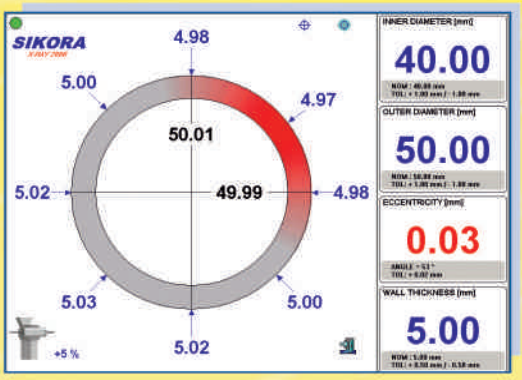
The international magazine for the tube and pipe industries

TUBE & PIPE TECHNOLOGY

FABTECH INTERNATIONAL & AWS WELDING SHOW

November 2007 | Vol 20 No 6 | US$28



X-RAY 2000 monitor image

X-RAY 2000

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- fast centering of the crosshead directly after starting of the extrusion process
- continuous measurement and control of the extrusion line under consideration of the minimum values
- permanent quality control

Quality control and process optimization:

at the extrusion of single and multi layer plastic tubes and pipes

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- **reduction of material over-consumption**
- **increased productivity**
- **approach as simple as a diameter gauge**

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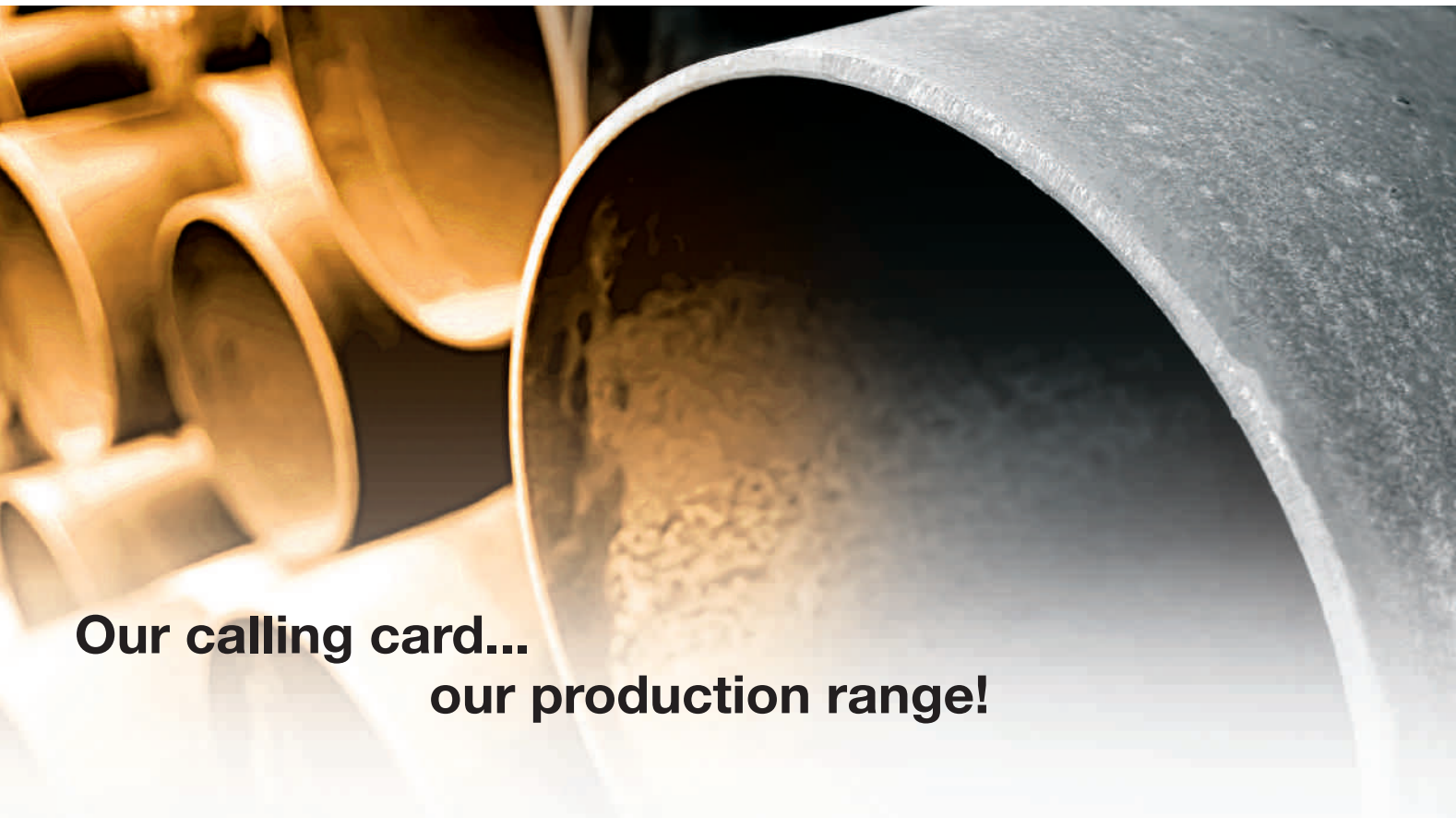

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EDITORIAL INDEX

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ENTRY

- Shear & Welder
- S. Accumulator
- Edge Miller



FORMING

- Sticker Stand
- Transition
- Cage Forming
- Fin Pass



WELDING

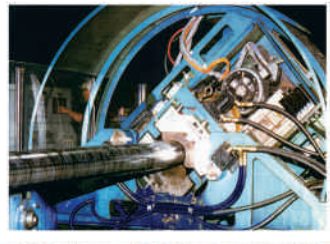
- Weld Stand
- H.F. Welder
- Seam Annealer
- Pull Out Stand




SIZING & CUT-OFF

- Sizing Stand
- Turks Head
- Cut-off



FINISHING

- End Facing
- Hydrostaitc Tester
- Off Line & Full Body Ultrasonic Tester



Contents

Sleepless in Chicago? Hopefully not

Although Margaret Thatcher claimed to have survived on only four hours sleep a night during her time as the UK's prime minister, it is not possible for the majority of us lesser mortals to function with serious fatigue. The general consensus says that 7-9 hours of sleep a night is the ideal to ensure a tip-top condition the next day.

According to a US study in Business Week magazine, sleep deprivation costs *'$45 billion a year in lost productivity, health-care bills and expenses relating to traffic accidents'*. The National Sleep Foundation, in its last study of adult sleep in the USA, found that 75 per cent of respondents reported having some form of sleep problem, with 44 per cent stating that it had a negative impact on their daily activities.

There is clearly a correlation between sleep problems and the turbulence of modern living (take, for example, the current concern over the global economy). Sleep is a great leveller, and quality sleep is just as important to the operator of a tube cutting line as a company's busy managing director. Like the natural instinct for sleep, bad decisions due to fatigue are universal.

For those in our industry travelling frequently on business – especially attending the many tube and pipe exhibitions each year – it is even more important to get a good night's sleep. Jetlag can be one of the worst causes of insomnia, sleep apnoea and other sleeping troubles. Sleep experts advising business travellers recommend optimum lighting, good room temperatures, sensible drinking, cat-naps and business class air travel.

So those like me travelling to this year's Fabtech exhibition in Chicago should all make a concerted effort to sleep well, so that nothing gets in the way of doing business.

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TUBE & PIPE TECHNOLOGY

The global magazine for the international industry

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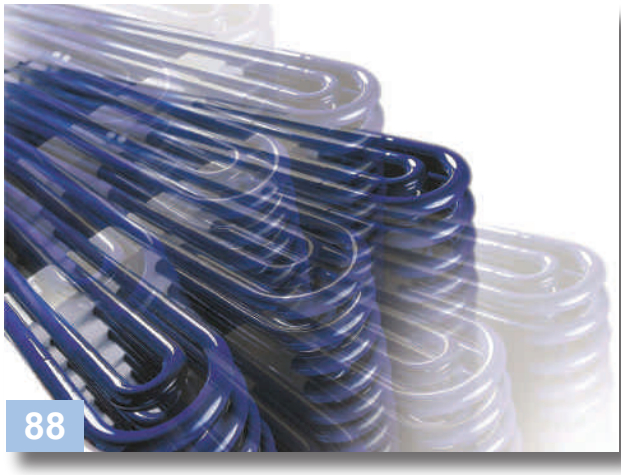

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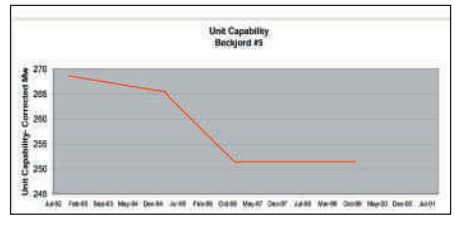

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FMA gambling on success in Las Vegas

Following two thriving intervening shows in Cleveland (2004) and Atlanta (2006), the organisers of Fabtech and the AWS Welding show have revealed the 2008 show will be held in Las Vegas from 6-8 October.

With a larger show held every odd year in Chicago, Fabtech's sojourn to Las Vegas is expected to take advantage of the city's reputation as a successful and popular venue for trade shows.

Las Vegas hosts the largest number of trade shows and has become one of the top business destinations in the world. The city welcomes over 6 million convention and trade show delegates a year.

The announcement to take the show to Las Vegas for the first time signals the show organiser's long-term plans to rotate the event between the USA's midwest, southeast, and west coast.

> ***Las Vegas has become one of the top business destinations in the world...and welcomes over 6 million show delegates a year***

This year's Chicago event in November is promising to be one of the best ever shows on record, and should provide a great launch pad for the 2008 event in Las Vegas.

Fabtech is co-sponsored by the Fabricators & Manufacturers Association, International (FMA), Society of Manufacturing Engineers (SME), and American Welding Society (AWS). It is the only annual North American event dedicated to showcasing a full spectrum of sheet metal forming and fabricating, tube/pipe and welding equipment and technology.

The organisers predict that around 20,000 people from around the world will visit more than 800 exhibits at the Las Vegas Convention Center. *"Our customers expressed interest in a West Coast location for the Fabtech International & AWS Welding Show several years ago. Exhibitors wanted an opportunity to reach the large number of metal fabricating technology users located in the western region of the US,"* said SME executive director Mr Mark Tomlinson.

Las Vegas will welcome the Fabtech and AWS Welding Show in 2008

The glitz and glamour of Las Vegas should provide an interesting and entertaining host city for all those attending the event in 2008

"After much research and careful consideration, we concluded Las Vegas has the potential to attract a high number of attendees that traditionally do not visit this show when it's held in other locations like Chicago," added FMA president Mr Jerry Shankel.

AWS executive director Mr Ray Shook supports the decision to hold the show in Las Vegas. *"Welding technology touches a vast number of applications and vocations. Many welding and cutting companies have participated in other Las Vegas trade shows,"* said Mr Shook.

"We are excited to participate in a metal fabrication show west of the Rockies," said Mr Burke Doar, vice president of sales and marketing for Trumpf Inc, *"No other city in the US does a better job of attracting exhibitors and attendees than Las Vegas."*

"We plan to provide all of their exhibitors and attendees with their greatest trade show experience yet," said Mr Chris Meyer, vice president of convention centre sales, Las Vegas Convention and Visitors Authority.

Future show dates and locations for Fabtech include a return to Chicago from 15-18 November, 2009, and Atlanta again from 2-4 November, 2010.

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Society of Manufacturing Engineers (SME) – USA
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Steel Tube Institute introduces redesigned website

The Steel Tube Institute, USA, which represents the steel tube and pipe producers of North America, has launched its newly redesigned website.

The new website incorporates a complete redesign, and a simplified navigation system that enables visitors to quickly find the areas and information that have been most frequently requested on the site.

It also contains technical, manufacturing, size-range and application information about structural steel tubing (HSS), steel conduit, as-welded mechanical and DOM tubing, and standard pipe.

The website serves as a resource for architects, fabricators, engineers, contractors and others who design, specify and use pipe and tube products.The STI website also contains information about tube and pipe producers, technical contacts, technical papers, video segments and other information.

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Linde Group acquires Turkish industrial gases company

The Linde Group, Germany, has acquired the Turkey based industrial gases company Birlesic Oksijen Sanayi AS (BOS), a subsidiary of the Koc group, at an enterprise value of approximately US$120mn, following the receipt of unconditional approval from the antitrust authorities.

BOS operates with industrial and speciality gases. In the fiscal year 2006, the company generated sales of approximately US$40mn and employed a staff of around 180. "*With this acquisition we have complemented our product range in the important strategic Turkish market, and neighbouring markets of the Middle East,*" said Dr Aldo Belloni, member of the executive board of Linde.

The takeover of BOS is Linde's second major transaction in Turkey, having acquired Karbogaz AS in July 2006.

