контрольные и оптические. И, наконец, что самое главное, – компания «Нексанс» была в состоянии обеспечить оперативную поставку в соответствии с сокращенным графиком строительства: в отличие от большинства крупных проектов подобного типа, на строительство которых требуется около пяти лет, с момента разработки исходного проектного решения комплекса обработки багажа на терминале №3 в Пекине до ввода его в эксплуатацию было затрачено всего три года.

Установленный компаниями «Сименс» (Siemens) и «Интер роллер» (Inter Roller) комплекс, который способен производить сортировку и транспортировку до 19200 единиц багажа в час, считается одним из крупнейших и самых современных в мире. Новый терминал №3 пекинского аэропорта, который открылся в марте 2008 гожа, позволил более чем вдвое увеличить прежнюю пропускную способность аэропорта (с 30 до 66,5 млн. пассажиров в год).

Около 330 стоек регистрации соединены с комплексом высокоскоростных лотковых транспортеров общей протяженностью 68 км. От стоек регистрации терминала №3А багаж транспортируется со скоростью 36 км/ч через туннель длиной 2,2 км к погрузочным каруселям международного терминала №3В.

Для обеспечения правильного функционирования багажного комплекса, объединяющего в себе высокоскоростные лотковые конвейеры, ленточные транспортеры и поворотные сортировщики лоткового типа, управление которыми полностью осуществляется компьютерной системой контроля за перемещением грузов, требовалось большое количество различных видов силовых, контрольных кабелей и кабелей для передачи данных.

Медные кабели были изготовлены на заводах «Нексанс» в Германии, а оптические кабели – на принадлежащем компании заводе «Оптикейбл» в Бельгии.

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## Новое семейство контрольных кабелей для станкостроительной промышленности

Компания «Айгус» (igus®), специализирующаяся в области энергетических цепей и вспомогательных устройств, выпустила новое семейство контрольных кабелей, предназначенных для энергетических цепей, используемых в станкостроительной промышленности. Маслостойкие кабели CF77 и CF78 серии Chainflex® разработаны для активного использования в условиях высоких многоцикловых нагрузок.

Новое семейство объединяет отдельные преимущества кабелей серии Chainflex® в единую конструкцию, облегчая тем самым выбор кабеля. Это особенно важно с учетом требований международных стандартов, необходимости в получении разрешений на использование материалов и увеличении технического ресурса изделий.

▲ *Маслостойкие контрольные кабели CF77 и CF78 серии Chainflex®, предназначенные для использования в станкостроении на международном уровне*

В случае использования 7 или меньшего количества проводов (номинальным напряжением U0/U 300/500 вольт) пламестойкие, безгалогенные кабели CF77 и CF78 выполняются послойной скруткой, а при использовании 12 и большего количества проводов (номинальным напряжением U0/U 300/300 вольт) – свивкой в жгуты.

Во избежание образования спиралей и разрыва жил кабели свиваются в жгуты вокруг сердечника прочного и эластичного каната. Тем не менее, наружный диаметр контрольных кабелей остается таким же небольшим, что и у кабелей сопоставимых типов, которые выполняются только послойной скруткой проводов. Отличающаяся высокой стойкостью к истиранию и прочностью на изгиб наружная оплетка кабеля, которая выполняется из полиуретана, экструдированного под давлением для заполнения всех зазоров и мест изгибов кабеля, обеспечивает дополнительную жесткость, а также не поддерживает распространения пламени и не содержит галогенов.

Новая серия маслостойких кабелей утверждена к использованию Лабораторией по технике безопасности США и Канадской ассоциацией по стандартизации и соответствует стандарту DESINA. Кроме того, кабели пригодны к использованию в условиях чистой комнаты (категория 1 стандарта ИСО).

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# Новая система защитного покрытия оптического волокна, оптимизированная для технологии FTTx

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## Аннотация

Концепция «оптоволокно до здания, офисного помещения или дома», или FTTx, дает конечному потребителю возможность использовать технологию широкополосной передачи данных и все шире применяется по всему миру. В настоящей работе авторы представляют основные эксплуатационные характеристики новой системы защитного покрытия для использования в сетях FTTx, прокладываемых там, где применение обычных кабельных конструкций, в которых особое внимание уделяется прочности, не оправдано.

Данное покрытие, которое может использоваться для оптоволокна, нечувствительного к изгибам с малым радиусом, а также для волокна стандарта G.652 и других конструкций, обеспечивает дополнительную защиту от потерь при микроизгибах, вызванных механическим напряжением.

Система характеризуется наличием обладающего малым модулем упругости и очень низкой $T_c$ первичного покрытия, благодаря которому обеспечивается дополнительный буферный эффект при поперечных и осевых напряжениях, возникающих под влиянием внешних сил или низкой температуры, а также новым окрашивающим пигментом с улучшенными свойствами, который вводится во вторичное покрытие для увеличения яркости кабеля и улучшения визуального контроля без дополнительного окрашивания.

## 1 Введение

В сетях FTTx используются инновационные и в то же время экономичные системные разработки, обеспечивающие продвижение технологии. Например, волокно, используемое для подключения «последней мили», может представлять из себя микрокабель[1], [2], [3].

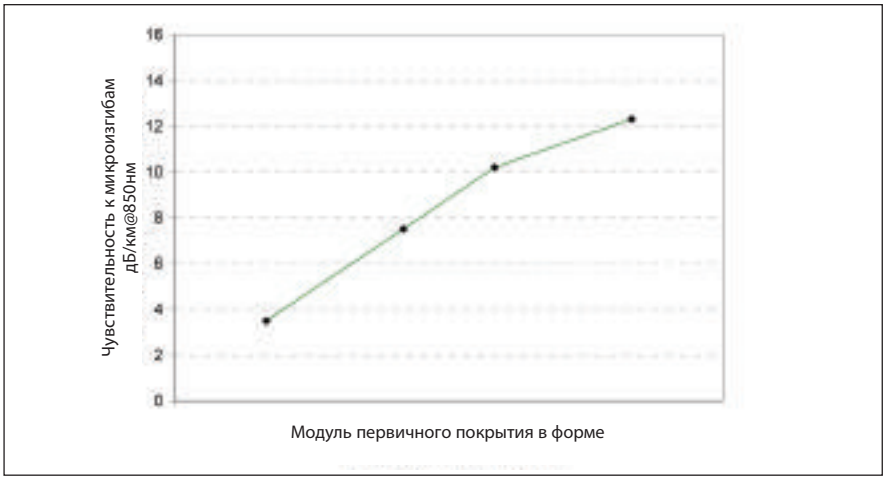
Пневматическая прокладка волоконно-оптического кабеля представляет собой еще один эффективный способ подключения к терминалу конечного пользователя [напр., 4]. Поиск возможных способов развертывания сетей, позволяющих преодолеть экономические препятствия на пути продвижения оптоволоконных решений в области широкополосной передачи данных для бизнеса и дома, остается в центре внимания отрасли. Предлагаемые к использованию методы весьма разнообразны и хорошо известны читателю.

Главной составляющей успешной системы FTTx является низкая себестоимость. Уменьшение сечения кабелей, размеров отводов и конструкций для пневматической прокладки зачастую также имеет очень важное значение, поскольку прокладка кабеля традиционной конструкции по уже существующим кабельным каналам во многих случаях крайне затруднительна. При прокладке нового оптоволокна приходится использовать уже имеющиеся небольшие каналы и узкие проходы.

Требования к снижению затрат и максимально возможному уменьшению размеров приводят к необходимости минимизации защиты оптического волокна, то есть к отходу от обычно используемых прочных и более габаритных кабельных конструкций.

В настоящее время существуют конструкции стекловолокна, обладающие пониженной чувствительностью к изгибам с малым радиусом, такие, например, как конструкции с цилиндрическим каналом в центральной части[5], или микроструктурированные волокна.

Конструкции стекловолокна с уменьшенным диаметром модового поля обладают меньшей чувствительностью к напряжениям в результате микроизгибов,




▲ **Рис. 1.** *Зависимость чувствительности к микроизгибам от модуля первичного покрытия для многомодового волокна диаметром 50 мкм*

однако они не совместимы со стандартом G.652 для одномодового волокна.

Для обеспечения их успешного применения во всех областях использования технологии FTTx требуется дополнительная защита от потерь при микроизгибах. С этой целью предлагается новая система защитного покрытия, оптимизированная для сетей FTTx и отвечающая дополнительным требованиям, которые технология FTTx предъявляет к волокну и кабельным конструкциям.

## 2 Конструкция защитного покрытия

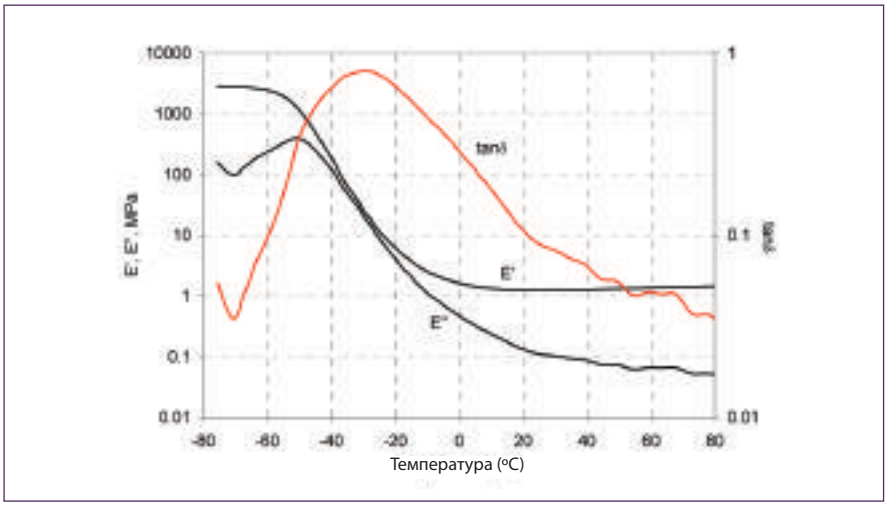
При разработке высококачественного покрытия для многомодового волокна выяснилось положительное влияние уменьшения модуля первичного покрытия.

На рис. 1 показано наблюдаемое соотношение между модулем первичного покрытия на волокне и чувствительностью оптического волокна к микроизгибам. В настоящей работе рассматриваются многомодовые волокна диаметром 50 мкм с градиентным показателем преломления.

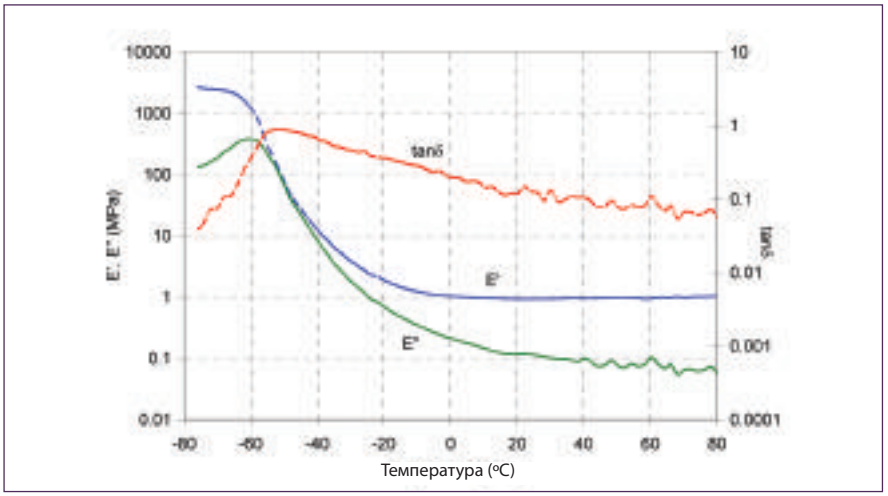
Модуль первичного покрытия измеряется на месте, при вулканизации на волокне[6]. Данные о чувствительности к микроизгибам получены в результате испытаний с использованием барабана фиксированного диаметра с наждачной бумагой[7]. Несмотря на то что более низкой величины модуля первичного покрытия можно добиться путем неполной вулканизации на волокне, предпочтительнее разработать покрытие таким образом, чтобы низкий модуль достигался при почти полной вулканизации.

Для уменьшения чувствительности к изгибу значение модуля должно составлять от 0,3 до 0,4 МПа.

Более низкое значение модуля первичного покрытия предполагает более низкую плотность сшивки и, следовательно, меньшую концентрацию реакционно-способных акрилатных групп. Как следствие, при вытяжке после фотоинициации с использованием УФ-ламп происходит образование поперечных связей акрилатных групп посредством полимеризации по свободно-радикальному механизму. Кинетика задает меньшую скорость вулканизации в течение обработки, если не принять мер по модификации этого




▲ **Рис. 2.** *Динамико-механические свойства промышленно выпускаемого первичного покрытия одномодового волокна при частоте осциллирующих напряжений 1 Гц*




▲ **Рис. 3.** *Динамико-механические свойства нового первичного покрытия одномодового волокна при частоте осциллирующих напряжений 1 Гц*

процесса для обеспечения оптимальных условий вулканизации. Этого можно достичь, поняв характер процесса вулканизации первичного покрытия.

Существуют, по крайней мере, две составляющих процесса вулканизации, которые замедляют скорость полимеризации мягкого первичного покрытия. Во-первых, общую измеренную скорость замедляют высокая температура вулканизируемых покрытий, обусловленная воздействием мощной УФ-лампы, и экзотермический эффект реакций полимеризации[8].

Во-вторых, получено подтверждение того, что близкое расположение нескольких УФ-ламп в конечном итоге ведет к быстрому наложению циклически повторяющихся периодов фотоинициации. С другой стороны, скорость исчезновения акрилатных групп в этих условиях замедляется. За счет расположения УФ-ламп время между повторным облучением под УФ-лампами возрастает, что приводит к значительному увеличению степени вулканизации покрытия по сравнению с другими процессами, проходящими с той же скоростью и при том же общем уровне УФ-излучения[9], [10].

Таким образом, представляется возможным эффективно воздействовать на первичное покрытие с низким модулем и достигать почти полной вулканизации при необходимых скоростях вытяжки волокна.

Другим касающимся первичного покрытия аспектом, который имеет важное значение для улучшения защиты от потерь при микроизгибах в сетях FTTx, является зависимость модуля от температуры. В то время как при комнатной температуре величина модуля может быть низкой, под воздействием перепадов температуры при эксплуатации в полевых условиях в

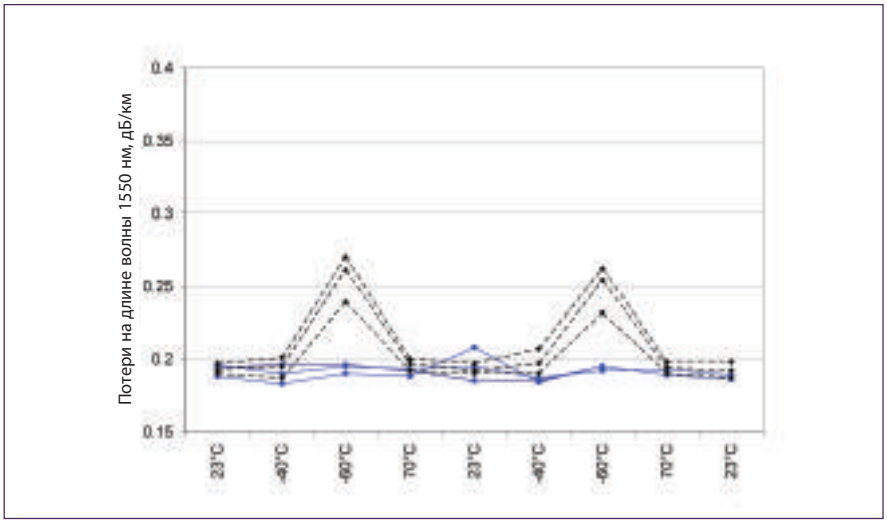
волокне могут возникать напряжения, ведущие к появлению микроизгибов. Соответственно, для того чтобы первичное покрытие оставалось мягким и обеспечивало защиту во всех ситуациях, требуется достижение возможно более низкой температуры стеклования $T_c$.

Жесткое вторичное покрытие необходимо для защиты первичного покрытия и стекла от повреждения в процессе транспортной обработки и монтажа. Конструкция этого покрытия может предусматривать нанесение цветной кодовой маркировки или уже включать в себя краситель, обеспечивающий идентификацию кабеля без использования отдельного процесса окраски.