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DIARY OF TUBE EVENTS

2007

NOVEMBER

11-14 **Fabtech/AWS Welding Show**
Chicago, USA
Exhibition
Email: information@fmafabtech.com
Website: www.fmafabtech.com

13-16 **Tube & Pipe Central Asia**
Almaty, Kazakhstan
Exhibition
Email: info@expocentralasia.com
Website: www.expocentralasia.com

DECEMBER

04-05 **AutoRussia 2007**
St Petersburg, Russia
Exhibition
Email: amir.sebahat@wbr.co.uk
Website: www.wbr.co.uk/autorussia

2008

FEBRUARY/MARCH

12 **Pipe Dream India 08**
New Delhi, India
Conference
Email: info@itatube.org
Website: www.itatube.org

13-15 **Tube India**
New Delhi, India
Exhibition & Conference
Email: kueppersS@messeduesseldorf.de
Website: www.tube.de

28-02 **BORU**
Istanbul, Turkey
Exhibition
Email: info@ihlasfuar.com
Website: www.ihlasfuar.com

MARCH/APRIL

31-04 **Tube Düsseldorf**
Düsseldorf, Germany
Exhibition
Email: liedtkeM@messeduesseldorf.de
Website: www.tube.de

MAY

27-30 **Tube Russia**
Moscow, Russia
Exhibition
Email: wolfgramc@messe-duesseldorf.de
Website: www.metallurgy-tube-russia.com

JUNE

02-04 **Middle East Plastic Pipes**
Dubai, United Arab Emirates
Exhibition
Email: sh@amiplastics.com
Website: www.amiplastics.com

SEPTEMBER

23-26 **Tube China**
Shanghai, China
Exhibition
Email: tube@mdc.com.cn
Website: www.mdc.com.cn

OCTOBER

06-08 **Fabtech/AWS Welding Show**
Las Vegas, USA
Exhibition
Email: information@fmafabtech.com
Website: www.fmafabtech.com

2009

JANUARY

11-14 **Tube Arabia**
Dubai, United Arab Emirates
Exhibition
Email: alfajer@emirates.net.ae
Website: www.tekno7.info

Sikora extends global headquarters in Bremen

Sikora, Germany, has increased the capacity of its headquarters in Bremen, with a new building that offers about 1,000m² more space for production and research and development.

With over 30 years experience in the field of measuring and control technology for the wire/cable and tube/pipe industries, Sikora has expanded in order to accommodate its increased staff levels that has risen by 30 per cent since the end of 2006.

The company's new international business premises was established in Bremen at the start of 2007. The new building, directly connected to the two existing buildings, offers 1,000m² for the research and development departments as well as enlarged space for production. An additional building was opened at the start of September for use by Sikora's purchasing department.

For many years, Sikora AG has been extremely profitable in the field of measuring and control technology for wire and cable. The expansion is partially due to the widening of its product range for the hose and tube sector.

View over the Sikora business premises in Bremen: Since January 2007 a modern new building (top right) has been providing further capacities for research and development. Moreover, since September 2007 an additional building (left corner) has been available to the Sikora purchase department

In 2006, Sikora achieved an annual turnover of €17 million, equating to a turnover increase of 15 per cent compared to the previous year.

Increased customer demands for powerful measuring devices led to a need for employees and larger production space. Sikora, which was originally made up of a one-man-company, has more than 150 employees worldwide today. The first-class products, which are based on X-ray and laser technology, are exclusively made in Bremen, Germany.

International representatives in the USA, China, Russia, Korea, India, Italy and the Ukraine as well as more than 30 regional offices guarantee sales and services on site.

The increase of the contract volume and the workforce resulted in the decision for the extension of the global headquarters of Sikora in Bremen.

Sikora's success can be attributed to continual product development and adaptation to the demands of the global market. The company fulfils all requirements in accordance with DIN EN ISO 9001:2000. The success is already reflected in various new measuring devices such as Laser 2300 XY or the processor-based system Ecocontrol 1000.

"Customer satisfaction has top priority," says Mr Harald Sikora, founder and president of Sikora, *"To remain among the top ranked international manufacturers of measuring and control devices, we permanently have to deal with individual customer demands with regard to quality, costs and delivery reliability."*

Sikora reports that the expansion is likely to continue. *"If the trend of the continuously increasing demand will persist we will have to take further possible extensions into consideration, in order to be able to serve the international market at any time,"* explains Mr Sikora.

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T-Drill celebrates 20th anniversary

T-Drill Industries, Finland, has celebrated the 20th anniversary of its current ownership. T-Drill has been in business for more than 30 years and is a leading manufacturer of tube and pipe fabrication equipment.

The company's first 10 years saw several owners and marginal growth. However, over the last 20 years under the drive and vision of Mr Osmo Syrenius, T-Drill has continued to grow and add to its product line. The company has a signature line of innovative and modern machines at the heart of a tube machinery range used for cutting, spinning, flanging, end forming and deburring.

T-Drill's Mr Syrenius

T-Drill has two modern manufacturing facilities in Finland as well as a facility in Atlanta (Georgia), USA. Available worldwide, the company's product line continues to be upgraded.

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SAET GROUP

RSA reports an order increase of 160 per cent

RSA, Germany, has reported a 160 per cent increase in orders already for 2007, based on only the first six months. The company is holding course to achieve its envisaged sales growth in double figures.

The company is a specialist in machines and technology for the sawing of tubes, sections, and solid bars. According to business manager, Dipl-Ing Rainer Schmidt, this development is not only the result of the upward economic trend. He says: *"The reason why we are growing above the average of the branch is mainly due to our product strategy."*

RSA has launched four new sawing concepts during the period of 2006 to mid-2007. These have been further developed from existing modules, in addition to completely new developments. One of the new developments concerns a saw that meets the special requirements of the steel trade and the pre-production of forged products.

Dipl-Ing Rainer Schmidt, business manager of RSA, considers the product strategy of the 'customized modules' as the deciding factor for the good course of the company

The Rasacut XXL is used to cut tubes with a wall thickness of up to 15mm and diameters of up to 170mm. According to the company, this results in a cutting time reduction of up to 90 per cent compared to up-to-date band saws – while the quality of the cut surface is significantly improved.

A sawing centre designed for the special requirements of components suppliers to the automotive industry: this involves sawing, facing, chamfering, and 100 per cent control of solid bars as a pre-product for shafts

For stainless steel processors, RSA provides the Rasacut TC saw which can cut thin-walled tubes of a wall thickness from 0.4mm with surface protection and without deformation. For the main customers of the components suppliers to the automotive industry, RSA has developed two sawing centres for specific applications.

One machine is designed for the production of vehicle lines from 0.6mm diameter that are deburred or chamfered on both ends and subsequently cleaned on the inside and outside with a very high degree of purity. A second specialized sawing centre concerns the high precision cutting, facing, chamfering, and checking of solid bars to be further processed into motor shafts.

Though there is a good demand in Germany, RSA sees an international market potential for these state-of-the-art installations, especially in eastern Europe.

According to Rainer Schmidt, the increase in orders does not result in delivery delays: *"Though our delivery times are shorter than the usual delivery times in the market, we are aiming at even significantly reduced delivery times. We are able to meet our delivery times, because we have allowed for the growth – and as a result extended the production capacities and the resources of the after-sales service."*

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RSA Cutting & Deburring Systems Ltd – UK
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Email: rsa.gb@rsa.de

Plymouth Tube acquires Trent Tube from Crucible Materials

Plymouth Tube Company has acquired Trent Tube from Crucible Materials Corp. The purchase includes the Trentweld Plant (East Troy, WI) and the Trent Processing Plant (Chicago, IL). Previously, Plymouth Tube acquired the Cold Work Anneal plant (also East Troy, WI) from Crucible in 2005.

Mr Don Van Pelt Jr, president of Plymouth Tube, remarks that *"We are excited by the addition of our new offerings to the market and look forward to promoting the strengths of these new Plymouth facilities."*

Trent Tube's Trentweld Plant produces 1/8" to 4" diameter welded and welded and drawn stainless steel tubing including nickel and high alloys for a variety of applications. Primary products include mechanical, air cylinder, electropolished tubing, and speciality tubing products such as tubing for aircraft, sanitary, pharmaceutical, high purity, and nuclear applications.

The Trent processing plant provides slit and edged stainless steel and nickel alloy coils (0.010" to 135" thick x 0.375" to 48" wide). Customers served by Plymouth include the Trent Weld plant as well as a broad base of other steel processors.

Plymouth Tube Company is a privately-held, family-owned global supplier of speciality carbon, alloy, stainless steel, and nickel alloy tubing. In addition, Plymouth produces steel, nickel alloy and titanium extruded shapes and cold drawn shapes. Plymouth Tube is headquartered in Warrenville, Illinois with 10 plants in the US, and sales representation around the world.

Plymouth Tube Company – USA
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Website: www.plymouth.com

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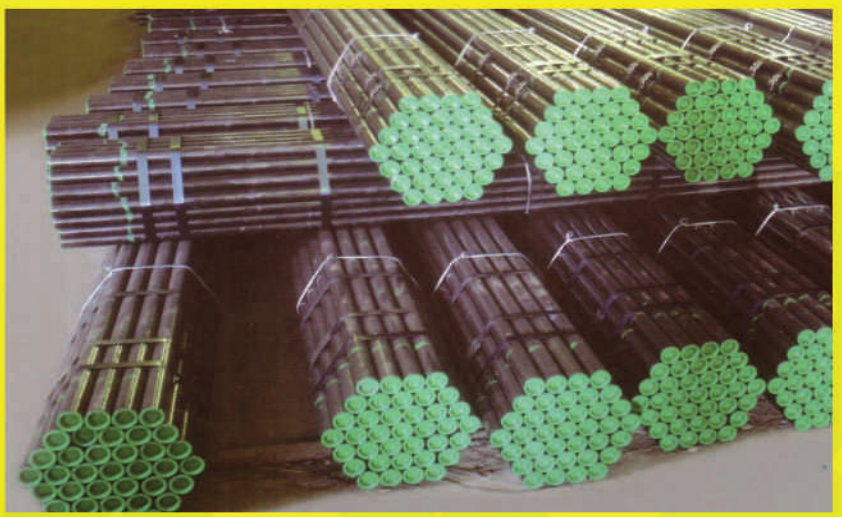

Carbon And Alloy Steel Seamless Pipes

Cold Drawn Seamless Pipe: OD: 1/8" to 6" WT: 1-10mm

Hot Rolled Seamless Pipe: OD: 6"-12" WT: 5-24mm

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TEL: 0086-10-84938049/84927034 FAX: 0086-10-84928449/51658353

Email: sales@china-steelpipe.com

URL: www.china-steelpipe.com

Twin events for the automotive industries in Ukraine and Russia

AutoRussia 2007 – an international forum for the Russian and international automotive industry – will take place for the third time from 4-5 December at the Astoria Hotel, St Petersburg, Russia. Over 300 senior representatives will attend the event, including leading figures in Russia's automotive manufacturing sector.

Representatives will attend from leading OEM projects based in the St Petersburg area – Russia's main region for automobile production, as well as senior representatives from international auto OEMs and T1s around the world. OEM projects in St Petersburg include General Motors, Suzuki, Avtovaz, Ford, Toyota and dozens of their key suppliers.

Keynote addresses will be given by Mr Maxim Sokolov, chairman, committee for strategic projects & investments, city of St Petersburg, and Mr Grigory Dvas, vice governor, economy & investment, government of Leningrad region. They will set out plans to further attract automotive investors in and around St Petersburg.

Roundtable discussions on 4 December will focus on sourcing and supplier localization in Russia, with top purchasing and supply chain executives available to answer delegate questions. These and other issues will be addressed by senior representatives of Lear, Tenneco, Intercos IV. Senior purchasing and supply chain professionals will also be on hand from General Motors Russia.

Two new projects will also be represented on the speaker panel. Stadco and Magna/GAZ joint venture will both speak about their strategies, plans and progress in setting up production in Russia and working with Russian suppliers. The conference will be followed by an official visit to Tenneco and Intercos IV in St Petersburg.

A partner to the St Petersburg event, the inaugural AutoUkraine 2008 conference will take place in Kiev on 29 January, 2008. With over 100 delegates expected, the conference is designed to attract an international audience of automotive professionals from OEMs, T1s and T2 suppliers in Ukraine, Russia and globally.

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St Petersburg – the automobile manufacturing capital of Russia, and host to AutoRussia 2007

Linde Group continues its growth trend

The Linde Group, an industrial and medical gases company, has achieved double-digit growth in sales and operating profit in the first six months of 2007. This confirms the company's forecast for the year with a further increase in sales expected. It is also in line with the company's aim for the coming years: Linde has set itself a medium-term target of a €3 billion plus operating profit for the 2010 financial year.

Linde's sales in the six months ending 30 June 2007 increased by 12.7 per cent to €5.888 billion (2006: €5.223 billion). The Linde Group also achieved significant growth in earnings. Operating profit (EBITDA) in the first six months of the year rose to €1.158 billion (2006: €1.010 billion), representing an increase of 14.7 per cent.