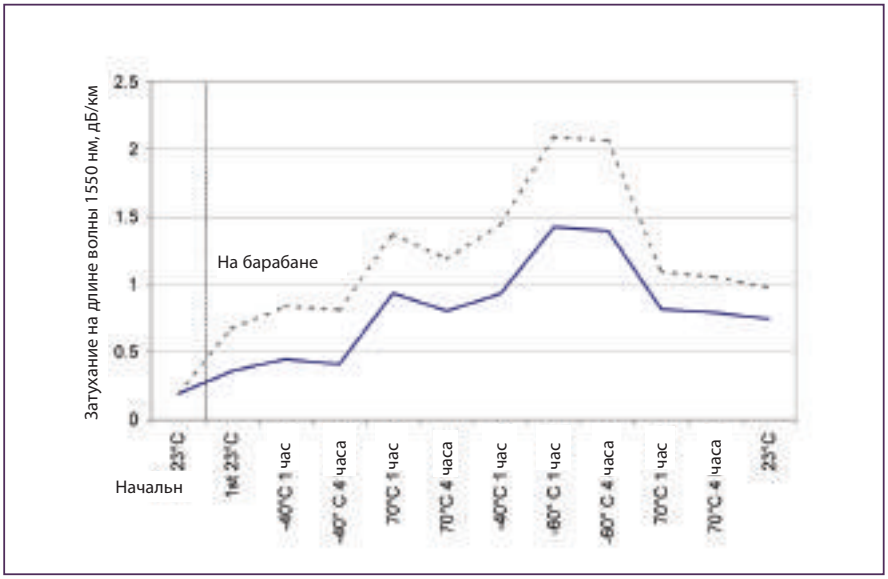
## 3 Результаты

Новое первичное покрытие, разработанное на основе промышленно выпускаемого покрытия для многомодового волокна с градиентным показателем преломления, было адаптировано для конструкций, использующих одномодовое волокно, при этом особое внимание уделено возможности применения в сложных условиях – например, в сетях FTTx.

Для защиты волокна было подобрано вторичное покрытие, отличающееся оптимизированной системой окраски с внедрением пигмента в структуру покрытия и не требующее нанесения дополнительного слоя краски для цветной маркировки. Новые, более яркие краски обеспечивают увеличение яркости и улучшение визуального контроля в условиях недостаточной освещенности, например, при сильной затененности или в кабельных колодцах.




▲ **Рис. 4.** *Результаты испытаний с использованием методики переплетения волокон в шахматном порядке и термоциклирования для типичной промышленно выпускаемой системы защитного покрытия одномодового волокна (пунктирная линия) и для оптимизированной системы защитного покрытия (сплошная линия)*




▲ **Рис. 5.** *Результаты испытаний с использованием барабана с наждачной бумагой и термоциклирования для типичной промышленно выпускаемой системы защитного покрытия одномодового волокна (пунктирная линия) и для оптимизированной системы защитного покрытия (сплошная линия)*

### *3.1 Механические свойства*

Динамико-механические свойства типичного промышленно выпускаемого первичного покрытия представлены на рис. 2.

Данные получены с использованием динамомеханического анализатора TA при частоте осциллирующих напряжений 1 Гц, при этом особое внимание уделялось тому, чтобы величина деформации находилась в пределах линейного участка кривой зависимости деформации от напряжения.

Отверждение образца покрытия проводилось под действием дозы УФ-излучения в 1 Дж/см$^2$ на основе пленки из полиэстера толщиной 75 микрон. Использовалась ртутно-галогенная лампа удельной мощностью 300 Вт/дюйм. Такого УФ-облучения достаточно для того, чтобы вулканизация материала проходила на пологом участке кривой «доза-модуль».

Данные свидетельствуют о том, что равновесный модуль равен приблизительно 1,5 МПа. На волокне покрытие данного типа обычно отверждается до модуля около 0,8 МПа, что является характерным значением для большинства промышленных первичных покрытий одномодовых волокон.

Причины различия в величине модуля пленки и модуля в форме подробно рассматриваются в цитируемой литературе (см. [8] по [10] включительно).

Температура стеклования $T_c$, определяемая по пику тангенса угла механических потерь $T_c$ δ, находится в районе -30 °C. Таким образом, данное покрытие, как и другие подобные рецептуры, начинает вести себя подобно стеклу при экстремально низких температурах от -40 °C до -50 °C. (Картина является неполной, так как соотношение напряжения и полученной деформации при низких температурах меняется в зависимости от времени, однако величина $T_c$ остается полезным показателем для сравнения.)

На рис. 3 представлены динамико-механические свойства нового первичного покрытия на примере пленочного образца, подготовленного аналогично вышеуказанному.

Как видно на рис. 3, новое первичное покрытие демонстрирует равновесный

модуль величиной чуть ниже 1 МПа в вулканизированной пленке, при этом модуль, измеренный непосредственно на волокне, обычно находится на уровне от 0,3 до 0,4 МПа, что является контрольным показателем.

С целью улучшения защиты в условиях низких температурах от потерь, связанных с вызываемыми механическим напряжением микроизгибами, температура стеклования сдвинута более чем на 20 °С ниже, чем у стандартного покрытия, характеристики которого представлены на рис. 2.

Предполагается, что релаксация напряжений, вызванных резкими перепадами температур, будет значительно более быстрой. Результаты испытаний, предназначенных для изучения защиты от потерь при микроизгибах, приводятся в следующем разделе.

### *3.2 Чувствительность к микроизгибам*

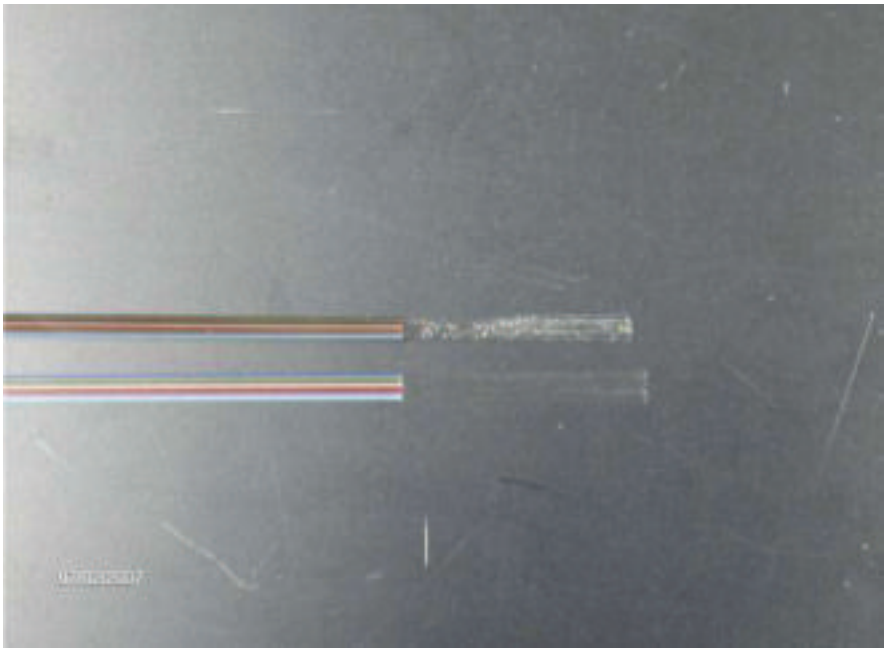
Для проведения сравнительной оценки чувствительности к микроизгибам стандартного коммерческого волокна с первичным покрытием и волокна с новой системой защитного покрытия были использованы два разных метода.

Оба метода предназначены для создания условий повышенного поперечного напряжения (при этом второй метод создает напряжение гораздо выше того, с каким обычно сталкиваются при эксплуатации). После измерения воздействия на затухание сигнала при комнатной температуре испытуемый образец может быть подвергнут термоциклированию для определения добавочных потерь, обусловленных резкими перепадами температур.

Первое испытание заключается в переплетении волокон в шахматном порядке и проведении термоциклирования. Образец волокна наматывается при натяжении с усилием 50 граммов на кварцевый цилиндр диаметром 300 мм с 9-мм «шагом».

При намотке на барабан 50 слоев создаются многочисленные точки пересечения волокон. Эти пересечения могут вызвать добавочные потери уже при комнатной температуре, если волокно обладает достаточной чувствительностью, однако обычно добавочных потерь при этом не наблюдается, или они невелики.

Барабан с намотанным на него волокном дважды подвергается термоциклированию, в данном эксперименте – при температурах



▲ **Рис. 6.** *Вид зачищенного ленточного кабеля с оптимизированной системой защитного покрытия (нижнее изображение) в сравнении с ленточным кабелем с типичной промышленно выпускаемой системой защитного покрытия*

циклов -40 °С, -60 °С, +70 °С и 23 °С, при этом потери измеряются на длине волны 1550 нм с часовым интервалом после выдерживания образца при температуре каждого цикла.

На рис. 4 представлены типичные результаты для образцов с новой системой защитного покрытия в сравнении с обычной промышленно выпускаемой системой.

В обеих системах покрытий используются цветные вторичные покрытия, но рецептура вторичных покрытий различна. Образцы волокон подбирались таким образом, чтобы у них совпадали геометрия покрытий, диаметр модового поля и длина волны отсечки.

Обе системы покрытий предлагают хорошую защиту от напряжений, вызванных микроизгибами, при 23 °С. При -40 °С обычное коммерческое первичное покрытие приближается к своей $T_c$, но все еще обеспечивает соответствующую защиту от микроизгибов за счет снятия напряжений в пределах разумных временных рамок.

При -40 °С наблюдаются лишь небольшие добавочные потери в волокне с обычным первичным покрытием, и не наблюдается потерь в волокне с оптимизированным первичным покрытием.

При -60 °С оптимизированное первичное покрытие также приближается к своей $T_c$, все еще обеспечивая аналогичный уровень защиты, тогда как обычное первичное покрытие теперь находится гораздо ниже $T_c$, и в волокнах наблюдаются добавочные потери.

Стремясь смоделировать еще более агрессивную среду с микроизгибами, в рамках второго метода мы изменили условия проведения утвержденных МЭК испытаний во вращающемся барабане с наждачной бумагой[7] с целью воспроизвести достаточно неблагоприятную среду с вызванными микроизгибами напряжениями, чтобы оказать воздействие на одномодовое волокно даже при комнатной температуре.

Для этого кварцевый барабан диаметром 300 мм был покрыт самоклеящейся наждачной бумагой зернистостью №40, в результате чего была получена очень грубая поверхность, на которую в один слой с натяжением 100 граммов было намотано волокно.

Используя парные образцы волокна, как и в испытании, связанном с переплетением волокон в шахматном порядке и термоциклированием, после намотки было измерено затухание при температуре 23 °С.

Затем барабаны были подвергнуты термоциклированию при экстремальных значениях температуры, и на этот раз затухание измерялось на длине волны 1550 нм после выдержки в один час, а затем повторно через четыре часа при соответствующей температуре. Результаты представлены на рис. 5.

Первоначальное измерение при 23 °C, произведенное, когда волокно еще находилось на исходных бобинах, показывает сходные потери, равные примерно 0,19 дБ/км для данных образцов волокна.

После намотки на барабан, также при комнатной температуре, оптимизированное первичное покрытие с более низким модулем обеспечивает значительно лучшую, чем обычное первичное покрытие, защиту при уровне добавочных потерь на одну треть меньше.

Во всем очень жестком диапазоне температур и в сложных условиях испытаний на барабане волокно с оптимизированным защитным покрытием демонстрирует гораздо меньшую зависимость от микроизгибов, чем обычная коммерческая система.

***3.3 Цветное вторичное покрытие***

Вторичное покрытие оптимизированной системы производится по новой рецептуре, обеспечивающей повышенную яркость и улучшенный визуальный контроль при любом освещении. Цвета соответствуют требованиям системы Манселла применительно к цветной кодовой маркировке оптического волокна и легко различимы как на светлом, так и на темном фоне.

Более яркая окраска потребовала увеличения концентрации пигмента в новом вторичном покрытии, а также усовершенствования состава предоставляемого вулканизационного пакета. Покрытие имеет поверхность, которая хорошо согласуется с материалом ленточной подложки, вследствие чего подложка легко отделяется от цветного волокна без ущерба для прочности.

Механические свойства цветного вторичного покрытия сбалансированы со свойствами первичного покрытия таким образом, что при тепловой зачистке слой покрытия с подложкой без остатка удаляется с поверхности стекловолокна (см. рис. 6).

## 4 Выводы

Разработана усовершенствованная система двухслойного защитного покрытия для одномодового волокна, которая оптимизирована для применения в сетях FTTx.

Новая система включает в себя более мягкое первичное покрытие с превосходными низкотемпературными характеристиками, которое защищает волокно от потерь при микроизгибах в любой среде и в самых сложных физических условиях.

Новое цветное вторичное покрытие с улучшенной цветовой насыщенностью и яркостью объединено с первичным покрытием. Вторичное покрытие имеет улучшенные характеристики для формирования ленточного кабеля, предназначенного для использования в прочных и в то же время легко разделяемых конструкциях.

Кроме того, двухслойное покрытие специально сбалансировано для обеспечения высокого уровня качества тепловой зачистки ленты, не оставляя на стекле практически никакого нагара, что облегчает и ускоряет сращивание и заделку.

Усовершенствования в конструкции системы защитного покрытия обеспечивают значительные преимущества при использовании в сетях FTTx любой конфигурации. ■

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# Gamme d'extracteurs équipés de groupes de traction à chenilles pour service lourd

▲ *La nouvelle machine de Gillard présente des courroies plus longues pour exercer une pression inférieure sur les produits extrudés*

La société Gillard a étendu sa gamme de machines de traction à chenilles de précision.

Les nouvelles machines sont des versions équipées de courroies extra-longues de la gamme de produits hautement performants réalisés par la société. Actuellement, les courroies sont disponibles avec des longueurs de 1 500mm ou 1 800mm et des largeurs de 225mm ou 300mm.

Gillard affirme que ces courroies plus longues permettent d'appliquer des efforts de traction supérieurs en utilisant une pression de serrage considérablement inférieure sur les produits extrudés. Cela permet également d'éviter des déformations et des dommages éventuels, en particulier dans les produits minces.

Les nouveaux moyens à chenilles sont également équipés d'une unité d'entraînement des courroies perfectionnée, avec des servomoteurs à CA à transmission directe. Deux servocommandes digitales sont utilisées dans une configuration maître-esclave pour optimiser le contrôle de la vitesse.

La courroie supérieure a été conçue pour "flotter" sur les protubérances ou les aspérités éventuelles durant le démarrage de la ligne d'extrusion. L'unité supérieure est suspendue sur deux cylindres pneumatiques à chaque extrémité, ce qui permet à la courroie de se soulever et baisser automatiquement pour s'adapter aux protubérances, tout en maintenant une prise adéquate du matériau extrudé.

Les machines sont équipées de dispositifs de protection conformément aux toutes dernières normes CE. Gillard offre une vaste gamme d'options permettant aux utilisateurs de personnaliser les machines en fonction des exigences des clients.

**Peter Gillard & Co Ltd – Royaume-Uni**
**Fax**: +44 1684 290330
**Email**: sales@gillard.co.uk
**Website**: www.gillard.co.uk

## Les câbles Nexans au cœur du système de bagages de l'aéroport de Pékin

La société Nexans a fourni plus de 2 500km de câbles d'énergie et de contrôle en Chine dans le cadre d'un contrat d'un montant d'environ 2,6 millions d'euros. Ces câbles jouent un rôle primordial dans l'exploitation du système de pointe servant à la manutention des bagages dans le nouveau Terminal 3 de l'aéroport international de Pékin.

Nexans a été sélectionné comme fournisseur exclusif de câbles pour ce projet sur la base de plusieurs critères : tout d'abord, les câbles Nexans répondaient rigoureusement aux exigences imposées par les normes en vigueur dans les aéroports, notamment en matière de souplesse et d'utilisation de matériaux isolants sans halogène. Nexans était, par ailleurs, en mesure de fournir l'ensemble des catégories de câbles requis (câbles d'énergie, câbles de contrôle et câbles à fibres optiques). Enfin et surtout, le Groupe pouvait assurer une livraison dans des délais raccourcis en répondant ainsi aux exigences d'un programme de travail avec des délais très courts: alors que la plupart des projets de grande envergure de ce type s'étendent habituellement sur environ cinq ans, le système de bagages du Terminal 3 de Pékin a été réalisé, de la conception initiale à la mise en service, en à peine trois ans.

Ce système devrait être l'un des plus imposants et modernes au monde, capable de trier et d'acheminer plus de 19 200 bagages à l'heure. Terminal 3 de l'aéroport de Pékin, entièrement ouvert au public depuis mars 2008, offre une capacité plus de deux fois supérieure (66,5 millions de passagers par an, contre 30 précédemment). Quelque 330 comptoirs d'enregistrement sont reliés à un système de tapis roulants à grande vitesse, d'une longueur de 68km. Les bagages sont transportés via un tunnel de 2,2km, à la vitesse de 36km/h, depuis les comptoirs du Terminal 3A vers les carrousels de chargement du Terminal international 3B.

Les câbles en cuivre ont été fabriqués par les usines Nexans basées en Allemagne, et les câbles à fibres optiques par l'unité Opticable, société du Groupe Nexans, en Belgique.

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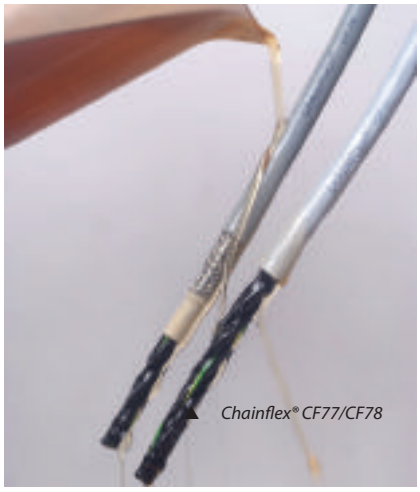
# Gamme de câbles de contrôle pour l'industrie des machines-outils


*Chainflex® CF77/CF78*

La société igus® spécialisée dans les accessoires et les chaînes porte-câbles pour la transmission de l'énergie, a mis au point une nouvelle gamme de câbles de contrôle pour l'utilisation dans les chaînes porte-câbles dans le secteur des machines-outils.