In a global market environment which remained stable, sales in the gases division rose in the first six months of 2007 by 8.1 per cent to €4.553 billion (2006: €4.212 billion). On a comparable basis, the global gases business of the Linde Group grew by 7.9 per cent. The highest sales increases were reported in South America and the Asia/Pacific region.

As confirmation of Linde's success, the company has recently won a €100mn contract from Skangass for the turnkey supply of a liquefied natural gas (LNG) production plant for a site in Risavika, near Stavanger, Norway.

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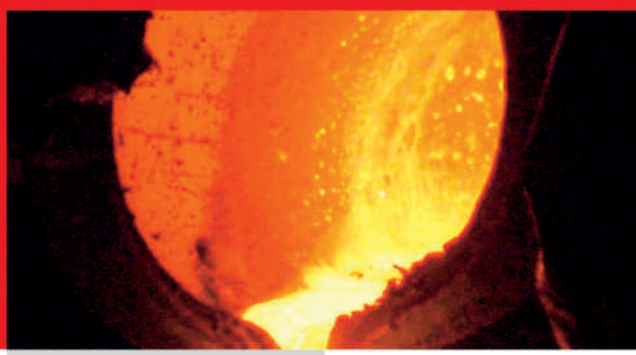

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Messe Düsseldorf

Industrial coatings technology at the heart of PaintExpo 2008

Suppliers of products and services covering all aspects of industrial coatings technology will converge on Karlsruhe in Germany for PaintExpo.

After a successful inaugural event in 2006, the promoters have already received more than 120 signed exhibition contracts for the 2nd international trade fair for industrial coatings technology which will take place from 11-14 March 2008.

With 244 exhibitors and 4,917 expert visitors from 41 countries, the promoters of PaintExpo succeeded in presenting a high-quality premiere event in 2006. The list of exhibitors for the next event includes nearly all of the leading suppliers of coating technologies and important paint manufacturers. Organisers FairFair GmbH have also reported an increase in both German and international exhibitors.

"PaintExpo is the only interesting trade fair in Germany for Eisenmann's coatings technology division," explains Mr Andreas Dibon, surface finishing sales manager at Eisenmann, with regard to his company's early decision to exhibit. Mr Frank Berg, German branch manager for Caldan Conveyor A/S, also says the was no question about participating at the event: *"For us, PaintExpo is the most important trade fair in Germany, and it's the only one at which we participate."*

The promoter has also announced that various exhibitors have significantly increased booth floor space in order to present their entire range of products and services.

However, increasing manufacturer interest in the coatings technology trade fair is not only being experienced in the area of coating materials. PaintExpo is also becoming increasingly attractive for companies involved in surface pre-treatment. Interest has also grown amongst suppliers of automation solutions and painting robots, and this indicates that explosion protection and work safety will gain in significance as exhibition topics.

The exhibits on display at the fair will include systems, processes, consumable materials and services for the organic coating process from pre-treatment right up to final inspection.

The training forum at PaintExpo will attract a great deal of attention, and be further expanded at the upcoming trade fair. All involved in this forum will take advantage of this opportunity to make their contribution to counteracting the shortage of skilled personnel in the coatings industry.

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Website: www.paintexpo.de

On target to become 'fifth largest' global manufacturer of stainless steel tube?

Changshu Walsin Specialty Steel Co Ltd, China, has claimed that it is close to becoming the fifth largest worldwide company for stainless steel seamless tube and pipe. This reported success follows on from a busy year of production in 2007. With an increase in production capacity by 2,000MT per month, the company has been able to increase supply to 20,000MT.

This increased activity from Walsin has been bolstered by good certification and contract news. The company has recently gained 'nuclear certification' in China after 3 years of preparation. This enables Walsin to supply stainless steel seamless pipe and tube into the China nuclear power plant project.

The facilities of Changshu Walsin, a company aiming to become the fifth largest worldwide producer of stainless steel seamless tube and pipe

Walsin is also close to fulfilling a substantial project for Shell in Canada, based on an order won at the end of last year. Walsin has already supplied and delivered 800MT out of a total of 1,000MT to Canadian National Resource Ltd.

Changshu Walsin Specialty Steel Co Ltd – China
Fax: +86 512 5256 8027
Email: rui_zhang@walsin.com • **Website**: www.walsinsstubing.com

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Interpipe to increase API 5L pipe production to capitalize on pre-qualification success

Interpipe has announced plans to increase production of seamless pipes for the oil and gas sector manufactured in accordance with the API 5L quality standard. This announcement follows on the heels of a pipe shipment growth increase of 13.3 per cent for the first half of 2007, and news of pre-qualification from a number of leading oil producers.

To meet the production increases and new demand, Interpipe will construct a treatment line for line pipes at the company's Niko Tube production facility to the south of its headquarters in Dnepropetrovsk, Ukraine. The company will also construct an additional treatment line at existing Niko Tube facilities to decrease the loading of the main line.

Mr Andrey Korotkov, Interpipe director for production and investments said: *"We are experiencing a great surge in demand for pipes made in accordance with the API 5L standard within the oil and gas industry and in order to meet this increase in business we need to expand our production capability. This is a terrific sign of the potential of the market for Interpipe in oil and gas – and we intend to maintain and grow our product lines in this area to support our ongoing global expansion."*

Italian company Mair Research SpA was selected as the supplier of equipment for the project. Mair Research SpA will provide Interpipe with a double heads linear hydrotester, a cutting and milling machine, chamfering machine and packaging line. Capacity of the new line – due for completion at the end of 2008 – will be 250 thousand tons per year.

Interpipe's mills – Interpipe Niko Tube and Interpipe NTRP – have recently gained pre-qualification from a number of leading oil producing companies. Interpipe Niko Tube has been approved for inclusion in the Kuwait Oil Company's approved list of manufacturers for oil and gas pipes produced in accordance with API 5CT.

Interpipe Niko Tube and Interpipe NTRP have also gained pre-qualification from the Abu Dhabi National Oil Company (UAE) and been approved for inclusion in the list of manufacturers for oil and gas pipes produced in accordance with API 5L.

As part of the prequalification process, the representatives of KOC and ADNOC carried out a technical audit and examined Interpipe's pipe producing technologies and quality management system. The auditors recognised that Interpipe's products reach the highest quality standards accepted in their companies.

Commenting on the pre-qualification results, Mr Rostyslav Chudnovsky, director of tubular sales for the oil and gas industry said, *"We are delighted to become an official supplier of KOC and ADNOC. This opportunity allows us to extend our customer base and improve our sales geography in the Middle East market."*

Interpipe – Ukraine
Fax: +380 562 389482
Website: www.interpipe.biz

Langbow announce expansion of premises

Machine supplier Langbow, UK, which moved to its current premises in 2006, has acquired the adjacent unit, for use as a working showroom. The company's newly acquired premises will be known as Soco UK, and will provide the facility for running trials on new Soco machines as well as demonstrating new and used machinery.

The company reports that levels of sales and enquiries have increased significantly on both new and used machinery, and that demand for the new Soco range of tube bending machines has been very active, along with a thriving used machine refurbishment programme.

Langbow has expanded its premises to enable an increase in the company's machinery stock

Langbow provides aftersales service as part of the package, not only for machines, but on product development, tooling and training. Director Mr Mark Smith commented, "*We specialise in training and development of parts to enable even totally new customers to tube bending the comfort and support in venturing into this area. Our aim is to remove the 'black art' from the process of tube bending.*"

The company also states that its five year warranty, giving customers peace of mind on all parts and labour costs, is also a significant factor in its recent success.

Langbow Limited – UK
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Email: sales@langbow.com
Website: www.langbow.com

OMK supply LDP for Nord Stream subsea section

Following the May launch of its mill 5000, United Metallurgical Company (OMK), one of Russia's largest producers of pipes, is preparing for commercial production of large diameter pipes (LDP) for the subsea section of the Nord Stream project.

Since Vyksa Steel Works (VSW) – part of OMK – joined the Nord Stream project, it has produced and delivered over 250,000t of LDP for gas pipeline construction.OMK president Mr Vladimir Markin said, "*In April, OMK became Russia's and the CIS's first DNV-OS-F101 certified producer of pipes for subsea pipeline systems.*"

OMK has also secured its first order for 1,500t of 914mm LDP from Petroleum Development of Oman (PDO). The company plans to increase LDP production to 2 million tonnes by 2010.

United Metallurgical Company – Russia
Fax: +7 495 231 77 63
Website: www.omk.ru

Borusan Mannesmann establish new plant in Spain

Borusan Mannesmann, Turkey, has established a new US$16mn factory in Spain, which is expected to generate a US$60mn turnover. The 50,000t/year capacity spiral pipe production line stems from investment which began at the start of 2006.

All the shares of BM Vobarno Tubi and BM Espana companies will be gathered under the umbrella of Borusan Mannesmann.

The new plant – aimed at the markets of North Africa, Middle East and Europe – is planned to start functioning in the third quarter of 2008.

BM Vobarno Tubi, the other investment included in Borusan Mannesmann, directs half of its output to the Italian automotive industry, and exports the other half to foreign markets including Germany and France.

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Events News in Brief...

events news in brief...

Middle East Plastic Pipes 2008 (www.amiplastics.com) will be held at Crowne Plaza Hotel, Dubai, United Arab Emirates, from 2-4 June 2008. The new conference has been organised in response to the developments taking place in the Middle East and North Africa. Papers are invited from experts across the supply chain from areas including construction, water industry, pipe and fitting installers and manufacturers/suppliers.

Fullstage Technologies GmbH (www.fullstage-technologies.com), Germany, exhibited its latest range of CNC tube bending machines and tube end-formers during its first open house event, held 23-25 July. The company displayed the 'BECS Master' brand of bending machines from Japanese manufacturer Chiyoda Kogyo, as well as its proprietary 'FST' brand of OEM tube fabrication systems from Taiwan.

The **International Fluid Power Exhibition (IFPEX)** – www.ifpex08.com – and **Air-Tech** will be held at the NEC, Birmingham, UK, from 22-24 April 2008. Other co-locating shows are Mach, Drives and Controls, Subcon and Electrex.

AMI, UK, has announced the **Plastic Pipe Fittings and Joints international conference** (www.amiplastics.com), which will take place from 10-12 December 2007, at the Maritim Hotel, Cologne, Germany.

Tube India 2008 – to be held in New Delhi in February – will now start and finish one day earlier. Due to a clash with Defexpo, the event has been moved to 13-15 February 2008.


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Events News in Brief...

events news in brief...

RathGibson (www.rathgibson.com), USA – a leading manufacturer of stainless steel, nickel, and titanium tube – has unveiled a new corporate brochure. RathGibson has also created various sale sheets on specific alloys, as well as launching a newsletter, called 'Connections'. In addition, RathGibson has redesigned its website.

Turner Machine Company Inc, USA, have redesigned its website to better reflect its range of straightening machines and services. The website – at www.turnermachineco.com – provides the complete history of the company and how customers benefit from the long history in straightening. The Turner, Wyko and Mackintosh Hemphill ranges of machines are all assembled under one roof using expertise in straightening machine setting and operation.

Roll-Kraft (www.roll-kraft.com), USA, has recently undergone a full ISO re-certification audit, conducted by a team of third-party auditors. Once again, Roll-Kraft fulfilled the requirements and received re-certification, with zero minor and zero major non-conformances. This success upholds the Roll-Kraft policy of maintaining documentation and procedures to properly identify Roll-Kraft as an international ISO-certified company.

Formtek Metal Forming (www.formtekgroup.com), USA, has announced a number of key appointments. Mr Eric Martin has been given the job of vice president – technical sales, and will be responsible for handling sales and marketing for the Yoder, Tishken, Dahlstrom, Lockformer, and B&K brands of rollforming equipment. The company has also hired Mr William Snyder as production manager for its Cleveland location.

Mr Hermann Tetzner has joined the management board of **SMS GmbH** (www.sms-group.com), and will be responsible for finance and control. Mr Tetzner last worked with German drug company Boehringer Ingelheim as Boehringer chief financial officer in the US.

Mr PL (Peter) Rietberg has been made chairman of the board of the **Van Leeuwen Pipe and Tube Group** (www.vanleeuwen.com). The new executive committee now includes Mr JM (Joop) Sassen, (chairman), Mrs Maureen van Engelen, Mr Robert van der Weck, and Mr WF (Wil) Livius.

The **Trumpf Group** (www.trumpf.com) has appointed two additional managing directors to its board. Mr Gerhard Rübling has been promoted to labour director and will be responsible for the services division group-wide. Meanwhile, Mr Friedrich Kilian has been given the additional responsibility of central purchasing for the Trumpf Group.