Les câbles Chainflex® CF77 et CF78 résistant aux huiles ont été développés pour des applications dynamiques caractérisées par un grand nombre de cycles et des charges élevées. Les câbles CF77 et CF78 ignifuges et sans halogène, sont toronnés en couches jusqu'à un nombre de 7 conducteurs (tension nominale U0/U 300/500 V) et toronnés en faisceaux dans le cas de 12 conducteurs ou plus (U0/U 300/300 V).

Les câbles sont toronnés en faisceaux autour d'un cordon central à haute résistance à la traction pour éviter des spirales éventuelles et la rupture des fils. Toutefois le diamètre extérieur des câbles de contrôle présente des dimensions réduites similaires à celles des types de câbles simplement toronnées en couches. La gaine extérieure en polyuréthane (PUR) extrudé à basse pression dans la totalité des cavités et des fissures du câble, offre une résistance élevée à l'abrasion et à la flexion tout en assurant une majeure stabilité et résistance à la flamme ainsi que l'absence d'halogène.

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# Draka cesse l'activité de fil de cuivre de Llanelli

Le Conseil d'Administration de Draka Holding NV, en ligne avec le programme Stop, Swap and Share (Triple S) de Draka, a annoncé son intention d'arrêter la production de fil de cuivre dans son établissement de Llanelli (Royaume-Uni) et de consolider la production d'autres établissements européens.

L'établissement de Llanelli, spécialisé dans la production de fil de cuivre, fait partie de la division européenne Énergie & Infrastructures et emploie environ 135 personnes. Les ventes aux tiers desservies par l'établissement de Llanelli seront absorbées par l'établissement de Draka à Derby au Royaume-Uni.

La fermeture de l'établissement de Llanelli a été discutée avec le Comité d'Entreprise Européen et séparément avec le Comité d'Entreprise National du Royaume-Uni.

**Draka Holding NV – Pays Bas**
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# Un contrat olympique pour Prysmian

Prysmian Cables and Systems, l'une des principales sociétés italiennes présentes en Chine, a complété un projet de haut niveau pour les jeux olympiques de Pékin 2008, en développant un réseau d'alimentation haute tension pour la fourniture d'énergie au village olympique. Prysmian a mis en service 20km de câbles haute tension à 220kV pour fournir de l'énergie au village olympique couvrant plus de 66 hectares de surface.

Le Centre International de Radiodiffusion porte également la firme de Prysmian, d'où la RAI italienne a transmis les images des jeux olympiques. Le groupe a câblé la totalité du centre de radiodiffusion de RAI, en fournissant des connexions de haut niveau technique en mesure d'assurer des transmissions de qualité supérieure.

Prysmian a fourni les supports passifs et les câbles LAN conformément aux spécifications de RAI, y compris: les câbles et les connecteurs pour les transmissions de télévision; les câbles et les connecteurs audio; les câbles UTP CAT 5E & CAT 6 pour la connectivité LAN; les câbles à fibres optiques pour les transmissions de télévision et à bande large, et le câbles et les connecteurs de radiofréquence.

Prysmian est présente en Chine avec cinq établissements de production, situés à Tianjin (câbles spécifiques pour applications industrielles), à Baoying dans la région de Jiangsu (câbles et systèmes Haute Tension) et à Wuxi et encore à Jiangsu (câbles optiques et en cuivre pour les télécommunications) en employant plus de 1 000 personnes au total. En outre, Prysmian Shanghai Trading importe et distribue la gamme de pointe de Prysmian d'accessoires pour les câbles moyenne et haute tension.

Prysmian a récemment inauguré un nouvel établissement à Pékin et prévoit d'augmenter d'environ 50% le chiffre d'affaires de ses activités en Chine d'ici 2010, ainsi que d'effectuer des investissements supplémentaires pour augmenter ses capacités de production.

La valeur totale des investissements de Prysmian en Chine, réalisés au cours de ces dernières années et prévus dans le plan, devrait dépasser 100 millions d'euros.

La société Prysmian est également impliquée dans d'autres projets chinois importants, comprenant le développement d'un nouveau réseau d'alimentation haute tension à Shanghai, le câblage du métro de Pékin et la conception et l'installation, pour le compte de China Nuclear Power Engineering Company, de câbles spécifiques haute technologie pour deux centrales nucléaires.

**Prysmian Cables & Systems – Italie**
**Website**: www.prysmian.com

# Nouveau système de revêtement à fibres optiques optimisé pour applications FTTx

Par Bob J Overton, Draka Comteq, Claremont, Caroline du Nord, Etats-Unis, et Xavier Meersseman, Draka Comteq, Billy Berclau, France


## Résumé

L'installation de réseaux de câbles à fibres optiques jusqu'aux locaux, aux bureaux et à domicile dénommés FTTx, permettant de porter la technologie de transmission des données à bande large à chaque utilisateur final, est en train de se diffuser rapidement de par le monde. Dans le présent article les auteurs illustrent les caractéristiques principales concernant les performances d'un nouveau système de revêtement conçu pour les applications FTTx, dans lesquelles les robustes câbles traditionnels s'avèrent non pratiques.

Le système de revêtement qui pourrait être utilisé avec des fibres optiques à rayon très court insensibles à la courbure, avec les fibres G.652 et avec d'autres modèles, offre une protection supplémentaire contre les micro-courbures causées par les contraintes. Il est caractérisé par un module réduit, un revêtement primaire avec la température de transition vitreuse ($T_g$) très basse pour un majeur amortissement contre les contraintes latérales et axiales causées par des contacts extérieurs ou par des températures réduites, et un nouveau pigment coloré, perfectionné, incorporé dans le revêtement secondaire pour améliorer la luminosité et la visibilité sans l'utilisation d'encres.

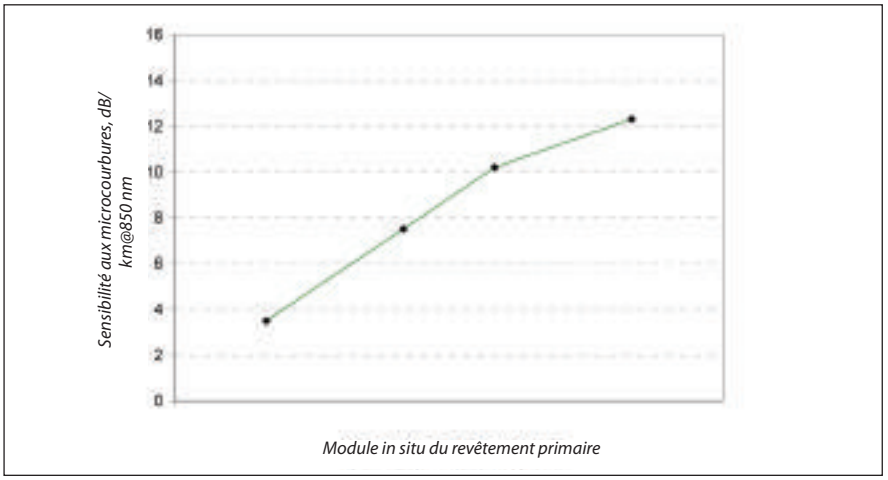

## 1 Introduction

Pour l'installation des réseaux FTTx on utilise des conceptions de systèmes innovants à des coûts réduits qui facilitent la diffusion de cette technologie. En d'autres termes, la fibre peut être amenée jusqu'à la dernière liaison (ou liaisons), par exemple sous la forme de microcâble[1, 2, 3]. Les fibres soufflées offrent une autre méthode efficace pour le transport de la liaison à la station terminale de l'utilisateur final[4]. L'attention du secteur industriel est constamment concentrée sur la recherche de méthodes d'installation permettant de dépasser les obstacles économiques concernant les solutions à bande large basées sur les fibres optiques pour la transmission de données aux bureaux et à domicile. Les propositions pour différentes méthodologies sont nombreuses et bien connues chez le lecteur.

Un facteur clé pour assurer un système FTTx couronné de succès est le coût réduit. Même les dimensions réduites des câbles, des dérivations et des structures de soufflage sont souvent critiques puisque l'installation de conduites destinées à des câbles de type traditionnel est généralement prohibitive dans les infrastructures existant déjà et il doit être possible d'utiliser des conduits de petites dimensions ou des passages étroits existant déjà pour les nouvelles installations à fibres optiques. La nécessité d'avoir des câbles économiques et de dimensions les plus possibles réduites a pour but de minimiser la protection des fibres optiques, en réduisant les performances des câbles traditionnels robustes et plus volumineux.

Des modèles en verre offrant une meilleure sensibilité aux rayons de flexion accentués, tels que les modèles de noyaux pourvus de rainure (trench-assisted)[5] ou des fibres pourvues de trou (hole-assisted) sont actuellement disponibles.

Les modèles en verre caractérisés par un diamètre de champ de mode inférieur sont moins sensibles aux contraintes causées par les microcourbures, mais sont compatibles avec les fibres G.652 SMF. Une protection supplémentaire est donc nécessaire contre les microcourbures pour assurer une installation couronnée de succès dans la totalité des applications FTTx. Dans ce but, un nouveau système de revêtement optimisé a été introduit pour les applications FTTx, qui présente les spécifications supplémentaires pour les réseaux FTTx permettant d'obtenir des fibres optiques et des câbles appropriés à ce type d'installations.




▲ **Figure 1**: *Sensibilité aux microcourbures par rapport au module primaire pour la fibre multimodale de 50µ*

## 2 Conception du revêtement

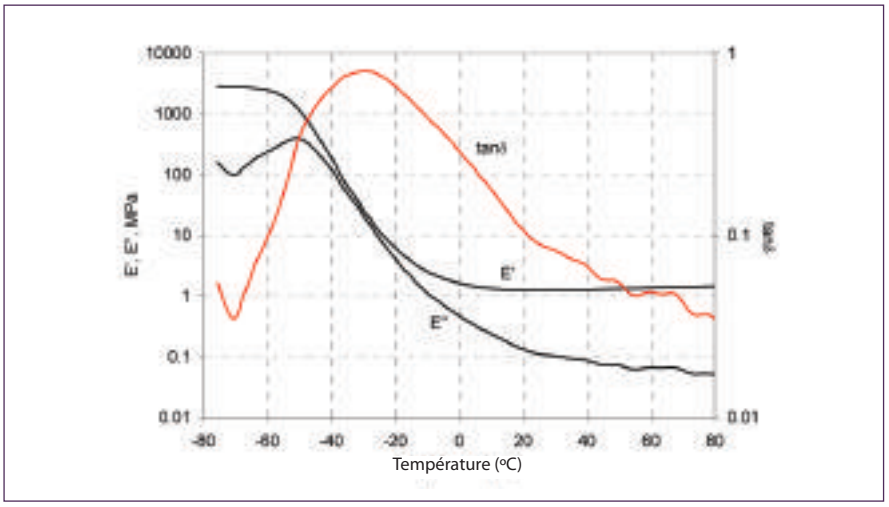
Dans le développement de revêtements multimodaux haute qualité, on a apprécié les avantages dérivant de la réduction du module du revêtement primaire.

La *Figure 1* illustre la relation observée entre le module sur fibre des revêtements primaires et la sensibilité à la microcourbure de la fibre optique. Les fibres présentées dans cette étude sont multimodales et sont caractérisées par un indice gradué de 50µ. Le module de revêtement primaire est caractérisé par une méthode de mesure in situ, et vulcanisé sur la fibre[6]. La sensibilité à la microcourbure est obtenue en utilisant la procédure du dévidoir en papier de verre avec un diamètre fixe[7]. Bien que le module inférieur du revêtement primaire puisse être obtenu au moyen d'une vulcanisation réduite de la fibre, il est souhaitable d'adapter le revêtement pour atteindre un module inférieur avec une vulcanisation quasi complète. Le module prévu varie de 0,3 à 0,4MPa pour réduire au minimum la sensibilité à la courbure.

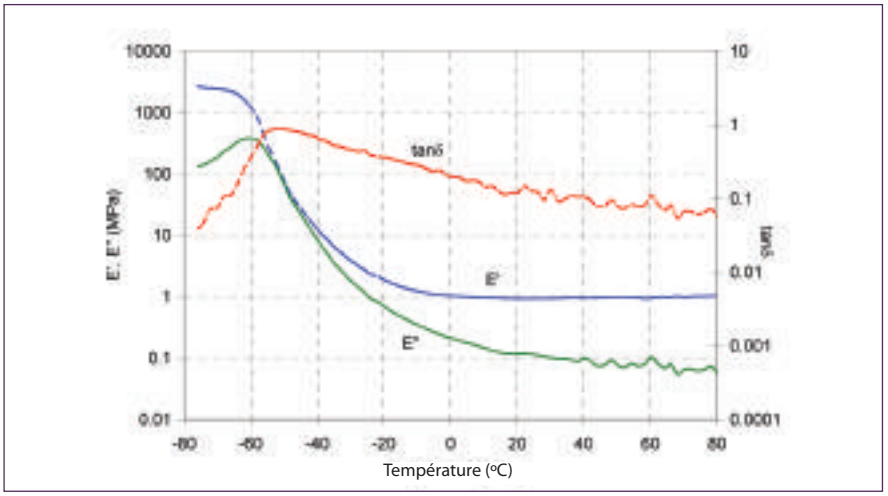
Un module inférieur pour le revêtement primaire entraîne une densité de réticulation inférieure et donc une mineure concentration des groupes d'acrylates réactifs. Les groupes d'acrylates réagissent avec la réticulation au moyen d'un mécanisme de polymérisation à radicaux libres, à la suite de photo-initiation induite par des lampes de vulcanisation à UV durant le tréfilage. Les principes de cinétique imposent une vitesse de vulcanisation réduite durant le processus, à moins que des mesures ne soient pas adoptées pour modifier le processus et pour optimiser la vulcanisation. Cela peut être obtenu moyennant la compréhension de la nature du processus de vulcanisation du revêtement primaire.

Il existe au moins deux composants du processus de vulcanisation intervenant pour retarder la vitesse de polymérisation du revêtement primaire souple. Premièrement, la température élevée des revêtements de vulcanisation induite par l'exposition à un environnement à lampes UV à haute intensité et les réactions de polymérisation exothermiques ralentissent la vitesse globale observée[8].

Deuxièmement, il a été démontré que la proximité des lampes UV empilées génère en effet des périodes de photo initiation répétées et superposées rapidement. La vitesse de disparition des groupes d'acrylates dans cette condition est encore retardée. Les lampes UV ont été installées de manière à ce que le temps entre les expositions UV répétées soit




▲ **Figure 2**: *Propriétés mécaniques dynamiques d'un revêtement primaire monomodal commercial, avec une fréquence d'oscillation de 1Hz*




▲ **Figure 3**: *Propriétés mécaniques dynamiques d'un nouveau revêtement primaire monomodal, avec une fréquence d'oscillation de 1Hz*

augmenté au maximum avec pour résultat un accroissement significatif du degré de vulcanisation du revêtement, par rapport aux processus caractérisés par la même vitesse et dose totale de rayons UV[9], [10].

Il est donc possible d'obtenir effectivement un revêtement primaire avec un module réduit et d'obtenir une vulcanisation quasi complète aux vitesses de tréfilage de la fibre requises. Un second aspect du revêtement primaire permettant d'obtenir une meilleure protection contre les microcourbures dans les applications FTTx est représenté par la dépendance du module de la température. Si d'un côté un module réduit peut être caractéristique à température ambiante, l'installation sur-le-champ expose la fibre à des températures extrêmes en présence de contraintes induisant les microcourbures. Par conséquent, il est nécessaire de maintenir la température de transition vitreuse $T_g$ à une valeur la plus réduite possible de manière à ce que le revêtement primaire reste souple et protecteur dans toute condition.

Un revêtement secondaire résistant est également nécessaire pour protéger le revêtement primaire et le verre d'éventuels dommages durant la manipulation et l'installation. Ce revêtement peut être projeté pour être encré selon un code de couleurs ou bien il peut inclure la couleur pour fournir l'identification sans exiger un processus d'encrage séparé.