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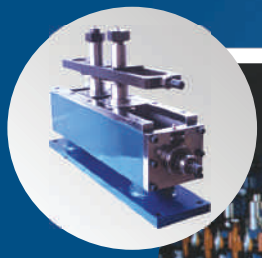

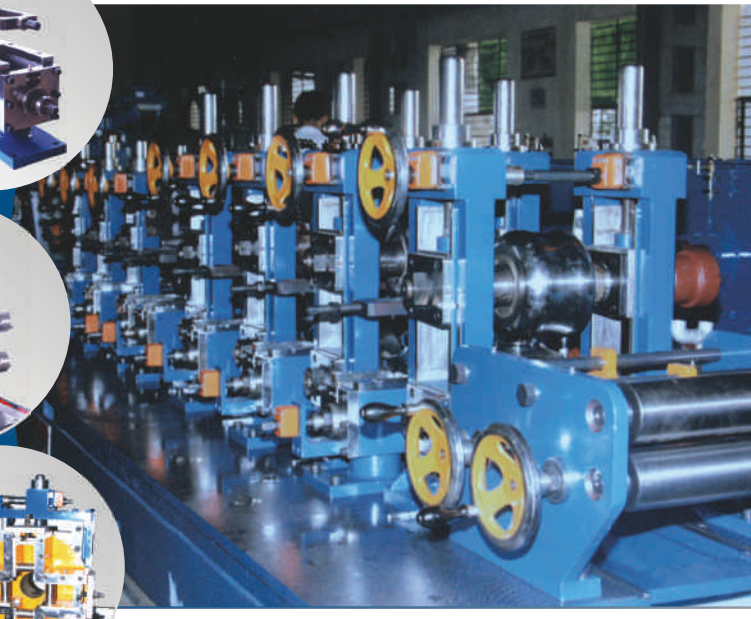

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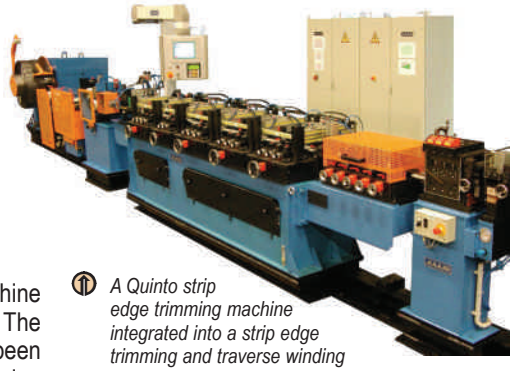
Modular machines to improve strip edge

Julius Maschinenbau GmbH, Germany, manufactures a modular range of strip edge processing machines that can be integrated with existing equipment. A Duo machine with six tools can easily be upgraded to a Trio, Quattro, Quinto or Sexto (18 tools), due to its modular construction.



A Quinto strip edge trimming machine integrated into a strip edge trimming and traverse winding

The Quinto strip edge processing machine cuts the edges of wound edge material. The strip edge trimming equipment has been tried and tested by the pipe manufacturing industry during weld joint preparation. If integrated in a pipe welding line, the thread chasing machine feeds both sides of a plane-parallel edge to the strip.

The strip requires less trimming and weld joint defects are reduced by the use of the thread chasing equipment, resulting in increased welding speed and productivity.

The thread chasing equipment can process the required strip edges on the stripping material by the flexibility of the tool application. The machine is equipped with technical options such as hydraulics and pneumatics, spraying, blowing off of chips, chip guide, automatic quick release, and tool holders which allow an adjustment during the working process.

The Tri-Step system is suitable for greater strip widths. In this module, the back tools are activated and adjusted by a motor, and the adjusting buttons are located on the front of the machine.

Julius Maschinenbau GmbH – Germany
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Latest additions to bending machine range

Silfax, France, has added three new machines to its product range. The company has also inaugurated a new subsidiary – Silfax North America – located in Michigan, USA.

The SE32LR bending machine, with 10 axes, can handle tube diameters from 5mm to 32mm in steel and stainless steel. The machine features left and right bending, multi-height and multi-radius on several levels and two tools, and pushed carriage for rolling.

Advantages include precision and repeatability of the axes, fast tool change, memorised tool adjustments, and loading/unloading system integration.

Silfax's S316 three axis bending machine can bend steel tube diameters from 4mm to 16mm, and aluminium tube up to 20mm. Advantages include precision and repeatability of the axes, compact size, multi-height work, and ergonomic height of loading.

The company's new electrical end-forming machine is available in rotary and linear models, SFER and SFEL, with 5, 8 or 12 ton capabilities. Features include numerical reference setting of tube on all the range, from two to eight steps, rolling up to three heads, and self diagnosis.

All of the new machines feature reduced power consumption, low acoustic level, no pollutant emissions, remote maintenance service and reduced maintenance.

Silfax – France
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Email: info@silfax.com
Website: www.silfax.com

Precise CNC end-working of pipe, tube and shaft

Arla Maschinentechnik GmbH, Germany, builds CNC controlled end-working machines for single-sided or double-sided end-working. The company's machines are based on a solid frame with one or two precise machining units, and include a unique concentric work-holding technology.

The Arla end-working machine can be compared to two separate CNC lathes, operated independently for every side of the workpiece. The principal difference is that this end-working concept incorporates a fixed workpiece and revolving tools. All machining units are directly driven by servomotors and are therefore very stiff and designed for high torques.

Arla end-working machine for pipe, tube and shaft

Typical applications include turning, tapping, threading, chamfering, boring, drilling, milling, de-burring, slotting, and other operations where additional slide units are necessary for a multi-axis machining. In order to produce complex contours, facing heads can also be implemented in dedicated machining units.

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New release of mandrel bend monitor

OES, Inc, Canada, has launched a new, advanced version of its patent pending process variation monitoring system for mandrel bending applications: release B of the PVM2000-MB mandrel bend monitor.

The new release provides dynamic in-process monitoring of each bend individually, a new bend force analysis of both an upper and lower tolerance limit, simplified 'learn', and enhanced user friendliness.

The upper and lower tolerance limits permit detection of excessive pull force or a loss of pull force on the mandrel rod during each bend cycle, indicating process variation that can lead to mandrel failure or production quality issues. These can result from loss of lubrication, weld seam imperfections, galling of the mandrel, wiper die wear, the mandrel position being out of adjustment, excessive tool wear or loss of mandrel integrity. The system can also detect excessive compression force during mandrel advance to prevent bending the mandrel rod if there is an insertion jam.

The new PVM2000-MB release B offers a simplified Learn cycle through simple integration of the monitor with the bender's operating system. Following a single process cycle, the mandrel bend monitor automatically goes to Run mode and alerts the operator to process variance that can lead to a problem, helping to protect tooling, reducing downtime, and assisting with set-up verification. The system enhances error proofing of the bend process by isolating product if a mandrel link breaks.

The PVM2000-MB mandrel bend monitor from OES, Inc

The PVM2000-MB provides two levels of alert to process variations, and offers both audible and visual alarm options to indicate failure conditions to the machine operator. Integrating the Fail output to machine control can stop the bend cycle before further damage occurs.

The system features a user-friendly touch screen interface display for monitoring, configuration and threshold adjustment. With updated BendView™ companion software, the entire bend process can be captured in real-time, and each bend in a production run can be logged to a computer file for analysis and traceability.

OES, Inc – Canada
Fax: +1 519 652 3795
Email: oes@oes-inc.com
Website: www.oes-inc.com

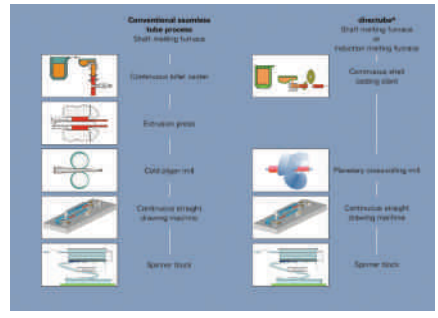
Delivery of complete directube® plant

Copper tube producer, KobeWieland Copper Products (KWCP), USA, has placed an order with SMS Meer, Germany, for the supply of a complete plant for the production of mother tubes. The new directube® line is to be installed at the company's plant in Pine Hall, North Carolina, and is scheduled for commissioning at the end of 2008.

In addition to the complete equipment for the plant with cathode charging facilities, melting and casting plant through to the planetary rolling mill (PSW), SMS Meer will supply the electrical open-loop and closed-loop control technology and ancillary facilities. The scope of supplies and services also includes commissioning of the plant and training of the company's personnel.

The order for the directube® line forms part of a major investment programme with which KWCP (a joint venture between Kobe Steel, Japan, and Wieland-Werke, Germany) aims to further increase its competitiveness and expand its existing production capacity. With a tube weight of 1,100kg, the directube® line in Pine Hall will be modern and efficient, and an important reference plant for SMS Meer.

The mother tubes produced on the directube® line will be made of DHP copper. On the planetary rolling mill, they will be reduced to



Comparison between a conventional seamless tube process and directube®

a diameter of approximately 60mm, with a wall thickness of approximately 3mm. They will be further processed by KWCP. The finished tubes, in a diameter range between 12.7mm and 7mm and with a wall thickness of approximately 0.3mm, will be employed predominantly in heat exchangers.

Features of the plant include the use of a pressure controlled casting furnace that ensures a constant high quality and high yield of the cast mother tubes and the operation of a continuous planetary rolling mill of the latest generation with a significantly enhanced production capacity.

SMS Meer GmbH – Germany
Fax: +49 2161 350 667
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Website: www.sms-meer.de

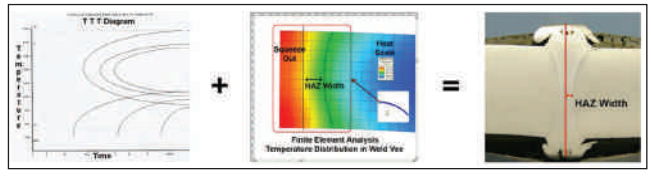
Advances in HF welding – heat affected zone

Currently, HF weld quality is achieved through careful and repeatable welding practices. Operator knowhow and experimental knowledge have become a foundation upon which tube and pipe companies find their success. Unfortunately, any minor changes in speed, setup, or material can be a variable which has an affect on the weld.

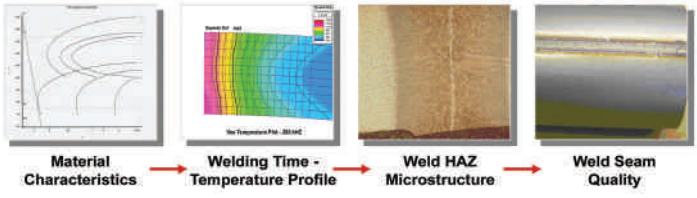
Companies are quick to ramp up welder power or fall back on mill setups that are known to provide an acceptable product. High frequency welding is surprisingly forgiving and while these adjustments are often satisfactory they are rarely ideal. Improving control of the HF weld itself can lead to more consistent weld strength and a higher quality end product.

The first true variable frequency HF welders went into operation in 2003. New technology at the time, it proved to many tube producers that 1) frequency is a key process parameter that should be selected for a particular product set-ups, and 2) each welding process has a 'best weld' point, where power and frequency are optimally balanced, with other mill variables.

A mathematical model has been developed to provide insight into making the 'best weld.' Increasing the operator's control over the welded seam will help maintain the best weld for demanding applications.



Maintaining control over the weld seam



From research to production – the heat affected zone (HAZ)

The area of the base metal which has had its microstructure and properties altered by welding is called the heat affected zone (HAZ). If one were to remove a cross section of welded pipe the HAZ would appear as a discoloured hourglass at the weld point. The first step to understanding how to control the HAZ is to learn how to describe it. This hourglass shape can be best described with the use of two values: vee apex heat and HAZ width.

Vee apex heat is the heat energy at the centre of the tube wall at the point of welding measured in Joules/mm^2. HAZ width is the physical width of the heat affected zone (the width of the HF weld hourglass) and is determined by HF welding frequency and time.

These weld parameters are characteristics of both HF current distribution (frequency) and thermal conduction (time). HF current distribution is essentially how deep an induced current penetrates the strip edge and is calculated from the electrical reference depth. This is a function of material resistivity, frequency, and material permeability.

Electrical reference depth =

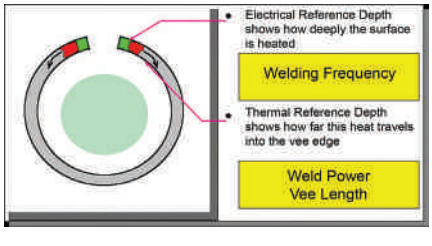
$$\sqrt{\frac{\pi * diffusivity * VeeLength}{4 * MillSpeed}}$$

As the heat from induced current distributes in the vee edge, thermal conduction pulls that heat through the material. This process is best described with the thermal reference depth which is a function of material diffusivity, vee length, and mill speed.