## 3 Résultats

Un nouveau revêtement primaire, basé sur le revêtement d'un produit multimode avec indice gradué commercial a été mis au point. Ce revêtement a été adapté pour des applications à des projets de fibres multimodales, et a été spécifiquement conçu pour l'installation dans des environnements caractérisés par des conditions difficiles de pose, comme dans le cas des applications FTTx. La solution, préférable, du revêtement secondaire, conçu pour protéger la structure de la fibre, présente un système

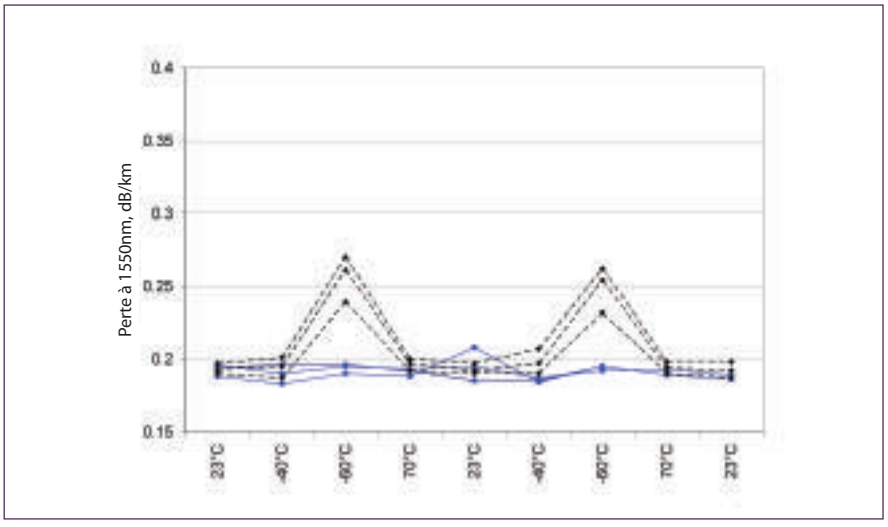
de coloration optimisé inclus dans le matériau, qui n'exige aucune couche supplémentaire d'encre pour le codage couleur. Les nouvelles couleurs sont caractérisées par une meilleure luminosité et visibilité dans des conditions de faible éclairage, comme par exemple dans des points très sombres ou dans les trous d'homme.

### *3.1 Propriétés mécaniques*

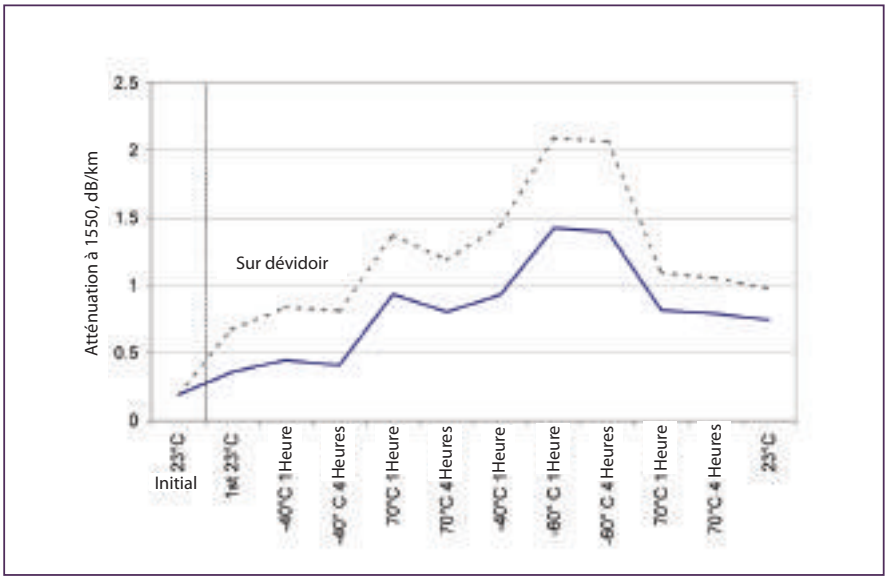
Les propriétés mécaniques dynamiques d'un revêtement primaire commercial type sont illustrées à la *Figure 2*. Les données ont été obtenues sur un analyseur mécanique dynamique TA avec une fréquence d'oscillation de 1Hz, en accordant une attention particulière afin de maintenir la déformation dans l'espace linéaire du comportement contrainte-déformation. L'échantillon du revêtement a été vulcanisé sur polyester dans une pellicule de 75-microns à une dose de rayons UV de J/cm$^2$. La lampe utilisée est une lampe à vapeurs de mercure-aux halogénures caractérisée par une puissance de 300W/pouces.

Cette exposition aux rayons UV suffit pour assurer que le matériau se trouve sur le plateau de la courbe dose/module. Les données montrent que le module d'équilibre se situe à environ 1,5MPa. Généralement, sur la fibre ce revêtement présente une vulcanisation satisfaisante avec un module d'équilibre d'environ 0,8MPa, un niveau typique de la majorité des revêtements primaires des fibres monomodales dans le secteur industriel.

Les raisons de l'écart entre le module de la pellicule et le module in situ sont illustrées en détail dans les références bibliographiques allant de[8] à [10].




▲ **Figure 4**: *Résultats des essais d'enroulement sur dévidoir/variation cyclique de température pour le système de revêtement monomodal commercial traditionnel (ligne pointillée) et le système de revêtement optimisé (ligne droite)*




▲ **Figure 5**: *Résultats des essais d'enroulement sur dévidoir en papier de verre/variation cyclique de température pour le système de revêtement monomodal commercial traditionnel (ligne pointillée) et le système de revêtement optimisé (ligne droite)*

La valeur $T_g$ estimée proche de la valeur maximale du tanδ est égale à environ -30°C. Par conséquent, le revêtement, et d'autres formulations similaires, répondent comme un verre à des températures extrêmement réduites de -40 à -50°C. (Il s'agit d'un cadre incomplet du fait de la relation entre le temps et la contrainte induite par la déformation à une basse température; toutefois, la valeur $T_g$ reste un paramètre de comparaison utile).

La *Figure 3* illustre les propriétés mécaniques dynamiques du nouveau revêtement primaire, en utilisant un échantillon de pellicule réalisé comme dans l'exemple cité plus haut.

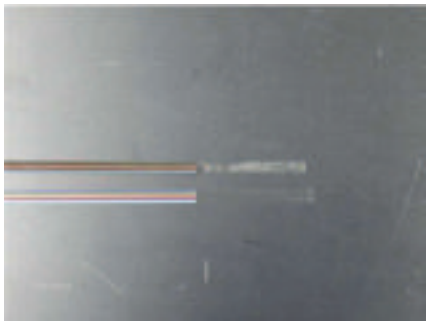
À la *Figure 3* le nouveau revêtement primaire présente un module d'équilibre légèrement inférieur à 1MPa dans la pellicule vulcanisée, alors que sur la fibre le module in situ se mesure généralement de 0,3 à 0,4MPa, la valeur cible. Dans le but d'améliorer la protection aux basses températures contre la microcourbure induite par des contraintes, la température de transition vitreuse est déplacée à plus de 20°C en moins par rapport au revêtement conventionnel décrit à la *Figure 2*.

Il faut donc prévoir une relaxation en contrainte considérablement plus rapide imposée durant les excursions de température. Les résultats des essais mis au point pour analyser la protection contre la microcourbure sont illustrés dans la section suivante.

### *3.2 Sensibilité à la microcourbure*

Deux méthodes d'évaluation différentes ont été utilisées aux fins d'une comparaison relative à la sensibilité à la microcourbure entre la fibre commerciale avec revêtement primaire traditionnel et la fibre pourvue du nouveau système de revêtement. Les deux méthodes ont été étudiées pour offrir des conditions de contrainte latérale extrêmes (où la deuxième méthode va décidément au-delà de ce que l'on rencontre normalement sur-le-champ). Après avoir mesuré l'effet sur l'atténuation à température ambiante, les structures d'essai peuvent être sujettes à une variation cyclique de la température pour déterminer la perte supplémentaire induite par les excursions de température.

Le premier essai est constitué par une opération d'enroulement sur dévidoir/variation cyclique de la température. La fibre échantillon est enveloppée avec une tension de 50 grammes sur un cylindre au quartz d'un diamètre de 300mm et un pas de 9mm. Cela entraîne de nombreux croisements de fibre à fibre durant l'enroulement des 50 couches sur le dévidoir. Les croisements peuvent causer une perte supplémentaire à température ambiante si la fibre est



▲ **Figure 6**: *Démonstration de dénudage du ruban avec le système de revêtement optimisé (fond) par rapport au système de revêtement commercial traditionnel sur ruban*

suffisamment sensible, mais normalement, à ce point, l'on n'enregistre que des pertes supplémentaires négligeables ou nulles. Dans cette expérience, le dévidoir avec la fibre est soumis deux fois à des variations cycliques de température (-40°C/-60°C/+70°C/23°C) et les mesures des pertes sont effectuées à 1550nm après une heure à la température des cycles. La *Figure 4* illustre les résultats typiques pour les échantillons du nouveau système de revêtement par rapport aux échantillons d'un système commercial traditionnel. Les deux systèmes de revêtement utilisent les revêtements secondaires colorés, mais des formulations de revêtement secondaire différentes. Les prototypes de la fibre ont été sélectionnés pour être compatibles avec la géométrie du revêtement, le diamètre du champ modal et la longueur d'onde de coupure.

Les deux divers systèmes de revêtement offrent une protection satisfaisante contre les contraintes induite par les microcourbures à 23°C. À -40°C la valeur du revêtement primaire commercial typique est proche du $T_g$ correspondant, tout en offrant une bonne protection contre les microcourbures moyennant la relaxation des contraintes dans un temps raisonnable. L'on ne peut apprécier qu'une faible perte supplémentaire à -40°C dans le revêtement primaire conventionnel et aucune perte dans la fibre avec revêtement primaire optimisé. De façon analogue, à -60°C le revêtement primaire optimisé est proche du $T_g$ correspondant, mais le revêtement primaire conventionnel est actuellement décidément inférieur à la valeur $T_g$ et les fibres présentent une perte supplémentaire.

Pour obtenir un environnement de microcourbure plus agressif, on a modifié l'essai avec le dévidoir en papier de verre IEC[7] de la deuxième méthode pour fournir ainsi une rigoureuse condition de contrainte induite par microcourbure suffisamment solide pour influencer les fibres monomodales même à température ambiante. Dans ce but, un dévidoir de 300mm a été revêtu avec du papier en verre adhésif avec une grosseur de grain égale à 40, en créant ainsi une surface très rugueuse autour de laquelle une seule couche de fibre a été enveloppée à une tension de 100gr. En utilisant des échantillons de fibres similaires à celles de l'essai de l'enroulement sur dévidoir/variation cyclique de la température, l'atténuation à 23°C a été mesurée près l'enroulement. Ensuite, les dévidoirs ont été soumis à des cycles de température extrêmes, cette fois en mesurant l'atténuation à 1550nm après une heure et encore après quatre heures à température. Les résultats sont illustrés à la *Figure 5*.

La mesure initiale à 23°C effectuée alors que la fibre se trouvait sur les dévidoirs originels montre une perte similaire d'environ 0,19dB/km pour ces échantillons de fibre. Une fois les dévidoirs enroulés, encore à température ambiante, le module inférieur du revêtement primaire optimisé offre une protection considérablement meilleure par rapport au revêtement primaire conventionnel, avec un tiers de la perte supplémentaire. Dans la gamme entière de températures extrêmes et des conditions d'aspérité des dévidoirs, la fibre avec revêtement optimisé offre une réponse à la microcourbure décidément inférieure par rapport au système commercial conventionnel.

### *3.3 Revêtement secondaire coloré*

Le revêtement secondaire pour le système optimisé a été reformulé pour obtenir une meilleure luminosité et visibilité avec tout type d'éclairage. Les couleurs sont conformes aux normes Munsell en ce qui concerne le marquage des fibres optiques et il est possible de les distinguer aisément sur les arrière-plans lumineux et sombres.

Les perfectionnements apportés aux couleurs ont requis une majeure concentration des systèmes de pigmentation dans ce nouveau revêtement secondaire, ainsi qu'une amélioration dans le paquet de vulcanisation fourni. Le revêtement présente une surface caractérisée par une excellente interface avec le matériau matrice du ruban permettant une séparation aisée de la matrice de la fibre colorée, mais sans en compromettre la robustesse. Les propriétés mécaniques du revêtement secondaire coloré se compensent avec celles du revêtement primaire de sorte que durant le dénudage thermique l'ensemble du revêtement/matrice se sépare parfaitement des fibres de verre (*Figure 6*).

## 4 Conclusions

Un système perfectionné de revêtement double pour les fibres monomodales optimisé pour les applications FTTx a été développé. Le nouveau système présente un revêtement primaire plus souple et des caractéristiques à basses températures excellentes pour la protection contre les microcourbures dans tout environnement et dans des conditions physiques extrêmes.

Un nouveau revêtement secondaire coloré caractérisé par une couleur plus résistante et vive a été associé au revêtement primaire. Le ruban du revêtement secondaire offre des caractéristiques améliorées et permet d'obtenir des structures robustes mais aisément accessibles.

Le double revêtement également est spécifiquement équilibré pour consentir un dénudage thermique de qualité supérieure dans le ruban, pratiquement sans aucun résidu sur le verre, et pour faciliter l'épissurage et les raccordements rapides.

Les perfectionnements dans le système de revêtement offrent des avantages significatifs pour l'installation dans presque tout projet de systèmes FTTx. ■

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# Gamma di estrattori equipaggiati con gruppi di traino cingolati per servizio pesante

▲ *La nuova macchina di Gillard è equipaggiata con cinghie più lunghe per esercitare una minore pressione sui prodotti estrusi*

La società Gillard ha ampliato la propria gamma di macchine di traino cingolate di precisione.

Le nuove macchine sono versioni con cinghie extra-lunghe della gamma di prodotti di elevate prestazioni realizzati dalla società. Attualmente sono disponibili cinghie di dimensioni ampliate di 1500mm o 1800mm di lunghezza e di 225mm o 300mm di larghezza.

Gillard sostiene che queste cinghie più lunghe permettono di applicare sforzi di trazione superiori utilizzando una pressione di serraggio inferiore sui prodotti estrusi. Ciò consente di evitare eventuali deformazioni e danni, in particolare nei prodotti sottili.

I nuovi mezzi cingolati sono inoltre dotati di un'unità di azionamento delle cinghie perfezionata, con servomotori a CA a trasmissione diretta. Vengono utilizzati due servoazionamenti digitali in una configurazione asservita per ottimizzare il controllo della velocità.

La cinghia superiore è stata progettata per "galleggiare" su eventuali protuberanze o asperità durante l'avviamento della linea di estrusione. L'unita' superiore è sospesa su due cilindri pneumatici ad entrambe le estremità, che permettono alla cinghia di sollevarsi ed abbassarsi automaticamente per adattarsi alle protuberanze, mantenendo contemporaneamente una presa adeguata del materiale estruso.

Le macchine sono complete di dispositivi di protezione conformemente alle più recenti norme CE. Gillard offre una vasta gamma di opzioni permettendo agli utenti di personalizzare le macchine secondo le esigenze dei clienti.

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## Cavi Nexans nel cuore del sistema di smistamento dei bagagli dell'aeroporto internazionale di Pechino

La società Nexans ha fornito oltre 2500km di cavi di potenza e di controllo in Cina nell'ambito di un contratto per un ammontare pari a circa 2,6 milioni di euro. Questi cavi giocano un ruolo fondamentale nel funzionamento del moderno sistema di smistamento bagagli del nuovo Terminale 3.

La società Nexans è stata selezionata quale fornitore esclusivo di cavi per questo progetto in base a numerosi criteri: innanzitutto, i cavi Nexans erano rigorosamente conformi alle esigenze imposte dalle norme in vigore negli aeroporti, in particolare in materia di flessibilità ed utilizzo di materiali isolanti senza alogeno. Nexans era peraltro in grado di fornire tutti i tipi di cavi richiesti (cavi di potenza, cavi di controllo e cavi a fibre ottiche). Infine e soprattutto, il gruppo Nexans poteva assicurare una consegna in tempi rapidi, soddisfando così i requisiti di un programma lavori per la costruzione molto stretto: mentre la maggior parte dei progetti di grande respiro di questo tipo si protrae normalmente per circa cinque anni, il sistema di smistamento bagagli del Terminale 3 di Pechino è stato realizzato, dal progetto iniziale alla messa in servizio, in appena tre anni.

Questo sistema è considerato uno dei più imponenti e più moderni del mondo, in grado di smistare e trasportare fino a 19.200 bagagli l'ora. Il nuovo Terminale 3 dell'aeroporto di Pechino, aperto al pubblico da marzo 2008, ha più che raddoppiato la propria capacità (da 30 a 66,5 milioni di passeggeri l'anno). Circa 330 banchi del check-in sono collegati ad un sistema di tapis roulants ad alta velocità, della lunghezza di 68km. I bagagli vengono trasportati attraverso un tunnel di 2,2km, alla velocità di 36km/h, dai banchi del check-in del Terminale 3A verso i vagoni di caricamento del Terminale internazionale 3B.

I cavi di rame sono stati fabbricati dagli stabilimenti Nexans con sede in Germania, ed i cavi a fibre ottiche dall'unità Opticable, società del Gruppo Nexans, in Belgio.