Thermal reference depth =

$$\sqrt{\frac{resistivity}{\pi * frequency * permeability}}$$

A diagram of welding power and weld power vee length



Taking a look at these together, one can see that the HAZ is described and effectively controlled by the following parameters: material characteristics (melting point, permeability etc), mill setup (vee length), mill speed, power, and frequency. This is not, however, an exhaustive list of variables.

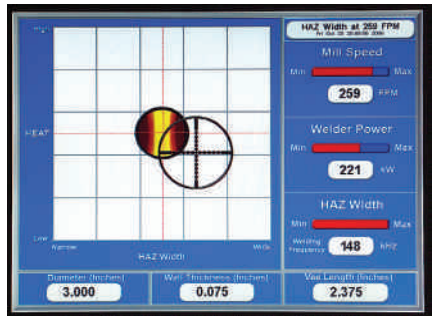
The mechanical attributes of the electrical reference depth and the thermal reference depth are, to some degree, intuitive. In practice, however, the relationships of these variables are complicated. Occasionally operators will attempt to modify these reference depths by modifying a single variable, such as vee length. Unfortunately this practice is very limiting and sometimes reveals very sensitive aspects of the HF weld setup.

In HF welding, the shortest possible vee length is desired to maximise welding efficiency. A short vee length also minimises 'vee breathing,' the mechanical process variation of the vee angle during HF welding. As much as possible a company should resist variation from their ideal vee length. In effect, the best way to adjust the quality of a weld is not through physical changes of vee length or mill setup, but instead through electrical means like adjusting frequency and power.

If the goal was to increase production by 10 per cent, how should one best modify frequency and power to achieve the same desired weld at the increased mill speed?

Computational software can be utilised to solve this problem. After the operator enters basic mill setup data (vee length, diameter, and wall) a model can help predict weld quality through changes in power and frequency to ultimately improve profitability for the company through a repeatable superior weld. For instance, when a mill operator increases the mill's speed, the model will calculate what changes are necessary in power and frequency in order to maintain the same HAZ characteristics.

HAZ screen display panel



One way these changes can be communicated is through an operator display providing graphical representation of the two descriptive qualities of the HAZ, namely weld heat, depicted on the Y-axis and HAZ width, on the X-axis. Software can then be used to graphically illustrate the method by which an operator can achieve a high quality weld. The ideal, desired HAZ, as defined through experience and past welding history, is specified to be at the X, Y origin or 'best weld' location.

During normal operation the actual HAZ characteristics are located on the graph. The operator can then adjust both the frequency and the power to bring it to the origin. For example, as the weld changes, whether due to an increase in mill speed or as a result of the slow decay of an impeder, the actual weld indicator will begin to move away from the central 'best weld' location and begin to show a widening or a narrowing of the HAZ width and a lowering or raising of the applied heat, ie weld power.

The mathematical model calculates and displays the 'best weld' location, thereby giving the operator a road map to adjust welder power and frequency. The welder operator will be able to restore the ideal HAZ characteristics by aligning the target with the centre of the HAZ display. The simplicity of the user interface helps the operator understand how minor changes at the mill can greatly influence the quality of the end product. This enables the operator to make the best weld possible with the highest level of repeatability.

This article was supplied by Mr Michael DiDonato, mechanical engineer, Thermatool Corp.

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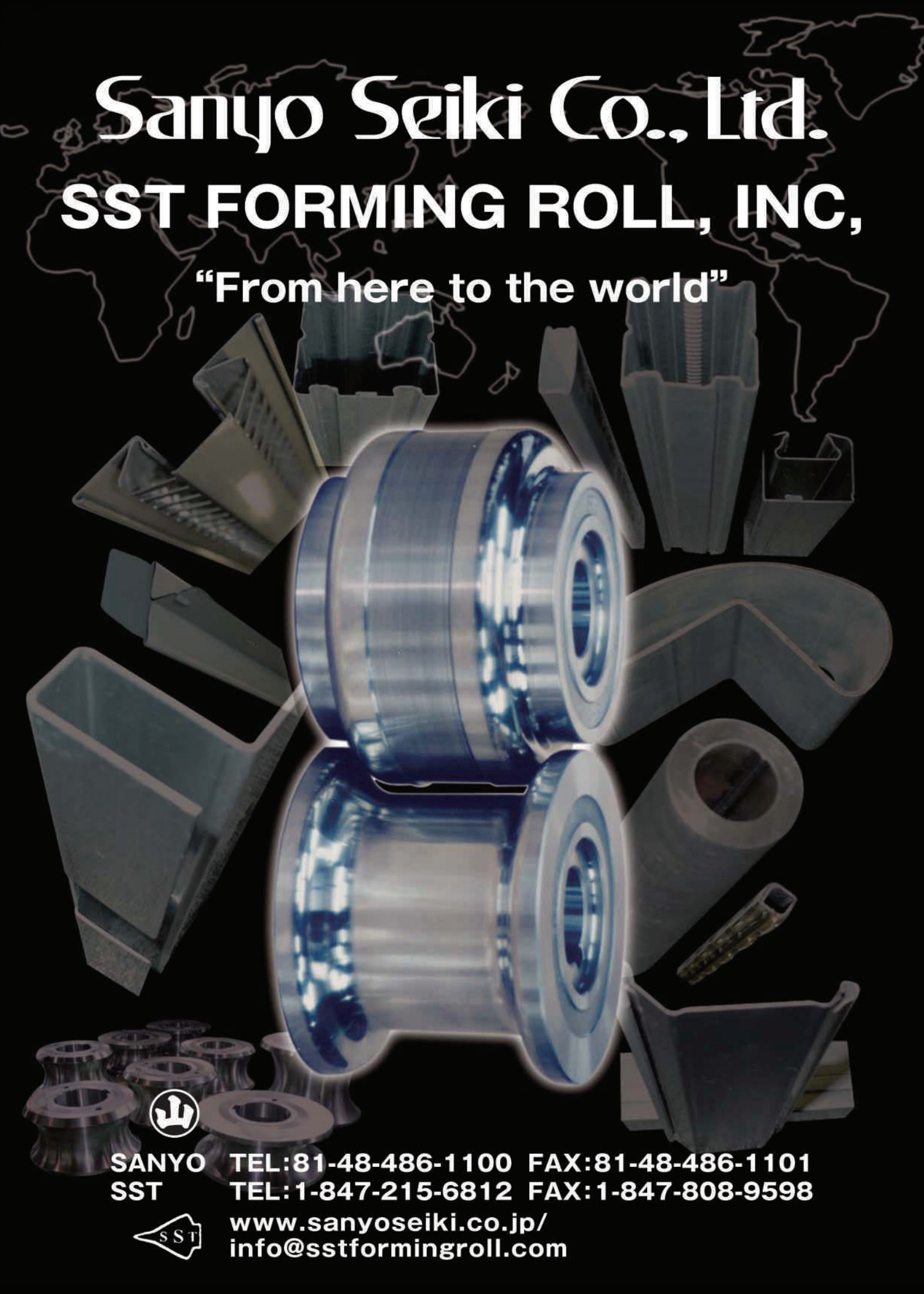

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X-ray and laser-based measurement for extrusion lines

Sikora AG, Germany, manufactures a range of measurement and control technology for the hose and tube industry. For the diameter measurement of hoses and tubes, Sikora provides measuring devices for a product diameter from 0.05mm to 300mm.

Progressive CCD-technique in combination with impulse-driven laser diodes and the use of powerful processors allow extremely short exposure times of 0.2 µsec. Vibrations of the product to be measured have no influence on the measurement, ensuring a precise, non-contact measurement. The technology is based on diffraction analysis and does not include any moving mechanics, which avoids maintenance. The claimed mean time between failures (MTBF) – the average time after which a device of this series shows a repairable defect – amounts to 15 years.

A special feature of the larger systems, Laser 2030 XY to Laser 2300 XY, is the swivelling gauge head, which can be folded upwards from the working area, if necessary. This also protects the gauge head from dirt and water drops falling into the measuring area. Laser 2300 XY is able to adapt to very large product diameters, as increasingly demanded by the hose and tube industry.

Sikora's X-Ray 2200 measurement device

Sikora's Laser 2010 T, Laser 2025 T and Laser 2050 T gauge heads provide diameter and ovality measurement, inclusive of minimum and maximum values, direction or angle. Ovality is always precisely measured, independent from the orientation of the minimum and maximum values in relation to the three measurement axes.

For the online acquisition of tube and hose profiles, the Laser 2000 Profil defines distinctive positions of a profile in the measuring field, from the functional equations of tangential laser diodes. This device is suitable for the exact measurement of round or oval profiles, even if the profiles are arranged in an inclined position. The design of the gauge head is downwards open and therefore provides effective protection against dirt or water.

For the integration of gauge heads into extrusion lines that are controlled by a production line processor, interfaces such as RS 485, Profibus DP, Canbus, Ethernet or analogue interfaces are already integrated in the gauge head. All gauge heads of the Laser 2000 series have an RS 232-C interface for PC or notebook connection.

Models from the Laser 2000 series

Sikora also produces X-Ray 2000 x-ray based systems. Advantages of x-ray measurement devices are high precision at simplest handling for permanent quality control of products with up to three layers. Diameter, wall thickness, eccentricity and ovality can be logged and recorded. The system quickly and precisely controls extruder rpm or line speed according to the setpoint. Even rubber hoses with a fabric reinforcement layer or composite pipes with multiple layers made of PE or aluminium will be measured reliably without any calibration or additional input of material data. Specifically adapted to common diameter ranges in hose and tube industries, the X-Ray 2000 is offered for various product diameters ranging from 5mm to 270mm.

For extrusion lines without production line processors, the company offers processor controlled display and controlling systems such as Ecocontrol 2000, which provides a full complement of production and quality control information. The system presents all numerical and graphical information on a 15" TFT touch screen driven display. A comprehensive feature set of trending and statistical analysis as well as data collection and reporting rounds out the system capabilities.

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New line of tube bending machines

Crippa SpA, Italy, has launched its new 'CA' line of tube bending machines with five and nine axes, for 63mm and 76mm diameter tubes.

The range includes four models: CA 563 (5 axes, 63mm maximum tube diameter), CA 963 (9 axes, 63mm max diameter), CA 576 (5 axes, 76mm max diameter) and CA 976 (9 axes, 76mm max diameter).

The new line is mainly designed for applications in the automotive and aeronautics industries.

Crippa SpA – Italy
Fax: +39 031 762403 • **Email**: info@defotech.com • **Website**: www.defotech.com

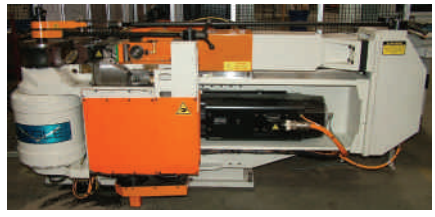
Hydroforming project benefits from all-electric CNC tube benders

Eagle Precision Technologies Limited, Canada, has supplied 6 all-electric benders for a unique hydroforming application to Vari-Form, a leader in hydroformed component manufacturing.

Hydroforming is a cost-effective way of shaping malleable metals such as steel into lightweight, structurally stiff and strong parts by injecting pressurised fluid into a tube to form the material into a die cavity.

The first step in producing hydroformed shapes is to bend a tube to a net shape to fit the die prior to hydroforming. This step of the process requires exact bending procedures and accurate machine operation to minimise scrap and fit the die correctly. In addition, the high-volume requirements of this project demanded a tube bender that could provide minimal cycle times.

Vari-Form conducted an in-depth technical evaluation of the different tube bending machine suppliers to the market. Following this evaluation, Vari-Form chose the Eagle all-electric CNC tube bender for this project.



An Eagle Precision Technologies all-electric CNC tube bender

Eagle's range of all electric benders have been designed with high efficiency, clearance and robustness as essential design criteria to meet Vari-Form's requirements of high speed, reliability and accuracy.

Furthermore, to meet Vari-Form's minimal cycle time requirements, Eagle's bender control solution, BendPro G2, can overlap machine motions and achieve optimal manufacturing efficiencies.

Eagle Precision Technologies is a leading manufacturer of CNC tube and pipe benders, tube and pipe end-finishing equipment, muffler manufacturing equipment and tooling. The company is a global supplier with a history of over 45 years of machine building experience and an installed base of more than 8,000 pieces of equipment in more than 60 countries.

Eagle Precision Technologies Limited – Canada
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Email: sales@eaglept.com
Website: www.eaglept.com

Leading Chinese range of seamless steel tube products

Ningbo New-Era Steel Tube Co Ltd is one of the leading Chinese manufacturers and exporters of seamless steel tube products. Established in 1987, the company supplies customers located worldwide, including Germany, USA, Netherlands, Singapore, Korea, Argentina, and India.

Ningbo manufactures a range of seamless steel tubes ranging from 6mm to 323mm

The company provides seamless steel tube and pipe (cold drawn and cold rolled), together with high precision tubes. Ningbo can manufacture non-standard and special application tubes, according to international standards, as well as EN, DIN, ASTM, SA, and BS standards. The product size range is 6mm-323mm OD (1/8" to 12"), and width thickness from 0.8mm to 30mm.

In the region of 85 per cent of the company's products are for export. The main export standards include DIN1629/2448 ST37/ST52, ASTM A106/A53/API 5L Gr.B, DIN2391 NBK, BK+S, BK, ST35.8, ST52-3, DIN2440/2441 (EN10255) ST33-2, EN10216-2 (DIN17175 16Mo3, ST35), and ASTM A519 4130, 4140, 1020.

Ningbo New-Era Steel Tube Co Ltd – China
Fax: +86 0574 87700068 • **Email**: trade@xjygg.com.cn • **Website**: www.xjygg.com.cn

Debris stoppers prevent pipeline catastrophe

The embarrassment and expense of dropping tools or leaving debris down holes or in pipes during maintenance can often be prevented by using inflatable plugs. Conversely the same product can be used to prevent overhead debris falling on to operators or onto sensitive equipment. Huntingdon Fusion Techniques has extended its range of 'pipe stoppers' which are simply inserted and then inflated to seal a pipe or tube.

One of the earlier applications for this innovative product was at a UK naval dockyard faced with the task of preventing debris weighing up to 1kg falling into the nuclear power plant during maintenance. The stopper had to be fed through a 600mm aperture and then inflated to seal a 953mm diameter vessel.

HFT manufactured the stopper with safety ties so that in the event of the stopper collapsing and falling down the hole it could be retrieved. Additionally a skirt was incorporated around the periphery so that any dust and debris would not fall into the crevice between the vessel wall and the edge of the stopper.

Power generating companies have standardised on inflatable stoppers to prevent dust and particulate material falling into the turbines when repairs are undertaken. In addition, a number of pipeline companies use the stoppers to seal off pipelines at night or at the weekend to prevent entry of vermin and other animals.

Huntingdon Fusion can manufacture these stoppers up to several metres in diameter and can also produce non-circular section devices to meet specific customer requirements.

Huntingdon Fusion Techniques Ltd – UK
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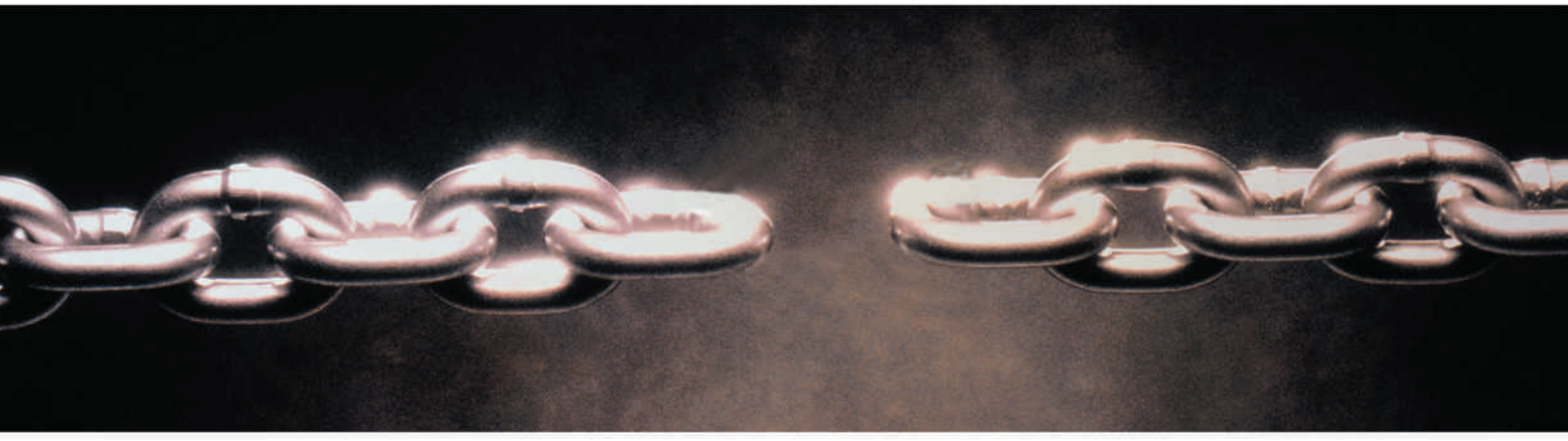
Email: hft@huntingdonfusion.com
Website: www.huntingdonfusion.com

Are You Missing a Key Link In Your Coil Entry System?



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Success of heavy-wall, high-yield upset pipe straighteners

Three producers of heavy-wall, high-yield strength OCTG drill pipe have chosen Bronx/Taylor-Wilson, USA, to supply a custom designed 6.CR.9 for hot straightening plain and upset end pipe.

Two machines have already been shipped, to Grant Prideco in Navasota, Texas, and to VAM Drilling in Houston, Texas. The third order is currently being manufactured by Bronx/Taylor-Wilson and will ship to Ipsco Koppel Tubulars in May 2008.

Bronx/Taylor-Wilson's six roll straightener

The machines are custom designed to handle $2^{3}/_{8}$" to 8" outside diameter, with wall thicknesses up to 1.25". The design load of the machine is 160 tons per straightening pass, which allows the machine to straighten materials with a yield strength exceeding 165,000 psi.

The machines have a quick opening feature implemented on all three top rolls to allow the upset end of the pipe to pass through the machine unrestricted. Designing the upset movements on top of the machine eliminates the need for any maintenance of cylinders in the base of the machine, an area typically flooded with water and scale from heat treated pipe.

The machine also implements numerous other design enhancements, such as a quick relief hydraulic circuit designed as protection in case an upset end pipe reaches a pair of rolls that are not open. The machines are fully-automatic and computer controlled, allowing seamless integration into the heat treat facility.

Bronx/Taylor-Wilson – USA
Fax: +1 330 244 1961 • **Email**: sales@btwcorp.com • **Website**: www.btwcorp.com

All-electric tube bending boosts efficiency at exhaust manufacturer

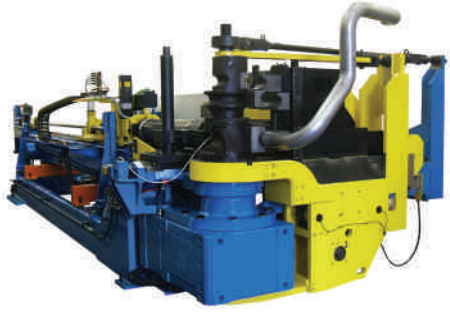
In its largest single order to date, AddisonMckee has provided complete exhaust solutions specialists, Dinex Group, Denmark, with over GB£1.1 million worth of tube bending machines. Dinex requested three all-electric DataBend tube bending machines as part of a substantial factory upgrade, to manufacture Euro 5-compliant exhaust components for the commercial vehicle exhaust market.

In order to provide the widest possible range of tube bending capabilities, the models ordered by Dinex were a DB150 ESRB machine (150mm maximum tube diameter, E – all-electric, S – multi-stack, R – multi-radius, B – boost), a DB130 ESRB model and a smaller radius DB100 ESRB machine.

Dinex also requested an upgrade for an older AddisonMckee hydraulic tube bender that had been in reliable daily service for almost twenty years, to enable it to incorporate AddisonMckee's latest control system.

Mr Christian Rogiers, AddisonMckee's director of global marketing, commented, "*Dinex required the capability to bend the tighter radius compound bends and complex parts that are increasingly becoming commonplace in commercial vehicle design.*"

AddisonMckee's all-electric DataBend tube bending machine



In order to meet Dinex's requirement to bend larger diameter tubing of up to 150mm, the DB150 ESRB model was equipped with an electric carriage boost of 150KN and a dual boost system to allow a true boost to the tangent point of the machine's tooling.

This model also significantly reduces tube wastage and considerably improves process cycle time when bending thinner wall, larger tube diameters on tight multi-radii.

The tube length is first boosted forward, via the use of the conventional boost carriage, to the point where, if progressed any further, the collet would interfere with the operation of the follower. In order to achieve further boost, and minimise waste material, the bending process is then switched seamlessly from collet boost to the company's newly developed internal boost system.

This process allows the maximum amount of material for bending to be presented by boosting right through the target point of the bending tools. An additional advantage of using this method to progress more tube through the bending dies is that traditional wear-out issues associated with the boost process are overcome.

Offering 150KN of electrical boost, the internal boost system reduces the amount of tube end scrap that is generated. Auto set-up, rapid changeovers and minimal downtime in between bending enhance productivity, while the use of all-electric technology means there are no hydraulic fluid temperature variances or contaminants.

The efficiency of electrical tube bending machinery was demonstrated by recent independent analysis by a customer using both hydraulic and electrically operated machinery. They compared a hydraulic 65mm diameter machine with an AddisonMckee DataBend DB 75 all-electric model by use of an amp meter with chart recorder for 3 shifts of normal continuous operation.

The findings, based on 237 days at 24 hours a day, concluded that annual electricity costs of the DB 75 all-electric model would be only 18.6 per cent of the cost of using the hydraulic tube bender.

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New centre of excellence for advanced products

In response to the increase in demand for advanced non-destructive testing solutions, Sonatest Ltd, UK, has created a new centre of excellence, with a dedicated team to support this growing sector and strengthen its position within the advanced NDT product market.

The development of the new Application Centre for Advanced Products and Projects (ACAPP) has taken place in order to provide high levels of technical support to end users and their specific applications, from consultancy to post sales stage.

Highly skilled, specialist engineers have been recruited to assist customers who require advanced NDT solutions and their specific applications. With a skill-set covering phased array expertise, mechanical, transducer and electronic design, together with software development, the ACAPP team is able to fully investigate and support all advanced application demands, providing bespoke solutions where required.

Products that are supported by the ACAPP group include the Harfang X-32 and other phased array products, the Sonatest NDTS Rapidscan2, Rapidscan-3d and the SFD-100 Systems Flaw Detector. At this level, these technologies require significant technical support throughout the sales process, often requiring proof of application suitability, involving testing and reporting, NDT effectiveness and system integration. Bespoke transducer development and instrumentation customisation are also supported. Some of this work will be carried out in the new facility of testing laboratories within Sonatest Ltd. Particular areas of expertise include composite inspection and on-line high speed scanning.

Sonatest's Rapidscan2 unit

The specialists within the ACAPP group are able to assist in developing procedures for product approval, integrating systems into end-users' workflows, training users and working on data analysis.

Sonatest Ltd is part of the Sonatest NDE Group of Companies, an independent manufacturer of ultrasonic flaw detectors, x-ray equipment, scanning systems, thickness gauges, transducers and NDT accessories.

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Website: www.sonatest.com

Accurate lengths with quick-change cut-off system

Roll-Kraft, USA, has launched the Rapid-Konvert cut-off system, an innovation based on Ardcor technology. The quick-change cut-off system provides accurate cut lengths throughout the entire speed range, with operation via a simple touchscreen. The system is operated by press, die, and closed-loop servo-driven controls.

The integrated die frame, cylinder, and carriage can be quickly changed between vertical and angular cuts. The quick-change die inserts are round for easy conversion between vertical- and angle-cut applications. Inserts are designed for long life, and can be sharpened using any conventional grinder. The die set with hydraulic cylinder is easily rotated within the frame for vertical or angled cutting action, with no need to remove hoses or change die sets.

The Rapid-Konvert cut-off system

Precision linear rails provide a quiet and low-maintenance system, and speeds of over 600ft per minute are possible, depending on the application. An electric servo motor and controls provide accurate and repeatable cuts within the specified range, by simply entering the desired speed on the display screen. Ardcor's Rapid-Konvert cut-off system can be fully integrated with existing equipment.

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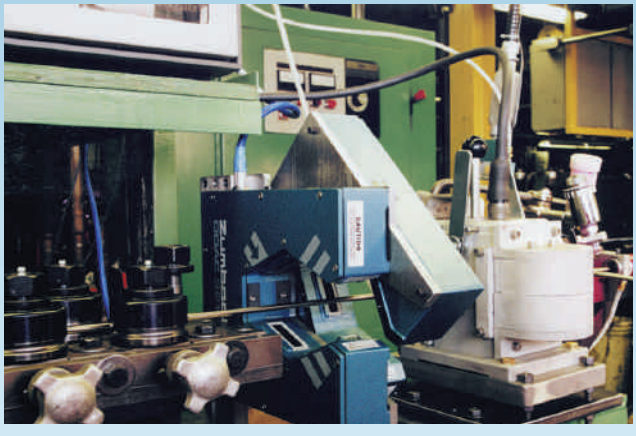

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Besides the above-mentioned systems, Zumbach also manufactures systems for the ultrasonic wall thickness measurement on tubing, pipe and hose made of plastics and rubber, as well as systems for cross-sectional measurement of hollow and full profiles.