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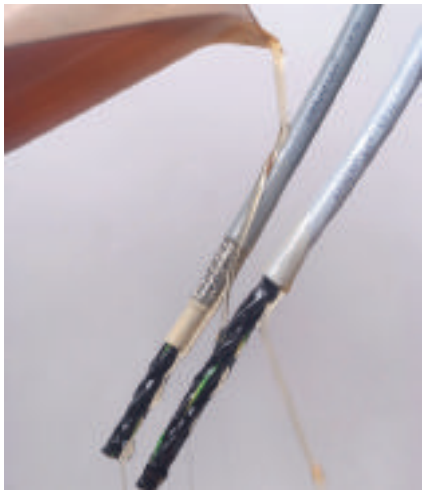
# Nuova gamma di cavi di controllo per l'industria delle macchine utensili



▲ *Chainflex® CF77/CF78*

La società igus® specializzata in accessori e catene portacavi per la trasmissione di energia ha messo a punto una nuova gamma di cavi di controllo per l'utilizzo nelle catene portacavi nel settore delle macchine utensili. I cavi Chainflex® CF77 e CF78 resistenti all'olio sono stati sviluppati per applicazioni dinamiche con alto numero di cicli e carichi elevati.

I cavi CF77 e CF78 ignifughi e senza alogeno, sono intrecciati in strati fino ad un numero di 7 conduttori (tensione nominale U0/U 300/500 Volt) e intrecciati in fasci quando hanno 12 o più conduttori (U0/U 300/300 Volt).

I cavi sono intrecciati in fasci attorno ad un cordone centrale ad alta resistenza alla trazione per evitare spirali e la rottura dei fili. Tuttavia il diametro esterno dei cavi di controllo presenta dimensioni ridotte simili ai cavi intrecciati solamente in strati. La guaina esterna di poliuretano (PUR), estruso a bassa pressione in tutte le fessure e cavità del cavo, offre un'elevata resistenza all'abrasione ed alla flessione assicurando una maggiore stabilità e sono resistenti alla fiamma e privi di alogeno.

La serie resistente all'olio ha ottenuto l'approvazione UL/CSA ed è conforme alle norme DESINA. I cavi sono inoltre adatti ad ambienti sterili (ISO Classe 1).

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## Draka chiude la fabbrica di filo di rame di Llanelli

Il Consiglio di Amministrazione di Draka Holding NV, in linea con il programma Stop, Swap and Share (Triple S) di Draka, ha annunciato l'intenzione di arrestare la produzione di filo di rame nel proprio stabilimento di Llanelli (GB) e consolidare la produzione in altri stabilimenti europei, dove la trafilatura fa già parte del processo di produzione integrato.

Lo stabilimento di Llanelli, specializzato nella produzione di filo di rame, fa parte della divisione europea di Energia ed Infrastrutture ed impiega circa 135 persone. Le vendite a terzi servite dallo stabilimento di Llanelli saranno assorbite dallo stabilimento di Draka a Derby nel Regno Unito.

La chiusura dello stabilimento di Llanelli è stata discussa con il Comitato Aziendale Europeo e separatamente con il Comitato Aziendale Nazionale del Regno Unito.

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# Contratto olimpico per Prysmian

Prysmian Cables and Systems, una delle principali imprese italiane presenti in Cina, ha completato un progetto di alto livello per i Giochi Olimpici di Pechino 2008, sviluppando una rete di alimentazione ad alta tensione per la fornitura di energia al villaggio olimpico. Prysmian ha messo in servizio 20km di cavi Alta Tensione a 220kV per fornire energia al villaggio olimpico che si sviluppa su una superficie di oltre 66 ettari.

Porta la firma di Prysmian anche il Centro Internazionale di Radiodiffusione, dal quale la RAI italiana, principale società di telecomunicazione italiana, ha trasmesso le immagini delle Olimpiadi.

Il gruppo ha cablato l'intero centro di radiodiffusione della RAI, fornendo connessioni di alto livello tecnologico in grado di assicurare la massima qualità delle trasmissioni.

Prysmian ha fornito tutto l'equipaggiamento passivo ed i cavi LAN, conformemente alle specifiche RAI, inclusi: cavi e connettori per trasmissioni televisive; cavi e connettori per audio; cavi UTP CAT 5E e CAT 6 per la connettività LAN; cavi in fibra ottica per trasmissioni televisive e a banda larga, cavi e connettori per frequenze radio.

Prysmian è presente in Cina con cinque impianti produttivi, situati a Tianjin (cavi speciali per applicazioni industriali), a Baoying, nella provincia di Jiangsu (cavi e sistemi Alta Tensione) e a Wuxi (cavi a fibre ottiche e in rame per le telecomunicazioni), e impiega oltre 1.000 dipendenti. Inoltre attraverso Prysmian Shanghai Trading, il Gruppo importa e distribuisce un'ampia gamma di accessori per cavi Alta e Media Tensione.

Prysmian ha recentemente inaugurato una nuova sede a Pechino e prevede di aumentare del 50% il volume d'affari delle proprie attività in Cina entro il 2010, nonché ulteriori investimenti per l'aumento delle capacità produttive.

Tra gli altri importanti progetti che Prysmian ha avviato in Cina, da evidenziare la costruzione di una nuova rete elettrica Alta Tensione a Shanghai, il cablaggio della metropolitana di Pechino e la progettazione ed installazione per conto di China Nuclear Power Engineering Company di cavi speciali ad elevata tecnologia per due centrali nucleari in costruzione nelle province di Liaoning e di Fujian.

**Prysmian Cables & Systems – Italia**
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# Nuovo sistema di rivestimento a fibre ottiche ottimizzato per applicazioni FTTx

A cura di Bob J Overton, Draka Comteq, Claremont, North Carolina, USA; e Xavier Meersseman, Draka Comteq, Billy Berclau, Francia


## Riassunto

L'installazione di reti di cavi in fibra ottica fino ai locali, agli uffici e alle abitazioni, denominate FTTx, che consente di portare la tecnologia di trasmissione di dati a banda larga al singolo utente finale, si sta espandendo rapidamente in tutto il mondo. Nel presente articolo gli autori illustrano le principali caratteristiche delle prestazioni di un nuovo sistema di rivestimento progettato per le applicazioni FTTx, nelle quali i robusti cavi tradizionali risultano essere poco pratici. Il sistema di rivestimento che potrebbe essere utilizzato con fibre ottiche insensibili alla piegatura con raggio di curvatura stretto, fibre G.652 ed altri modelli, offre una protezione aggiuntiva contro le micropiegature indotte dalle sollecitazioni. Esso è caratterizzato da un modulo ridotto, da un rivestimento primario con temperatura di transizione vetrosa ($T_g$) molto basso per una maggiore ammortizzazione contro le sollecitazioni laterali ed assiali indotte da contatti esterni o da basse temperature, e da un nuovo pigmento colorato, perfezionato, incorporato nel rivestimento secondario per migliorare la luminosità e la visibilità senza l'utilizzo di inchiostri.


## 1 Introduzione

Per l'installazione di reti FTTx si utilizzano sistemi innovativi a costi ridotti che facilitano la diffusione di questa tecnologia. In altri termini, la fibra può essere portata fino all'ultimo collegamento (o collegamenti), ad esempio sotto forma di microcavo[1], [2], [3]. Le fibre soffiate offrono un altro metodo efficace per il trasporto del collegamento alla stazione terminale dell'utente finale[4]. L'attenzione di tutto il settore industriale è costantemente concentrata sulla ricerca di metodi di posa che consentono di superare gli ostacoli economici relativi all'installazione di soluzioni a banda larga basate su fibre ottiche per la trasmissione di dati agli uffici e alle abitazioni. Le proposte per varie metodologie sono numerose e ben note al lettore.

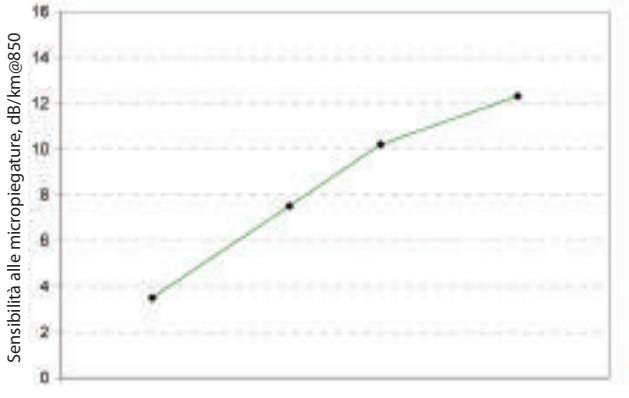
Un fattore determinante per ottenere un sistema FTTx di successo è il costo ridotto. Anche le dimensioni ridotte dei cavi, delle derivazioni e delle strutture di soffiaggio sono spesso critiche, poiché l'installazione di condotti destinati a cavi di tipo tradizionale è spesso proibitiva nelle infrastrutture esistenti e deve essere possibile utilizzare condotti di piccole dimensioni o passaggi stretti già esistenti per le nuove installazioni di fibre ottiche. La necessità di avere cavi economici e di dimensioni le più possibili ridotte ha lo scopo di minimizzare la protezione delle fibre ottiche, riducendo le prestazioni dei cavi tradizionali robusti e più voluminosi.

Attualmente sono disponibili modelli in vetro caratterizzati da una minore sensibilità a raggi di curvatura accentuati, come i modelli di nuclei provvisti di scanalatura (trench-assisted)[5] o le fibre provviste di foro (hole-assisted). I modelli in vetro caratterizzati da un diametro del campo modale inferiore sono meno sensibili alle sollecitazioni da micropiegatura, ma non sono compatibili con le fibre G.652 SMF.

È pertanto necessaria una protezione aggiuntiva contro la micropiegatura per assicurare un'installazione positiva in tutte le applicazioni FTTx. A questo scopo, è stato introdotto un nuovo sistema di rivestimento ottimizzato per applicazioni FTTx che permette di ottenere fibre ottiche e cavi adeguati a questo tipo di installazioni.

## 2 Forma costruttiva del rivestimento

Nello sviluppo di rivestimenti multimodali di alta qualità, è stato apprezzato il beneficio derivante dalla riduzione del modulo del rivestimento primario.




▲ **Figura 1**: *Sensibilità alle micropiegature rispetto al modulo primario per la fibra multimodale da 50µ*

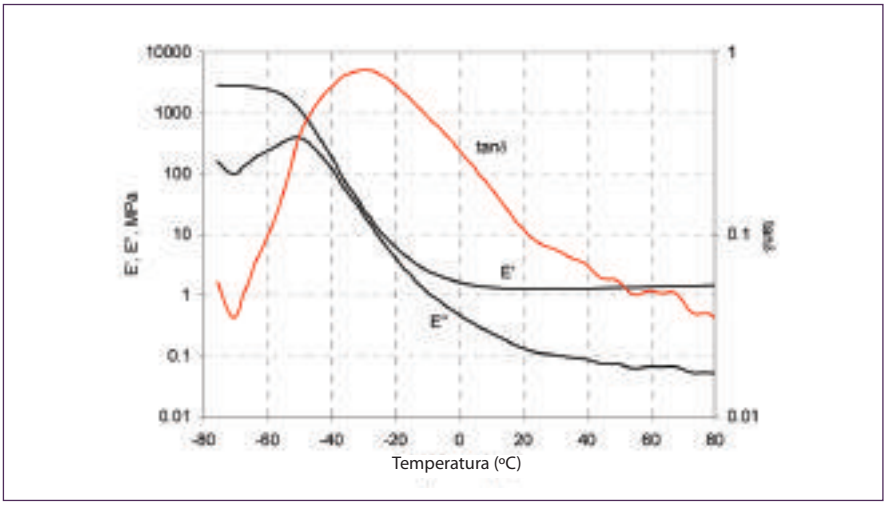
La *Figura 1* illustra la relazione osservata fra il modulo su fibra dei rivestimenti primari e la sensibilità alla micropiegatura della fibra ottica. Le fibre presentate in questo studio sono multimodali caratterizzate da un indice graduato di 50µ. Il modulo del rivestimento primario è caratterizzato da un metodo di misurazione in situ, vulcanizzato sulla fibra[6]. La sensibilità alle micropiegature si ottiene utilizzando il procedimento dell'aspo di carta vetrata con diametro fisso[7]. Nonostante si possa ottenere un modulo inferiore nel rivestimento primario mediante una bassa vulcanizzazione della fibra, è auspicabile adattare il rivestimento per raggiungere un modulo inferiore con vulcanizzazione quasi completa. Il modulo previsto va da 0,3 a 0,4Mpa per ridurre al minimo la sensibilità alla piegatura.

Un modulo inferiore per il rivestimento primario comporta una densità di reticolazione inferiore e quindi una minore concentrazione dei gruppi di acrilati reattivi. I gruppi di acrilati reagiscono con la reticolazione tramite un meccanismo di polimerizzazione mediante radicali liberi, in seguito a fotoiniziazione indotta da lampade di vulcanizzazione ad UV durante la trafilatura. I principi di cinetica impongono una ridotta velocità di vulcanizzazione durante il processo, salvo che non vengano adottati provvedimenti per modificare il processo e ottimizzare la vulcanizzazione. Ciò si può ottenere mediante la comprensione della natura del processo di vulcanizzazione del rivestimento primario.

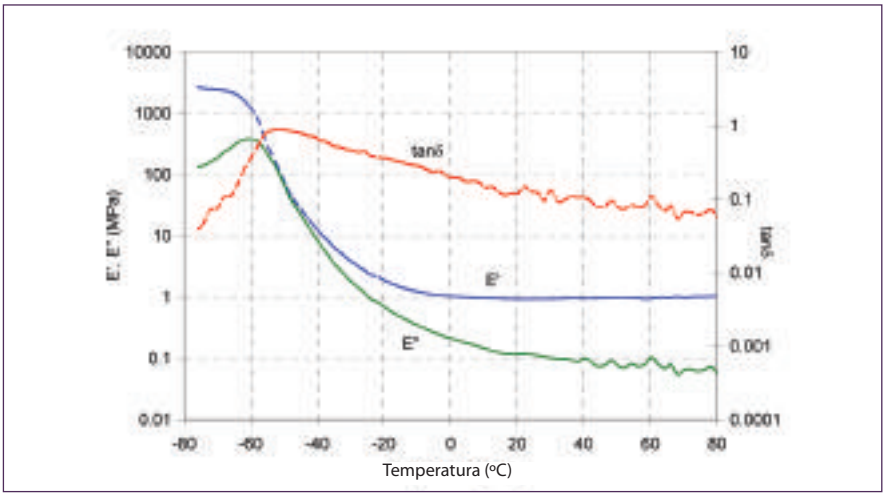
Esistono almeno due componenti del processo di vulcanizzazione che intervengono a ritardare la velocità di polimerizzazione del rivestimento primario morbido. Innanzitutto, l'elevata temperatura dei rivestimenti di vulcanizzazione indotta dall'esposizione ad un ambiente con lampade UV ad alta intensità e le reazioni di polimerizzazione esotermiche che rallentano la velocità complessiva osservata[8].

In secondo luogo è stato dimostrato che la vicinanza di lampade UV impilate in effetti generano periodi di fotoiniziazione ripetuti e sovrapposti rapidamente. La velocità di scomparsa dei gruppi di acrilati in questa condizione è ancora ritardata. Le lampade UV sono state disposte in modo tale che il tempo fra le esposizioni UV ripetute risulta aumentato al massimo con conseguente aumento significativo del grado di vulcanizzazione del rivestimento, rispetto a processi caratterizzati dalla stessa velocità e dose totale di raggi UV[9], [10].

É pertanto possibile ottenere effettivamente un rivestimento primario con modulo ridotto e ottenere una vulcanizzazione pressoché completa alle velocità di trafilatura della fibra richieste.




▲ **Figura 2**: *Proprietà meccaniche dinamiche di un rivestimento primario monomodale commerciale, con una frequenza di oscillazione di 1Hz*




▲ **Figura 3**: *Proprietà meccaniche dinamiche di un nuovo rivestimento primario monomodale, con una frequenza di oscillazione di 1Hz*

Un secondo aspetto del rivestimento primario per ottenere una migliore protezione contro la micropiegatura nelle applicazioni FTTx è la dipendenza del modulo dalla temperatura. Se da un lato un modulo ridotto può essere caratteristico a temperatura ambiente, l'installazione in campo espone le fibre a temperature estreme in presenza di sollecitazioni che inducono le micropiegature.

Pertanto, è necessario mantenere la temperatura di transizione vetrosa $T_g$ più bassa possibile in modo che il rivestimento primario resti morbido e protettivo in tutte le condizioni.

É inoltre richiesto un rivestimento secondario resistente per proteggere il rivestimento primario ed il vetro da eventuali danni durante la manipolazione e l'installazione.

Questo rivestimento può essere progettato per essere inchiostrato secondo un codice a colori o può includere il colore per fornire l'identificazione senza richiedere un processo di inchiostratura separato.

# 3 Risultati

È stato sviluppato un nuovo rivestimento primario, basato sul rivestimento di un prodotto multimodale con indice graduato commerciale, che è stato adattato per applicazioni a progetti di fibre monomodali, in particolare mirato all'installazione in ambienti caratterizzati da condizioni difficili di posa, come nel caso delle applicazioni FTTx. La soluzione, preferibile, del rivestimento secondario, progettato per proteggere la struttura della fibra presenta un sistema di colorazione ottimizzato incluso nel materiale, che non richiede uno strato aggiuntivo di inchiostro per la codifica a colori. I nuovi colori sono caratterizzati da una migliore luminosità e visibilità in condizioni di scarsa illuminazione, come ad esempio in punti molto ombrosi o nei pozzetti d'ispezione.

### *3.1 Proprietà meccaniche*

Le proprietà meccaniche dinamiche di un tipico rivestimento primario commerciale sono illustrate nella *Figura 2*. I dati sono stati ottenuti su un analizzatore dinamico

meccanico TA con frequenza di oscillazione di 1Hz, prestando attenzione a mantenere la deformazione entro la regione lineare del comportamento sollecitazione-deformazione. Il campione del rivestimento è stato vulcanizzato su poliestere in una pellicola di 75-micron con una dose di raggi UV di J/cm$^2$. La lampada utilizzata è una lampadina alogena ai vapori di mercurio con una potenza di 300W/pollici.

Questa esposizione ai raggi UV è sufficiente ad assicurare che il materiale si trovi sul plateau della curva dose/modulo. I dati evidenziano che il modulo d'equilibrio si aggira intorno a 1,5MPa. Sulla fibra questo rivestimento presenta generalmente una buona vulcanizzazione con un modulo di circa 0,8MPa, un livello tipico della maggior parte dei rivestimenti primari delle fibre monomodali nel settore industriale.

Le ragioni della discrepanza fra il modulo della pellicola e il modulo in situ sono illustrate in dettaglio nei riferimenti bibliografici da[8] a [10].

Il valore $T_g$ stimato vicino al valore massimo del tan$\delta$ è pari a circa -30°C. Pertanto, il rivestimento, ed altre formulazioni similari, risponderanno come un vetro a temperature estremamente ridotte da -40 a -50°C. (Si tratta di un quadro incompleto, poiché vi è una relazione tra il tempo e la sollecitazione indotta dalla deformazione a bassa temperatura, tuttavia il valore $T_g$ resta un utile parametro di comparazione).

La *Figura 3* illustra le proprietà meccaniche dinamiche del nuovo rivestimento primario, utilizzando un campione di pellicola realizzato come nell'esempio sopra citato. Nella *Figura 3* il nuovo rivestimento primario presenta un modulo d'equilibrio di poco inferiore a 1MPa nella pellicola vulcanizzata, mentre sulla fibra il modulo in situ si misura generalmente da 0,3 a 0,4MPa, che è il valore previsto. Nell'ottica di migliorare la protezione a basse temperature contro la micropiegatura indotta da sollecitazioni, la temperatura di transizione vetrosa viene spostata ad oltre 20°C in meno rispetto al rivestimento convenzionale descritto nella *Figura 2*. Si deve pertanto prevedere un rilassamento delle tensioni molto più rapido imposto durante le escursioni di temperatura. I risultati dei test progettati per analizzare la protezione contro la micropiegatura sono illustrati nella sezione successiva.

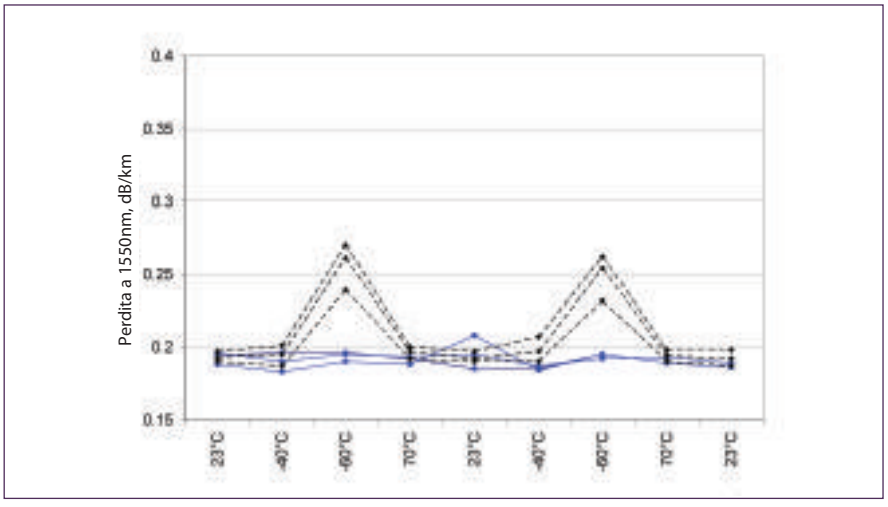
### *3.2 Sensibilità alla micropiegatura*

Ai fini di una comparazione relativamente alla sensibilità alla micropiegatura fra la fibra commerciale con rivestimento primario tradizionale e la fibra provvista del nuovo sistema di rivestimento, sono stati utilizzati due diversi metodi di valutazione.

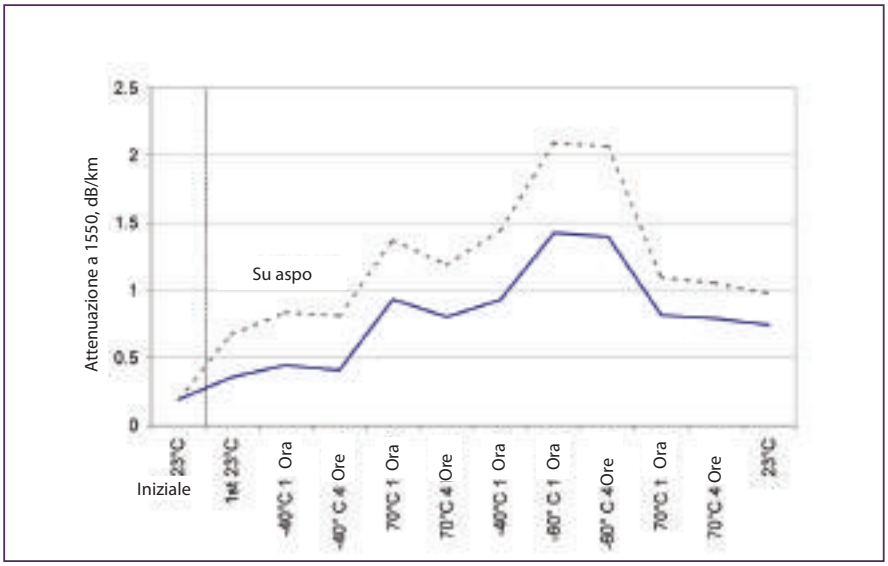
Entrambi i metodi sono studiati per offrire condizioni di sollecitazione laterale estreme (ove il secondo metodo si spinge decisamente oltre a ciò che si incontra normalmente sul campo). Dopo aver misurato l'effetto sull'attenuazione a temperatura ambiente, le strutture di prova possono essere sottoposte a variazione ciclica della temperatura per determinare la perdita aggiuntiva indotta dalle escursioni di temperatura.

La prima prova è costituita da un procedimento di avvolgimento su aspo/variazione ciclica della temperatura. La fibra campione è avvolta con una tensione di 50 grammi su un cilindro al quarzo del diametro di 300mm ed un passo di 9mm. Ciò crea numerosi incroci da fibra a fibra durante l'avvolgimento dei 50 strati sull'aspo. Gli incroci possono provocare una perdita aggiuntiva a temperatura ambiente se la fibra è abbastanza sensibile, ma normalmente a questo punto si registrano perdite aggiuntive trascurabili o nulle. Nel presente esperimento, l'aspo con la fibra avvolta viene sottoposto a variazioni cicliche di temperatura (-40°C/-60°C/+70°C/23°C) per due volte e vengono contemporaneamente effettuate misurazioni delle perdite a 1550nm dopo un'ora alla temperatura dei cicli.

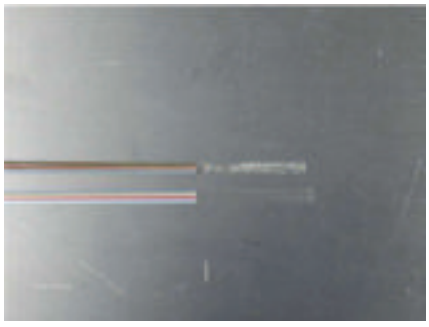
La *Figura 4* illustra i risultati tipici per i campioni del nuovo sistema di rivestimento rispetto ai campioni di un sistema commerciale tradizionale. Entrambi i sistemi di rivestimento utilizzano rivestimenti secondari colorati, ma diverse formulazioni del rivestimento secondario. I prototipi della fibra sono stati selezionati per essere compatibili con la geometria del rivestimento, il diametro del campo modale e la lunghezza d'onda di taglio.




▲ **Figura 4**: Risultati delle prove di avvolgimento su aspo/variazione ciclica del*la temperatura per il sistema di rivestimento monomodale commerciale tradizionale (linea tratteggiata) ed il sistema di rivestimento ottimizzato (linea continua)*




▲ **Figura 5**: *Risultati delle prove di avvolgimento su aspo di carta vetrata/variazione ciclica della temperatura per il sistema di rivestimento monomodale commerciale tradizionale (linea tratteggiata) ed il sistema di rivestimento ottimizzato (linea continua)*



▲ **Figura 6**: *Esempio di spellatura del nastro con il sistema di rivestimento ottimizzato (fondo) rispetto al sistema di rivestimento commerciale tradizionale su nastro*

I due diversi sistemi di rivestimento offrono entrambi una buona protezione contro le sollecitazioni da micropiegatura a 23°C. A -40°C il tipico rivestimento primario commerciale è prossimo al relativo $T_g$ ma offre comunque una buona protezione contro la micropiegatura tramite rilassamento dello sforzo entro un tempo ragionevole. È possibile apprezzare solo una lieve perdita aggiuntiva a -40°C nel rivestimento primario convenzionale e nessuna perdita nella fibra con rivestimento primario ottimizzato. Analogamente a -60°C, il rivestimento primario ottimizzato è prossimo al relativo $T_g$, e offre una protezione simile, ma il rivestimento primario convenzionale è ora decisamente inferiore al valore $T_g$ e le fibre presentano una perdita aggiuntiva. Per ottenere un ambiente di micropiegatura più aggressivo, è stata modificata la prova con l'aspo di carta vetrata IEC[7] del secondo metodo per offrire una rigorosa condizione di sollecitazione da micropiegatura abbastanza solida da influenzare le fibre monomodali persino a temperatura ambiente.

A questo scopo, un aspo al quarzo del diametro di 300mm è stato rivestito con carta vetrata adesiva con grano della grossezza pari a 40, creando così una superficie molto ruvida attorno alla quale è stato avvolto un singolo strato di fibre ad una tensione pari a 100gr. Utilizzando dei campioni di fibre simili a quelle della prova di avvolgimento su aspo/variazione ciclica della temperatura, l'attenuazione a 23°C è stata misurata dopo l'avvolgimento. Quindi gli aspi sono stati sottoposti a cicli di temperature estreme, questa volta misurando l'attenuazione a 1550nm dopo un'ora e nuovamente dopo quattro ore a temperatura. I risultati sono illustrati nella *Figura 5*.

La misurazione iniziale a 23°C effettuata mentre la fibra si trovava sugli aspi originali presenta una simile perdita di circa 0,19dB/km per questi campioni di fibra. Una volta avvolti gli aspi, sempre a temperatura ambiente, il modulo inferiore del rivestimento primario ottimizzato offre una protezione notevolmente migliore rispetto al rivestimento primario convenzionale, con un terzo della perdita aggiuntiva. In tutta la gamma di temperature estreme e di condizioni di asperità degli aspi, la fibra con rivestimento ottimizzato offre una risposta con valori di micropiegatura notevolmente inferiori rispetto al sistema commerciale convenzionale.

### *3.3 Rivestimento secondario colorato*

Il rivestimento secondario per il sistema ottimizzato è stato riformulato per ottenere una migliore luminosità e visibilità con ogni tipo di illuminazione. I colori sono conformi alle norme Munsell per quanto riguarda la codifica a colori delle fibre ottiche e si possono distinguere facilmente su sfondi luminosi e scuri. I perfezionamenti apportati alle colorazioni hanno richiesto una maggiore concentrazione dei sistemi di pigmentazione in questo nuovo rivestimento secondario, nonché un miglioramento nel pacchetto di vulcanizzazione fornito.

Il rivestimento presenta una superficie caratterizzata da un'eccellente interfaccia con il materiale matrice del nastro che consente una facile separazione della matrice dalla fibra colorata senza comprometterne la robustezza.

Le proprietà meccaniche del rivestimento secondario colorato si compensano con quelle del rivestimento primario cosicché durante la spellatura termica l'insieme rivestimento/matrice si separa perfettamente dalle fibre di vetro (*Figura 6*).

## 4 Conclusioni

È stato sviluppato un sistema perfezionato di rivestimento a due strati delle fibre monomodali, ottimizzato per applicazioni FTTx. Il nuovo sistema presenta un rivestimento primario più morbido con eccellenti caratteristiche a bassa temperatura per la protezione contro la micropiegatura in qualunque ambiente e in condizioni fisiche estreme.

É stato abbinato un nuovo rivestimento secondario colorato caratterizzato da un colore più resistente e vivace con il rivestimento primario. Il nastro del rivestimento secondario presenta caratteristiche migliorate e permette di ottenere strutture robuste ma facilmente accessibili. Anche il rivestimento a due strati è specificamente equilibrato per consentire una spellatura termica di qualità superiore nel nastro, praticamente senza alcun residuo sul vetro, e facilitare giunzioni e terminazioni rapide. I perfezionamenti nel sistema di rivestimento offrono vantaggi significativi per l'installazione in qualsiasi progetto dei sistemi FTTx. ■

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# Gama de extractoras con unidades de tracción de oruga para uso extra pesado

▲ *La nueva máquina de Gillard ofrece cintas más largas para aplicar una presión menor en los productos extruidos*

Gillard ha ampliado su gama de unidades de arrastre de orugas de precisión.

Las máquinas nuevas son versiones de cinta extralarga de la reconocida gama de productos. Ahora hay disponibles cintas de dimensiones ampliadas de 1500mm y 1800mm de longitud y de 225mm y 300mm de anchura.

Gillard afirma que estas cintas más largas permiten aplicar esfuerzos de tracción mayores con una presión de agarre considerablemente inferior en los productos extruidos. Esto evita deformar y dañar el material, sobre todo en el caso de productos delgados.

Las nuevas orugas llevan también una unidad de accionamiento de las cintas mejorada, con servomotores de CA de acoplamiento directo. Se utilizan dos servoaccionamientos digitales con configuración master/slave para optimizar el control de velocidad.

La cinta superior ha sido estudiada para "flotar" sobre cualquier bulto o protuberancia durante el arranque de la línea de extrusión. La unidad superior se apoya en dos cilindros neumáticos por ambos lados. Esto permite a la cinta levantarse y bajarse automáticamente para adaptarse a los bultos, manteniendo al mismo tiempo un agarre adecuado sobre el material extruido.

Las máquinas están dotadas de todos los dispositivos de protección según las últimas normas CE. Gillard ofrece una amplia gama de opciones para personalizar las máquinas según los requisitos de los usuarios.

**Peter Gillard & Co Ltd – Reino Unido**
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**Website**: www.gillard.co.uk

## Cables Nexans en el corazón del sistema de transporte de equipajes del aeropuerto de Pekín

Nexans ha suministrado más de 2.500Km de cables de alimentación y control a China en el ámbito de un contrato valorado en unos 2,6 millones de euros en total. Estos cables juegan un papel fundamental en el funcionamiento del moderno sistema de transporte de equipajes de la nueva Terminal 3.

Nexans fue seleccionada como único proveedor de cables para este proyecto por varias razones. En primer lugar, los cables de Nexans cumplen todas las normas requeridas para aplicaciones en aeropuertos, incluida la flexibilidad y aislamiento sin halógenos. Además, Nexans podía suministrar todos los tipos de cables necesarios: alimentación, control y fibra óptica. Por último y más importante, Nexans podía efectuar una entrega rápida que permitiría acortar los tiempos de construcción (la mayoría de proyectos análogos importantes tardan unos cinco años). El sistema de transporte de equipajes de la Terminal 3 de Pekín tardó tan sólo tres años en pasar de la fase de proyecto inicial a la de puesta en marcha.

El sistema es considerado uno de los más grandes y más modernos, con capacidad para clasificar y transportar hasta 19.200 maletas por hora. La nueva Terminal 3 del aeropuerto de Pekín, que fue inaugurada en marzo de 2008, tiene más del doble de capacidad de la que tenía antes el aeropuerto pasando de 30 a 66,5 millones de pasajeros al año.

Unos 330 mostradores de facturación están conectados a un transportador de bandeja de alta velocidad de 68Km de longitud. Las maletas son transportadas por un túnel de 2,2Km a una velocidad de 36Km/h desde los mostradores de facturación de la Terminal 3A hasta los vagones de carga de la Terminal internacional 3B.

Los cables de cobre fueron fabricados en las plantas alemanas de Nexans y la fibra óptica en la fábrica belga Opticable de Nexans.

**Nexans – Francia**
**Fax**: +33 15669 8484
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# Nueva gama de cables de control para el sector de máquinas herramienta

▲ *Chainflex® CF77/CF78*

La compañía igus®, especializada en accesorios y cadenas portacables para la transmisión de energía, ha desarrollado una nueva gama de cables de control a usar en las cadenas portacables del sector de máquinas herramienta. Los cables Chainflex® CF77 y CF78, resistentes al aceite, han sido estudiados para aplicaciones dinámicas con gran número de ciclos y altas cargas.