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QuickSwitch system for inline pipe dimension change

KraussMaffei, Germany, is a supplier of key application technologies for the plastics and rubber compounding and processing industries. Since launching its QuickSwitch system for inline pipe dimension change in 2003, KraussMaffei Berstorff has sold more than 24 systems. Initially available only for polyolefin pipe production, in 2006 the company launched a version for PVC pipe.

In Europe, the company has taken orders for a number of complete QuickSwitch systems. A polyolefin line for the diameter range 25mm to 63mm, plus a single-layer pipehead, has been supplied to Italy. A system for the 70mm to 160mm diameter range with a 3-layer pipehead is already installed and in operation with another Italian customer.

The technology is also gaining ground in Eastern Europe, where QuickSwitch systems for polyolefin pipe in all three available diameter ranges have been installed. The systems operate with the single-screw extruders KME 60-36 B/R, KME 75-36 B/R and KME 90-36 B/R, respectively, and are teamed up in each case with a single-layer pipehead. A reference line is due to be commissioned shortly with a customer in Austria, who will be producing polyolefin pipe in the diameter range 160mm to 250mm.

A QuickSwitch system from KraussMaffei Berstorff

Pipe manufacturers outside Europe, for example in Iran and Australia, are also benefiting from QuickSwitch's dimension change on-the-fly. Extrusion lines for PO pipe will shortly go into operation in these countries. QuickSwitch systems allow press-button change to pipe dimensions – within the designated diameter range – without stopping the production line. This reduces the production time lost to dimension change to a minimum, and makes the production of small batches of a particular dimension financially viable.

The company currently offers QuickSwitch for polyolefin pipe in three diameter ranges: 25mm to 63mm, 70mm to 160mm and 160mm to 250mm. QuickSwitch can be used flexibly in the production of both single- and multi-layer polyolefin pipe within the designated diameter range. The PVC QuickSwitch system can process all available PVC dryblends and C-PVC, and covers the diameter range from 90mm to 160mm. The company is also developing QuickSwitch systems for other dimensions and other raw materials.

QuickSwitch is available either as a complete fully-automated extrusion line or as an upgrade package for existing conventional lines. The upgrade package allows a phased conversion from conventional pipe production to flexible production with QuickSwitch.

KraussMaffei GmbH – Germany
Fax: +49 89 8899 3092
Website: www.kraussmaffei.com

Thermal insulation for sub-sea oil and gas flow-lines

Dow Hyperlast, a business unit of The Dow Chemical Company, has introduced Hyperlast™ 7980327 low density syntactic polyurethane, which features insulation and protection enhancements for sub-sea oil and gas flow-lines and similar marine applications worldwide.

With over 22 years' experience in developing sub-sea insulation and protection products, Dow Hyperlast has developed the material using an environmentally non-hazardous catalyst system which reduces potential waste disposal costs. With a K-value of 0.105 w/mk, Hyperlast 7980327 requires reduced thickness to achieve a specified level of insulation (U–value), while the lower density results in less kilos per metre of coated pipe.

Dow Hyperlast has developed a new polyurethane for sub-sea lines

Practical benefits include increased capacity for carrying reels of pipe on lay ships and pipe barges, with potential savings resulting from the reduced number of trips during pipe laying operations. Processing of the new product is as easy as the existing Hyperlast Syntactic 512™ product, with fast production cycles requiring low energy demands.

Dow Hyperlast was created after Dow Polyurethanes, a business group of The Dow Chemical Company, acquired British Vita's polyurethane systems business, Hyperlast Limited. The Hyperlast acquisition includes elastomer systems enterprises in the UK and USA, as well as Autothane Limited, a manufacturer of advanced automotive suspension components. The addition of Hyperlast expands Dow's ability to produce innovative spray cast elastomers for the marine, engineering resin, oil and gas pipeline and automotive industries.

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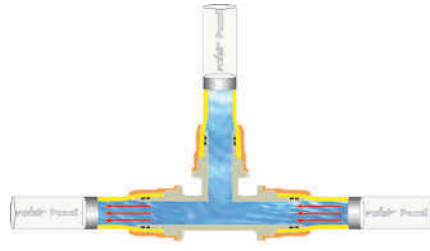
Website: www.hyperlast.com

Specialist in multilayer pipe and crimp-fittings in PPSU

Valsir, Italy, is a specialist in the technology of multilayer pipes and crimp-fittings. The company's Pexal-easy is an advanced system of fittings made of Polyphenyl Sulfone (PPSU).

The material's characteristics make the new Pexal-easy fittings equal in performance and quality to brass fittings. The elevated mechanical characteristics (including tensile strength and modulus of elasticity) exceed those of normal polymers, and are similar in performance to metal fittings, withstanding accidental or deliberate blows, either at low or high temperatures. The body of the fitting, the nuts and the threads are all made from PPSU.

Pexal-easy also possesses elevated ageing resistance that is maintained even at high temperatures. The structure of the fittings is immune to chemical agents, and it can therefore be laid in grooves or in surface mounting. Connection between the pipe and the fitting is carried out easily, reducing the laying times. An innovative system that locks the nut onto the fitting ensures a firm connection with the pipe, eliminating the possibility of error, and the base of the thread features a special anti-loosening profile.



An example of the use of Valsir's Pexal-easy pipe fittings

The fitting can be reused without having to replace the o-rings or the nut. Unlike other systems, with Pexal-easy there is no reduction in the bore when passing from the pipe to the insert, meaning a significant reduction in pressure drops. Where a $^{5}/_{8}$" pipe was required, with Pexal-easy it is possible to use a $^{1}/_{2}$" pipe.

Valsir SpA – Italy
Fax: +39 0365 820 261
Website: www.valsir.it

Small diameter thin wall tubes

High Tech Tubes Ltd, UK, supplies small diameter and thin wall tubes to the aerospace, electronics, instrumentation and medical industries worldwide.

The company is an independent manufacturer, specialising in producing non-standard tubes with tight tolerances, mainly in stainless steel and nickel/nickel alloys. These products are also supplied in aluminium alloys, OFHC and DHP copper, 70/30 brass and 70/30 cupro-nickel.

Outside diameters range from 0.25mm (0.01") to 16mm (0.625"), and wall thicknesses from 0.05mm (0.002") to 1mm (0.04").

The company also produces profile tubes, including square, rectangular, hexagonal, elliptical, flat oval, triangular and half-round sections. Quality assurance is covered by ISO.9001:2000 and the International Aerospace standard AS.9100:Rev. B.

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All-electric tube bending brings quality finish to hydraulic tube components

Pressure Tubes Limited, UK, is a supplier of manipulated tube components, assemblies and systems intended predominantly for hydraulic pressure applications. Since 2004, the company's focus has been on supplying 'yellow goods' OEMs, such as JCB and Terex Construction, with products that can be delivered straight to vehicle assembly lines for just-in-time fitting to backhoe loaders, excavators and various other construction and agricultural industry equipment.

The BLM E-Turn CNC tube bender deposits finished components onto a storage rack prior to inspection and dispatch

With this in mind, the company took delivery of a BLM E-Turn right and left hand computer-controlled tube bending machine capable of completing complex tube components in one cycle.

The new machine is equipped with an automatic loading and unloading facility that enables it to run for long periods with the minimum of supervision, allowing the operator to carry out other ancillary work. This is one aspect of the sweeping changes being made to the way in which customers' orders are progressed through the 30,000ft^2 factory.

"*Having decided that our business should focus on hydraulic system components, we set about improving the efficiency of the manufacturing process with the intention of reducing the overhead and generating funds for new investment,*" said Pressure Tubes Limited's Phil Harrison. "*We installed the E-Turn in February 2006 and are now looking to buy a second machine, one incentive being that, unlike our existing hydraulic-powered tube benders, the all-electric E-Turn can run unmanned. Programming is simple, set-up times are much shorter and parts can be completed in a third of the time taken on our other tube bending machines.*"

The company reports that turnover has increased five-fold since 2004, to £3.6 million, as the result of various initiatives. For example, Pressure Tubes previously bought in 6m lengths of hydraulic tube, which were then cut, deburred and washed in-house before bending. Now tube is being delivered cut to length against specific part numbers, and ready to go straight onto the E-Turn. After bending, components can be delivered to a new robot welder for tee pieces and brackets to be TIG-welded precisely into place.

"*Once you have succeeded in securing new business, it is close attention to quality, delivery and price that makes sure you keep it,*" commented Mr Harrison. "*This is why we opted for the BLM E-Turn. Our customers tend to order small batches of a wide variety of parts on a just-in-time basis, and this means we must be in a position to guarantee our process efficiency and machine reliability.*"

Because the complete head of the E-Turn rotates through 180°, it is capable of left and right-hand bending in automatic cycle, which eliminates work-in-progress. As to part quality, complex hydraulic tube components requiring radii of less than 1x diameter can be manipulated using the integral 'bend boost' device; this can have its power modulated during the bending process to avoid unsightly stress marks.

The controllability of the E-Turn's 12 axis movements – courtesy of the Visual Graphics Programming (VGP) software – ensures that components are not only produced right first time, but are repeatable batch to batch without undue reliance on operator expertise. Since all axis movements are set automatically, job changeovers, typically, are completed within two to three minutes. The VGP software also allows checking on-screen, providing a reliable guide to component cycle times and identifying any possible collision risk. Because the PC-based control selects the correct parameters, the guesswork is taken out of the tube bending process. An added bonus for Pressure Tubes is the fact that the E-Turn is environmentally friendly, since power is only required during axis movements.

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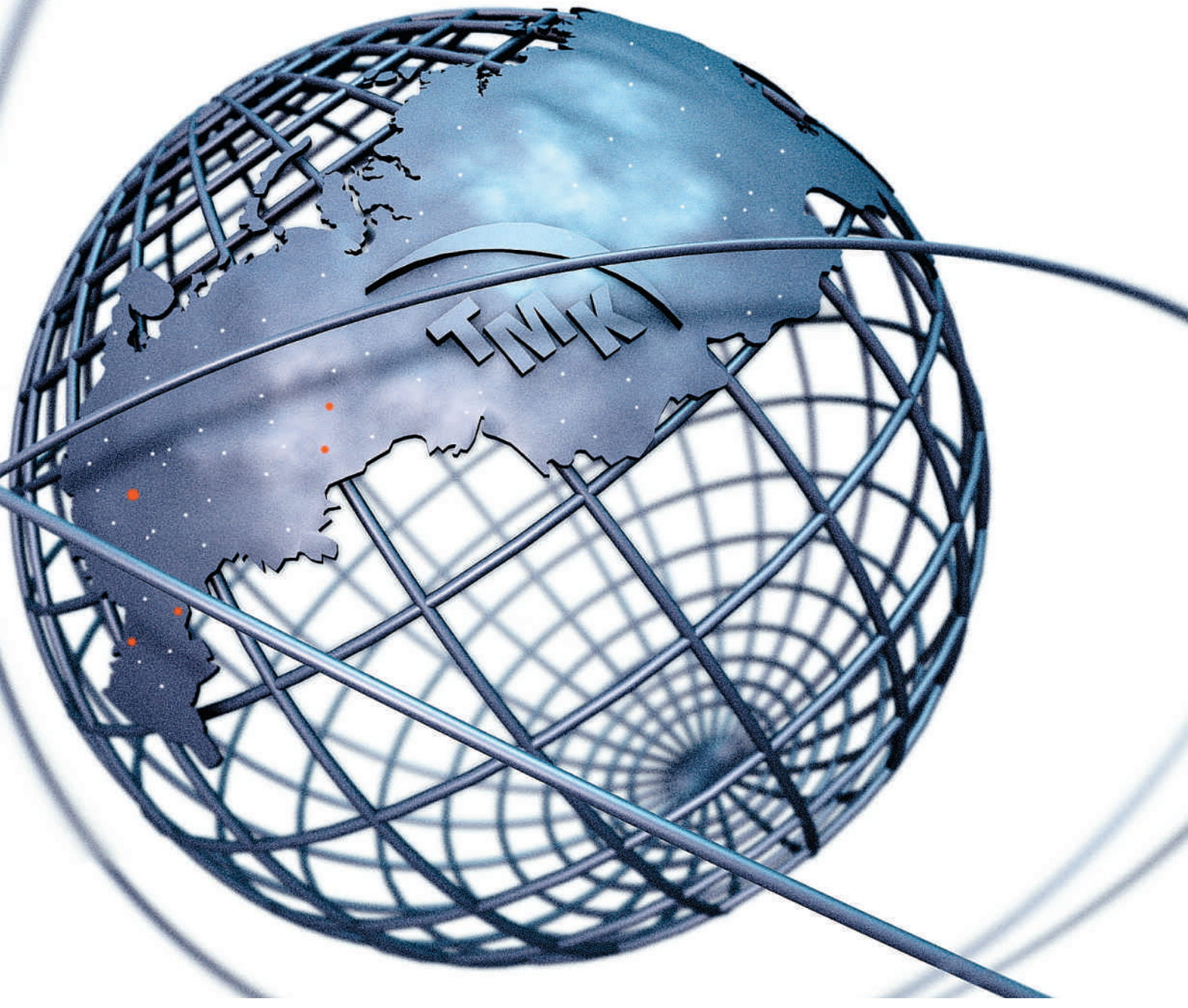

TMK is one of the leading manufacturers of pipe products in Russia and the world. The Company's production facilities are located in Russia and Romania. The Company's products are supplied to more than 60 countries around the world.