Los cables CF77 y CF78, resistentes a la llama y sin halógenos, están trenzados en capas cuando tienen 7 o un número inferior de conductores (tensión nominal U0/U 300/500 Voltios) y trenzados en fajos cuando tienen 12 o más conductores (U0/U 300/300 Voltios).

Los cables están trenzados en fajos alrededor de un cordón central de alta resistencia a la tracción para evitar tirabuzones y la rotura de los hilos. A pesar de eso, el diámetro externo de los cables de control tiene dimensiones reducidas comparables a las de los modelos que están trenzados solamente en capas.

La cubierta externa de poliuretano (PUR) extruido bajo presión rellenando todos los huecos y las cavidades del trenzado, ofrece alta resistencia al rozamiento y a la flexión, asegurando mayor estabilidad, siendo además retardante de la llama y sin halógenos.

**igus UK Ltd – Reino Unido**
**Fax**: +44 1604 769514
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## Draka cierra la fábrica de hilo de cobre de Llanelli

El consejo directivo de Draka Holding NV, siguiendo las directrices del programa Stop, Swap and Share (Triple S) de Draka, ha anunciado su intención de parar la producción de hilo de cobre en su fábrica de Llanelli (GB) y consolidar la producción en otras plantas europeas, donde el estirado de alambre ya forma parte del proceso de fabricación integrado.

La planta de Llanelli, que se dedica a la producción de hilo de cobre, forma parte de la división europea de energía e infraestructura y tiene empleadas a unas 135 personas. Las ventas a terceros servidas por la planta de Llanelli serán absorbidas por la planta de Draka en Derby, en el Reino Unido.

El cierre de Llanelli ha sido discutido con el Comité de Empresa Europeo y, a parte, con el Comité de Empresa Nacional del Reino Unido.

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# Contrato olímpico para Prysmian

Prysmian Cables and Systems, una de las mayores empresas italianas presentes en China, concluyó un proyecto de alto valor para los Juegos Olímpicos de Pekín 2008 en el que desarrolló la red de alimentación de alta tensión de la ciudad olímpica.

Prysmian puso en servicio 20Km de cables de alta tensión a 200KV para suministrar electricidad a la ciudad olímpica, que se extiende por más de 66 hectáreas de terreno.

La marca de Prysmian quedó impresa también en el Centro de Radiodifusión Internacional, desde donde RAI, primera emisora televisiva italiana, transmitió las imágenes de las Olimpiadas. El grupo cableó todo el centro de radiodifusión de RAI, donde efectuó conexiones de alto nivel técnico capaces de garantizar la máxima calidad de transmisión.

Prysmian suministró todos los cables de los medios pasivos y cables LAN, conformes a las especificaciones de RAI, como: cables y conectores de radiodifusión para los medios de comunicación; cables y conectores de audio; cables UTP Categoría 5E y Categoría 6 para redes LAN; fibra multimodo para la red troncal de transmisión y transmisión por banda ancha, además de cables y conectores de radiofrecuencia.

Prysmian tiene cinco plantas de producción en China, situadas en Tianjin (cables especiales para aplicaciones industriales), en Baoying, en la provincia de Jiangsu, (cables y sistemas de alta tensión) y en Wuxi, también en la provincia de Jiangsu, (cables ópticos y de cobre para telecomunicaciones). Juntas suman más de 1.000 empleados. Prysmian Shanghai Trading importa y distribuye la gama de vanguardia de Prysmian en accesorios para cables de media y alta tensión.

Prysmian ha abierto recientemente una planta nueva en Pekín y tiene planeado aumentar en un 50% aproximadamente sus actividades chinas para el 2010, potenciando sus inversiones para incrementar sus capacidades productivas.

Las inversiones de Prysmian en China, sumando las ya realizadas y las previstas, ascienden a más de 100 millones de euros en total.

Prysmian participa en otros proyectos importantes en China, incluido el desarrollo de una red de alimentación de alta tensión nueva en Shangai, el cableado del metro de Pekín y el desarrollo e instalación, por cuenta de la Compañía de Ingeniería de Energía Nuclear China, de cables especiales de alta tecnología para dos centrales nucleares que se están construyendo en las provincias de Liaoning y Fujian.

**Prysmian Cables & Systems – Italia**
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# Nuevo sistema de revestimiento de fibra óptica para aplicaciones FTTx

Por Bob J Overton, Draka Comteq, Claremont, Carolina del Norte, EE.UU., y Xavier Meersseman, Draka Comteq, Billy Berclau, Francia


## Resumen

La instalación de redes de cables de fibra óptica hasta el local, la empresa, el hogar, llamadas FTTx (sigla inglés por "fibra hasta cualquier punto x"), que lleva la tecnología de transmisión de datos de banda ancha hasta el usuario final, se está expandiendo rápidamente por todo el mundo. En este estudio, los autores presentan las características principales de las prestaciones de un nuevo sistema de revestimiento diseñado para aplicaciones FTTx, en las cuales los cables robustos convencionales resultan poco prácticos.

El sistema de revestimiento, que puede ser usado con fibra óptica de tipo "bend insensitive" (que evita la pérdida de señal por curvaturas acentuadas), o bien con fibra G.652 u otros tipos, ofrece mayor protección contra las microcurvaturas inducidas por los esfuerzos. Presenta un módulo bajo, un revestimiento primario con temperatura de transición vítrea $T_g$ muy baja que permite amortiguar mejor los esfuerzos laterales y axiales debidos a contacto externo o baja temperatura, y un nuevo pigmento de color mejorado incorporado en el revestimiento secundario para más brillo y mejor visibilidad sin necesidad de aplicar tintas.


## 1 Introducción

Para la instalación de redes FTTx se utilizan sistemas innovadores de coste reducido que facilitan la difusión de esta tecnología. Por ejemplo, la fibra puede ser llevada en el último enlace (o enlaces) en forma de micro cable[1], [2], [3]. Otro método eficaz para llevar el enlace a la terminación del usuario final es la fibra soplada[4]. Todos los sectores industriales siguen interesados en buscar métodos de instalación capaces de superar los obstáculos económicos para el despliegue de soluciones de banda ancha de fibra para la transmisión de datos hasta la empresa o el hogar.

Las propuestas de distintas metodologías son muchas y bien conocidas por el lector.

Un factor clave para conseguir un sistema FTTx de éxito es su bajo coste. Las dimensiones reducidas de los cables, de las derivaciones y de las estructuras para el soplado también son factores críticos, dado que la instalación de canalizaciones para cables convencionales es a menudo prohibitiva en la infraestructura existente y debe ser posible utilizar los conductos pequeños o los recorridos ajustados existentes para las nuevas instalaciones de fibra.

La necesidad de tener cables económicos y de dimensiones lo más pequeñas posible lleva a reducir la protección de las fibras ópticas, reduciendo las prestaciones de los cables convencionales robustos y más voluminosos.

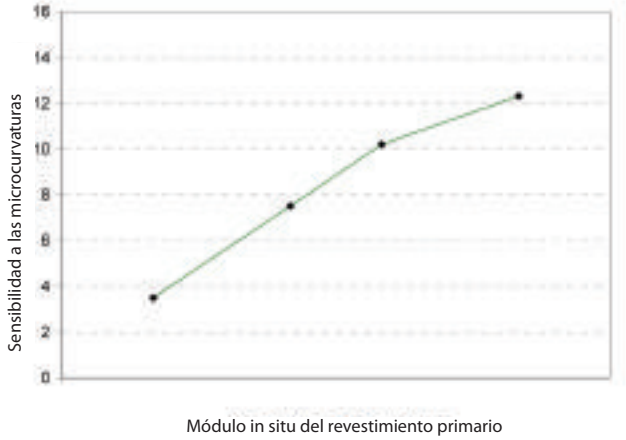
Hoy en día existen diseños del vidrio con menor sensibilidad a radios de curvaturas acentuados, como los con recubrimiento del núcleo modificado con flúor (*trench-assisted*)[5] o con huecos (*hole-assisted*), que ayudan a mantener la luz en el núcleo. Los diseños del vidrio con diámetro del campo modal más bajo son menos sensibles a los esfuerzos de microcurvatura, pero no son compatibles con la fibra monomodo G.652. Por lo tanto, es necesario tener una protección adicional contra la microcurvatura para asegurar una instalación exitosa en todas las aplicaciones de sistemas FTTx. Para ello se presenta un nuevo sistema de revestimiento optimizado para soluciones FTTx, que permite tener fibras y cables adecuados para este tipo de instalaciones.

## 2 Diseño del revestimiento

Durante el desarrollo de revestimientos multimodo de alta calidad se ha observado la ventaja de reducir el módulo del revestimiento primario.

La *Figura 1* muestra la relación observada entre el módulo de los revestimientos primarios en la fibra y la sensibilidad a las microcurvaturas de la fibra óptica.

Las fibras presentadas en este estudio son de tipo multimodo con índice graduado de 50µ. El módulo del revestimiento primario está caracterizado por un método de medición in situ, curado en la fibra[6].




▲ **Figura 1**: *Sensibilidad a las microcurvaturas frente al módulo del revestimiento primario para fibra multimodo de 50µ*

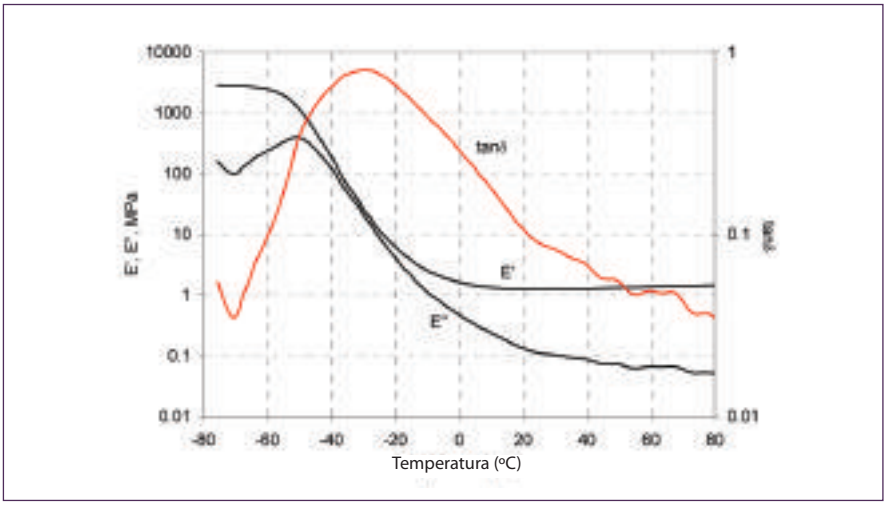
La sensibilidad a las microcurvaturas se obtiene usando el procedimiento de tambor de papel de lija de diámetro fijo[7]. Aunque se puede obtener un módulo más bajo en el revestimiento primario con un curado de la fibra limitado, se quiere ajustar el revestimiento para alcanzar un módulo más bajo con curado casi total. El módulo buscado está comprendido entre 0,3 y 0,4 MPa para reducir al mínimo la sensibilidad a curvatura.

Un módulo más bajo para el revestimiento primario implica una densidad de reticulación más baja y, por lo tanto, menor concentración de grupos de acrilatos reactivos. Los grupos de acrilatos responden con la reticulación a través del mecanismo de polimerización mediante radicales libres, después de la fotoiniciación inducida por las lámparas de curado por UV durante el trefilado. Los principios de cinética sugieren una velocidad de curado reducida durante el procesamiento, a menos que no se tomen medidas para modificar el proceso y optimizar el curado. Esto se puede obtener entendiendo la naturaleza del proceso de curado del revestimiento primario.

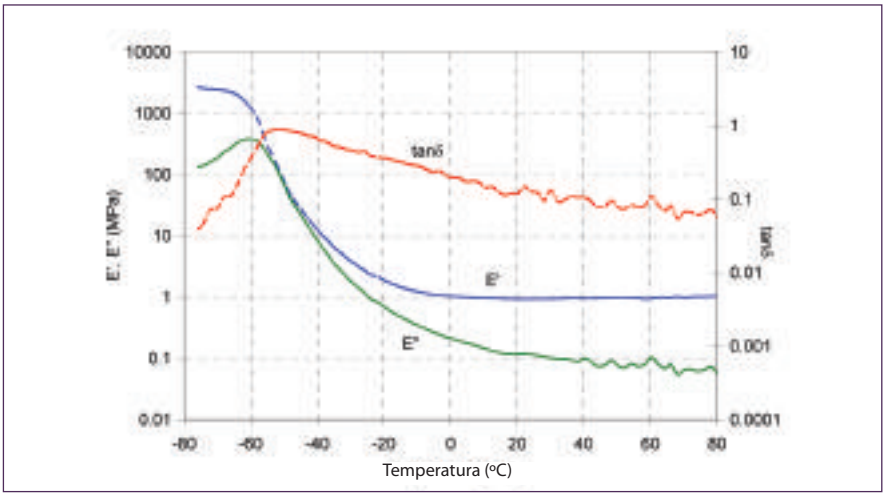
Hay por lo menos dos componentes del proceso de curado que actúan retrasando la velocidad de polimerización del revestimiento primario blando. Primero, la alta temperatura de los revestimientos de curado generada por la exposición a un ambiente de lámparas UV de alta intensidad y las reacciones de polimerización exotérmicas ralentizan la velocidad total observada[8].

Segundo, se ha demostrado que lámparas UV apiladas muy cerca unas de otra crean efectivamente periodos de fotoiniciación repetidos, rápidamente superpuestos. La velocidad de desaparición de los grupos de acrilatos en estas condiciones es retrasada de nuevo. Las lámparas UV han sido dispuestas de manera que el tiempo es aumentado al máximo entre exposiciones a UV repetidas con un aumento significativo del grado de curado del revestimiento, respecto a procesos con la misma velocidad y dosis de UV totales[9], [10]. Por lo tanto, es posible obtener efectivamente un revestimiento primario con un módulo reducido y un curado casi completo a las velocidades de trefilado requeridas de la fibra.

Un segundo aspecto del revestimiento primario para alcanzar una protección mejorada contra las microcurvaturas en aplicaciones FTTx es la dependencia del módulo de la temperatura. Aunque un módulo bajo puede ser característico a temperatura ambiente, la instalación en campo expone la fibra a temperaturas extremas donde pueden originarse esfuerzos que causan microcurvaturas. Por lo tanto, es necesario tener la temperatura




▲ **Figura 2**: *Propiedades mecánicas dinámicas de un revestimiento primario monomodo comercial, frecuencia de oscilación de 1Hz*




▲ **Figura 3**: *Propiedades mecánicas dinámicas de un nuevo revestimiento primario monomodo, frecuencia de oscilación de 1Hz*

de transición vítrea $T_g$ más baja posible de manera que el revestimiento primario quede blando y proteja en todas las situaciones.

Además, se requiere un revestimiento secundario resistente para proteger el revestimiento primario y el vidrio contra daños durante el manejo y la instalación. Este revestimiento puede ser diseñado para ser coloreado según un código de colores o puede incluir el color para identificarlo sin necesidad de colorearlo después.

# 3 Resultados

Se ha desarrollado un nuevo revestimiento primario basado en un revestimiento de un producto multimodo con índice graduado comercial, que ha sido adaptado para ser usado en diseños de fibra monomodo, con el fin de ser instalado en ambientes extremos como los de los sistemas FTTx. El revestimiento secundario de preferencia para proteger la estructura de la fibra presenta un sistema de coloración optimizado incluido en el material que no requiere un estrato adicional de tinta para la codificación con colores. Los nuevos colores son mejorados para ofrecer brillo y visibilidad en situaciones de iluminación débil como, por ejemplo en la sombra o en pozos de inspección.

### *3.1 Propiedades mecánicas*

Las propiedades mecánicas dinámicas de un revestimiento primario comercial típico están ilustradas en la *Figura 2*. Los datos se han obtenido en un analizador mecánico dinámico de TA con frecuencia de oscilación de 1Hz, manteniendo la deformación en la región lineal del comportamiento esfuerzo-deformación.

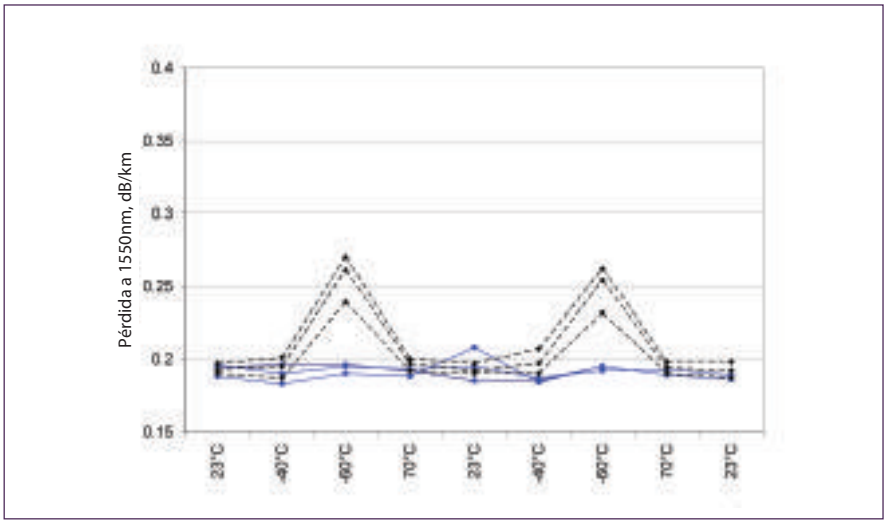
La muestra del revestimiento ha sido curada en poliéster en una película de 75 micrones con una dosis de UV de 1 J/cm$^2$. La lámpara usada es una bombilla de mercurio halogenado con salida de 300 W/pulgada.

La exposición a los UV es suficiente para asegurar que el material esté en plateau de la curva dosis-módulo.

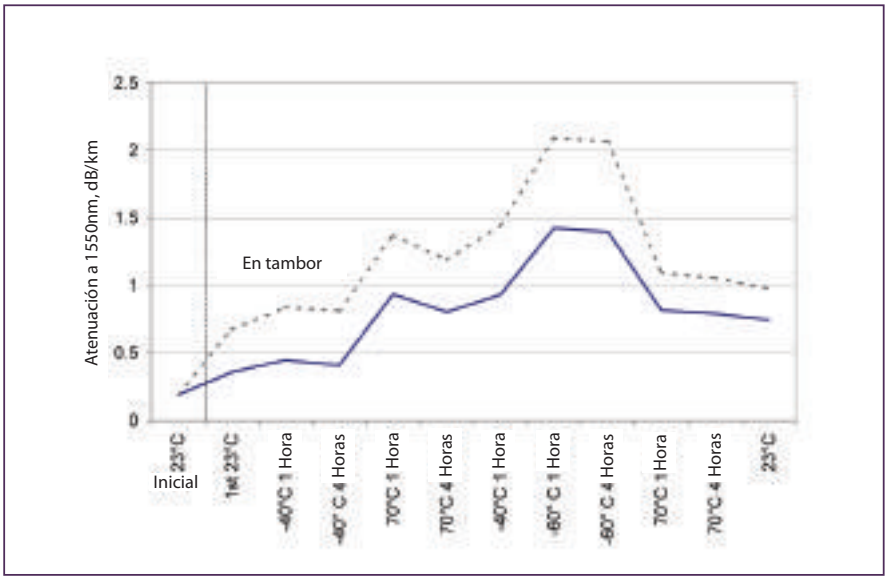
Los datos muestran que el módulo de equilibrio es aproximadamente 1,5MPa. En la fibra, este revestimiento normalmente se cura bien con un módulo de aproximadamente 0,8MPa, un nivel característico de la mayoría de los revestimientos primarios de fibra monomodo. La razón de la discrepancia entre el módulo de la película y el módulo in situ se describen con detalle en los documentos de referencia de[8] a [10].

La "$T_g$", estimada cerca del pico de tanδ, es a aproximadamente -30°C. Por lo tanto, el revestimiento, y otras formulaciones similares, responderán como un vidrio a temperaturas extremadamente bajas de -40 a -50°C. (Se trata de una representación incompleta, dado que existe una relación entre tiempo y esfuerzo por deformación a baja temperatura, pero la "$T_g$" resulta un parámetro útil para la comparación).

La *Figura 3* muestra las propiedades mecánicas dinámicas del nuevo revestimiento primario, usando una película de muestra realizada de manera similar al ejemplo de arriba. En la *Figura 3*, el nuevo revestimiento primario muestra un módulo de equilibrio justo por debajo de 1MPa en la película curada, y en la fibra el módulo in situ es típicamente de 0,3 a 0,4Mpa, que es el valor buscado. Con el fin de mejorar la protección a temperaturas bajas contra las microcurvaturas inducidas por esfuerzos, la temperatura de transición vítrea es desplazada más que 20°C más por debajo respecto a la del revestimiento convencional ilustrado en la *Figura 2*. Por lo tanto se debe esperar una relajación de esfuerzos mucho más rápida impuesta durante las variaciones de temperatura. Los resultados de las pruebas para examinar la protección contra las microcurvaturas son ilustrados en la sección siguiente.




▲ **Figura 4**: *Resultados de las pruebas de enrollado en tambor / ciclos de temperatura para el sistema de revestimiento monomodo comercial convencional (línea descontinua) y el sistema de revestimiento optimizado (línea continua)*




▲ **Figura 5**: *Resultados de las pruebas de tambor con papel de lija/ciclos de temperatura para el sistema de revestimiento monomodo comercial convencional (línea descontinua) y el sistema de revestimiento optimizado (línea continua)*

### *3.2 Sensibilidad a las microcurvaturas*

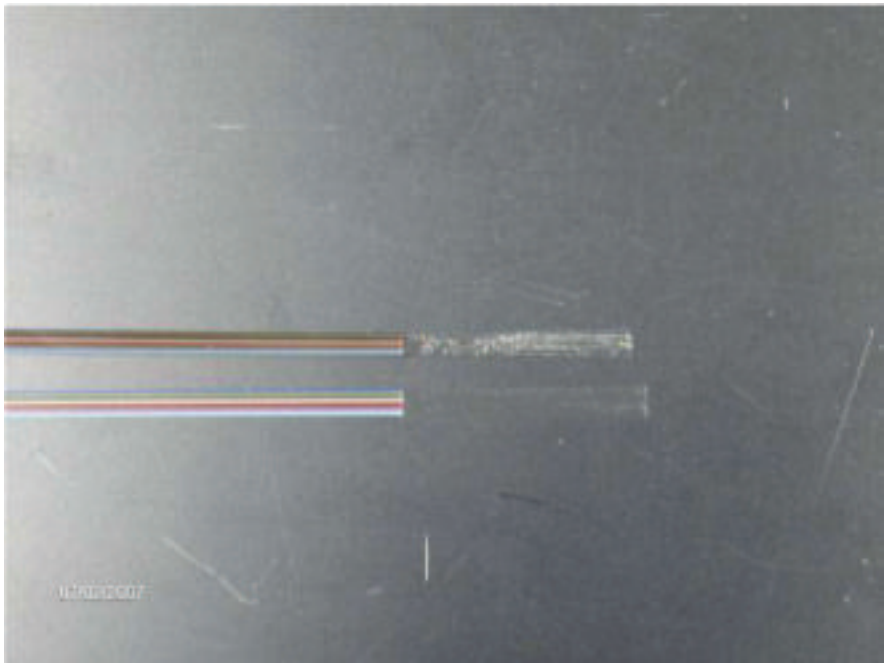
Para establecer una comparación pertinente a la sensibilidad a las microcurvaturas entre la fibra con revestimiento primario comercial convencional y la fibra con el nuevo sistema de revestimiento se han usado dos métodos de evaluación diferentes. Ambos métodos están ideados para proveer condiciones de esfuerzo lateral extremas (donde el segundo método supera efectivamente en mucho los valores que se encuentran normalmente en campo). Después de medir el efecto en la atenuación a temperatura ambiente, las estructuras de prueba pueden ser probadas con ciclos de temperatura para determinar la pérdida adicional inducida por las variaciones de temperatura.

La primera prueba es un procedimiento de enrollado en tambor/ciclos de temperaturas. La muestra de fibra es enrollada con una tensión de 50 gramos en un cilindro de cuarzo de 300mm de diámetro con un "paso" de 9mm. Esto crea numerosos cruces de fibra a fibra durante el enrollamiento de 50 estratos en el tambor.

Los cruces pueden causar pérdida adicional a temperatura ambiente, si la fibra es bastante sensible, pero normalmente no se registran pérdidas adicionales en ese punto. El tambor con la fibra enrollada es probado con ciclos de temperatura, en este experimento con ciclos de -40°C/ -60°C/+70°C/23°C repetidos dos veces, mientras se miden las pérdidas a 1550nm después de una hora a la temperatura de los ciclos.

La *Figura 4* muestra los resultados típicos de muestras del nuevo sistema de revestimiento frente a muestras de un sistema comercial típico. Ambos sistemas de revestimiento utilizan revestimientos secundarios de color, pero formulaciones de revestimiento secundario distintas. Las muestras de fibra han sido seleccionadas para ser compatibles con la geometría del revestimiento, el diámetro de campo modal, y la longitud de onda de corte.

Los dos sistemas de revestimiento ofrecen buena protección contra los esfuerzos de microcurvatura a 23°C. A -40°C el revestimiento primario comercial está cerca de su $T_g$ pero proporciona todavía buena protección contra las microcurvaturas por esfuerzo relajándose en un tiempo razonable. Se registra solamente una pequeña pérdida adicional a -40°C en el revestimiento primario convencional y ninguna en la fibra con revestimiento optimizado. A -60°C el revestimiento primario optimizado está cerca de su $T_g$ proporcionando todavía un nivel de protección similar, pero el revestimiento primario convencional ahora está muy por debajo de la $T_g$ y las fibras muestran pérdida adicional.



▲ **Figura 6**: *Ejemplo de pelado de la cinta con el sistema de revestimiento optimizado (abajo) respecto al sistema de revestimiento comercial convencional en la cinta*

Para obtener un ambiente más agresivo de microcurvatura, se ha modificado la prueba de tambor de papel de lija IEC[7] del segundo método para crear condiciones de esfuerzo de microcurvatura bastante severas como para afectar la fibra monomodo incluso a temperatura ambiente. Para crear esta situación el tambor de cuarzo de 300mm de diámetro ha sido revestido con papel de lija adhesivo de 40 grit de grosor creando una superficie muy áspera alrededor de la cual se ha enrollado un estrato de fibra con tensión de 100 gramos. Usando muestras de fibras similares a las de la prueba de enrollado en tambor/ciclos de temperatura, se ha medido la atenuación a 23ºC después del enrollado. Luego, se han sometido los tambores a ciclos de temperaturas extremas, midiendo esta vez la atenuación a 1550nm después de una hora y de nuevo después de cuatro horas a la temperatura. Los resultados se pueden apreciar en la *Figura 5*.

La medición inicial a 23ºC tomada mientras la fibra estaba en los carretes originales muestra pérdida similar de aproximadamente 0,19dB/km en estas muestras de fibra. Después de enrollar los tambores, todavía a temperatura ambiente, el módulo más bajo del revestimiento primario optimizado ofrece una protección significativamente mejor respecto al revestimiento primario convencional, con un tercio de pérdida adicional. En todo el campo de temperaturas extremas y bajo las duras condiciones del tambor, la fibra con revestimiento optimizado ofrece una respuesta con valores de microcurvatura muy inferiores respecto al sistema comercial convencional.

### *3.3 Revestimiento secundario coloreado*

El revestimiento secundario del sistema optimizado ha sido reformulado para mejorar el brillo y visibilidad con todo tipo de iluminación. Los colores son conformes a las normas Munsell para la codificación con colores de la fibra óptica y se pueden distinguir fácilmente en ambientes iluminados y oscuros.

Las mejoras de coloración han requerido aumentar la concentración de los sistemas de pigmentación en este nuevo revestimiento secundario y mejorar el paquete de curado provisto. El revestimiento presenta una superficie que constituye una interfaz excelente con el material matriz de la cinta, de manera que la matriz se separa fácilmente de la fibra coloreada pero sin sacrificar la solidez.

Las propiedades mecánicas del revestimiento secundario coloreado son equilibradas con las del revestimiento primario de manera que, durante el pelado en caliente, el conjunto revestimiento/matriz se separa perfectamente de las fibras de vidrio (*Figura 6*).

## 4 Conclusiones

Se ha desarrollado un sistema de revestimiento doble de fibra monomodo mejorado y optimizado para aplicaciones FTTx. El nuevo sistema presenta un revestimiento primario más blando con excelentes características a temperaturas bajas para la protección contra las microcurvaturas en cualquier ambiente y en las situaciones físicas más duras.

Junto con el revestimiento primario se ha aplicado un nuevo revestimiento secundario con resistencia y vivacidad de color mejoradas.

La cinta del revestimiento secundario presenta características mejoradas y permite obtener estructuras robustas pero fácilmente penetrables.

El doble revestimiento también es específicamente equilibrado para permitir un pelado de la cinta ideal en caliente virtualmente sin residuos en el vidrio y facilitar empalmes y terminaciones rápidas.

Las mejoras del sistema de revestimiento ofrecen ventajas significativas para el despliegue de cualquier diseño de sistemas FTTx. ■

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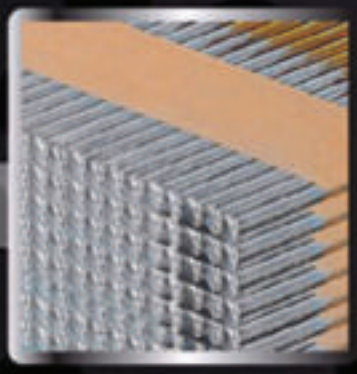

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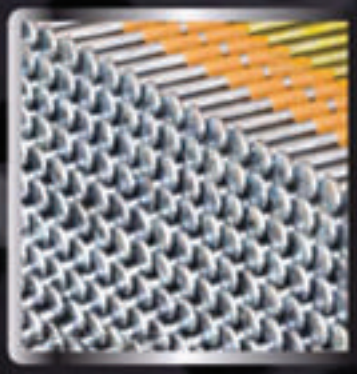

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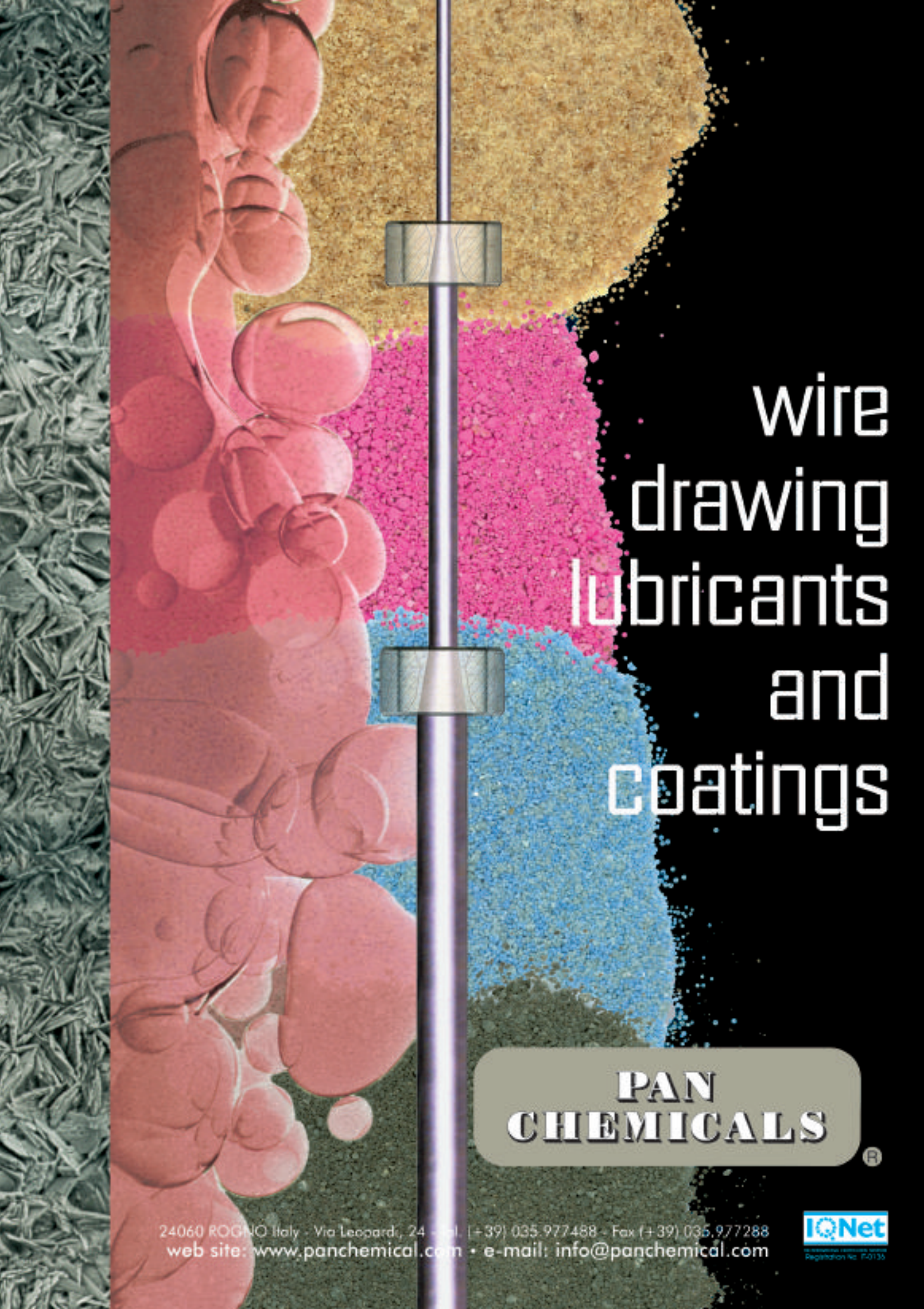
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