TMK's products are used in the oil-and-gas complex, in energy, machine building, construction, shipbuilding, in aviation, space equipment and in agriculture. TMK's products are certified according to international standards.

TMK representative offices operate in Azerbaijan, Kazakhstan, China, the USA, and also in countries of South-East Asia, the Middle East and the European Union. The company TMK Global AG is TMK's exclusive dealer outside the borders of Russia and the CIS.

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Sleeve-technology steel pipe coating unit

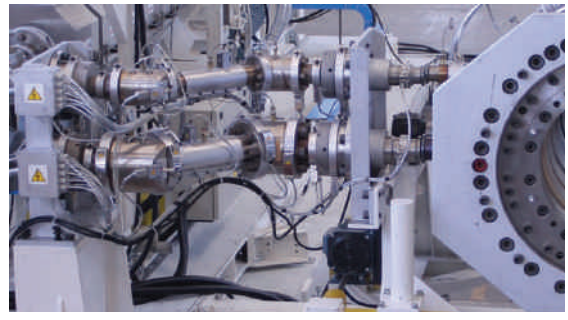
Bandera, Italy, has completed the production of the latest version of its extrusion platform for the coating of steel pipes with sleeve technology, for shipment to a Russian coater.

The system is suitable for coating pipes up to Ø 21", and includes an extrusion platform supporting two extruders. One TR160 series machine will be used for PE extrusion, with the other TR85 series unit used for tie resin – meaning a total output of 1,250kg/h. The extruders are equipped with bimetallic barrels, the extrusion screws are coated with a special wear-resistant and antifriction alloy, and AC motors with 'direct torque control' vectorial inverters are used.

Temperatures are controlled by multi-loop modules connected to the PLC (Siemens S7 300) by Profibus cables, and all parameters are managed from a supervising PC. The platform is designed to adjust its position forward and backward in the pipe direction, in order to optimise the distance between the primer cabinet and the extrusion head, depending on the primer being used.

The latest extrusion platform from Bandera

The equipment also features an automatic pipe-head axis self-aligning system. Sensors are located at the inlet side of the head and detect pipe position. The head, connected to the extruders by special flexible adapters, is motorised in such a way that it is able to move both in X and Y directions at the same time. In practice, the head can follow the pipe's bending deformation, and optimise the coating thickness uniformity, allowing a considerable raw material saving.



The automatic pipe-head axis self-aligning system uses flexible adapters

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All-electric tube bender cuts fabrication times for aircraft ducting parts

The installation of a Unison all-electric tube bending machine is helping Senior Aerospace SSP to dramatically reduce

cycle-time and improve efficiencies for fabricating aircraft duct components with complex shapes. Tubular parts with multiple bends are now fabricated in a single machine stage, eliminating a manually-controlled hydraulic bending process that could take a week or more.

Senior Aerospace SSP makes ducting components for many of the world's leading aircraft manufacturers, for applications such as engine exhaust gas recirculation, de-icing systems, and air conditioning. Most of the tubing parts are fabricated in small batches from exotic materials such as 625 and 718 Inconel, and titanium.

Because of the space restrictions on most aircraft, parts often have complex 3D shapes with closely-spaced bends. Fabricating these using Senior Aerospace SSP's manually-controlled hydraulic bending machinery typically involved a start-stop process, with bends made one at a time.

This involved fitting the tooling and setting the machine up for each bend. Bent parts would then be sent off for cleaning, and the exercise repeated for the next bend one or more days later. This meant that for parts with three or four bends, a complete fabrication cycle could often last a week or more.

To improve productivity, Senior Aerospace SSP invested in an all-electric tube bending machine from Unison, for tubing sizes up to 4" (100mm) diameter. The bending axes on this machine are based on software-controlled servomotors. Tool settings for tube parts are stored in software, allowing the machine to be setup and a complete sequence of bends to be made in a single continuous process.

Several of the parts being made have such closely spaced bends that the machine is programmed to accommodate specially-designed compound tooling that grips the previous bend, because the straight sections between bends are too short for conventional clamping tools.

The machine also has the ability to stack as many as four bending tools at once onto the bending head. This saves considerable setup time by allowing a variety of jobs to be run without having to make a new setup.

Tubing parts with multiple bends – which are typically fabricated in small batches of up to 20 with production cycle times ranging from several days to two weeks – are now almost invariably produced in a single shift. Unlike the previous manually controlled bending process, these batches are also typically produced without any scrap, as the machine's closed-loop control maintains axis settings to a very fine resolution, regardless of variations in operating conditions such as temperature.

"The Unison machine has allowed us to trim days off the normal fabrication times for many of the complex tubing parts we produce, as well as eliminating intermediate cleaning processes," says Mr Thomas Marshall, manufacturing engineer at Senior Aerospace SSP in Burbank. *"It's playing a valuable role in improving the productivity and flexibility of one of our key component production processes."*

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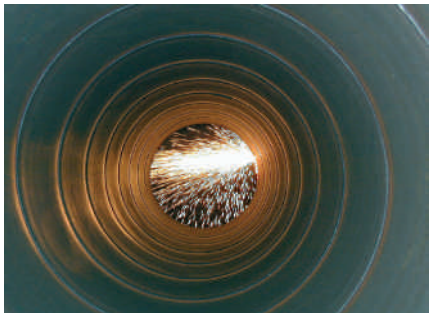
Extensive range of pipe and fittings from Turkey

Petek Boru Sanayi AS, Turkey, is the manufacturer of an extensive range of pipe and pipe fittings. Established in 1979, the company's factory in Izmit provides 22,300m² of land, with 12,300m² under cover area.

The company is specialised in five product areas. These product lines include production of (SAW) spirally welded pipes (carbon and stainless steel) from 12" up to 48" in diameter, with 2-12.7mm wall thickness. Standard pipe lengths are 6-12m, although any special diameter or pipe length can be produced on demand.

Petek Boru manufactures SAW spirally welded pipes (carbon and stainless steel) from 12-48" Ø

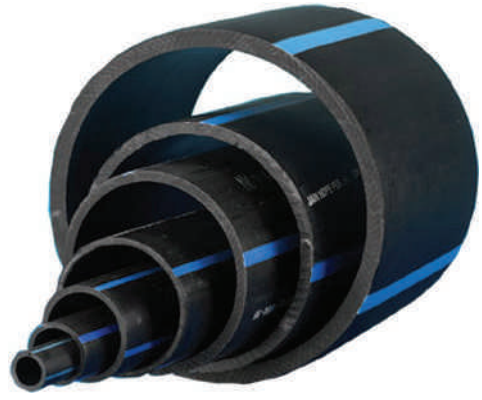


Pipes are manufactured in accordance with EN 10217-1 standard. Petek Boru also supplies ERW, seamless, ductile iron and chimney pipes.

Also in the Petek Boru scope is internal lining and external coating of steel pipes. This capability includes coal-tar epoxy and solvent-free epoxy (according to EN 10289), cement mortar (according to AWWA C 205), bitumen (according to DIN 30673), PE-polyethylene (according to EN 10288/ DIN 30670), polyurethane (according to EN 253/EN 489), and FBE-fusion bonded epoxy. Coatings are provided for sewage, natural gas and linepipes. As a result of these coatings, pipes are prevented from heat loss and corrosion inside and out.

Petek Boru also manufactures HDPE 100 pipes between DN 50-DN 250 and PN 2.5-PN16, corresponding to wall thicknesses of 2mm-22.7mm. Standard pipe lengths are 6-12m. All PE 100 pipes are manufactured according to EN 12201-2 standard.

PE 100 pipes are mostly used in water supply and wastewater lines and for drainage, agricultural irrigation, transfer of chemical fluids and food industries as well as for telecommunication and signalling cables.



Internal lining and external coating of steel pipes is available from the company

Finally, the company produces 45° and 90° steel elbows (carbon and stainless) up to 8" in diameter.

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Tube manufacturer counts on TubeInspect S for prototyping

EMW, Germany, a medium-sized manufacturer of tubes, has successfully developed from a classical metalwork shop to a modern, creative tube manufacturing workshop.

Aicon's TubeInspect S provides high-precision tube measurement

Since 2006, the company has applied Aicon's TubeInspect S optical tube measuring system, for measuring sample tubes and setting up its bending machines. The company has not only saved time in reverse engineering, but also decreased the costs of materials. In addition, the measuring results of TubeInspect are completely independent from the user, so they are reliable and repeatable.

TubeInspect, from Aicon 3D Systems, Germany, is a non-contact measuring system. The tube to be measured is placed in an optical measuring cell, and several high-resolution digital cameras accurately measure the tube's geometry in only a few seconds. The bending data is reported in an easily understandable way, and can be directly transmitted to the bending machines.

This procedure is very time-saving for EMW, compared to the manual generation of bending data. Markus Klass, production manager at EMW, commented, "*The advantages are particularly easy to see when a sample tube possesses many bends. Sometimes, we work with prototypes with more than 15 bends. If you are then supposed to find out the correct bending data by trying, it will take you a long time, even with expert knowledge. Now we can rely on solving the task with TubeInspect S in just a few seconds.*"

Interior view of the TubeInspect system

The measuring system is also of benefit when expensive materials like stainless steel are processed. EMW is now in a position to determine the correct geometries of a sample tube, and to set up the bending machines with almost no rejections, decreasing the costs of materials.

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Specialised machines for permanent product embossing

ASD Automation und Sondermaschinenbau GmbH, Germany, is the specialised manufacturer and supplier of stamping and embossing machines for marking a variety of steel and metal parts. The company offers a new generation of ULU-standard-universal machines that claims to cover around 90 per cent of user requirements.

With largely identical parts and modules, these machines remain universal while allowing further optimisation. They have additional functional units and parts, allowing the machine to provide extra fields of application and optimal adaptation of the machine(s) to the product sizes. This increases the efficiency of the production throughput, reduces cost and boosts productivity.

A highlight of the ASD capability is the innovative roll-on embossing machine range – branded ULU 80/170 – which is universal, longitudinal and circumferential. This machine provides a range of functions for state-of-the-art embossing and marking technology.

The ULU 80/170 offers longitudinal (continuous) roll-on embossing for strips, coils, metal sheet, pipe (plastic/metal), thin-wall pipe, and sections of all kinds (eg round, square, hexagon, oval, flat, formed). Embossing is carried out along the longitudinal axis, with specified distances, to an accuracy of approximately 0.1mm. Full and variable feed-through speeds are possible, up to approximately 200m/min. The machines can also be used for round (circumferential) roll-on embossing of short and long pipes, pipe fittings and one-sided form bent pipes.

The roll-on embossing machines are universal, enabling marking of a variety of cylindrical parts on the circumference, multiform, and in one or more lines, or with reductions. Marking can also be carried out on coils and long metal sheets in varying widths on cut-to-length machines (eg they are ideal for steel service centres).

Also fully automatic, the machine enables fully automatic feeding and conveying of large throughputs. This can be applied to marking on the circumference in single or more lines, eg for fittings, sockets, hose casings, ferrules and threaded bushes and other mass-produced short round parts and thin-wall products.

The feeding devices can be modified and adjusted accordingly. Each feeding and unloading stroke of a/m mass-produced parts occurs without any compressed air consumption (presently the most expensive energy source). Consequently, there is a constant guarantee of high efficiency – particularly in cases of larger batches.

These four capabilities (longitudinal, circumferential, universal and automatic) equate to four machines in one. They lead to high flexibility and variety, resulting in numerous and versatile possibilities of application. This enables rapid set up and accommodation of products up to Ø 80/170mm. With a modular extension, the machine can even be used for circumferential marking of flange rings and pipe sections up to around Ø 1,000mm.

With rapid change of embossing types, two sizes are available as standard machines, enabling optimal adaptation to diverse and different products. The machines have many configurations, ensuring versatile and flexible modular systems with an upwards compatible design. Upgrading can be carried out as required, together with future retrofitting.

Accessories include special embossing types for thin-wall pipes, flexible pin designs, and various cleaning devices. Round profiles can also be marked longitudinally and on the circumference while in the same position, by using a conveying device with a rapid 90° pivot.

Universal machines (ULUs) of a larger size can also be supplied. In addition to the universal machine, other standard machines are available. The company also has in-depth knowledge of feeding, conveying, handling and automation of parts. ASD is also an expert in the field of drive technology, low backlash and highly dynamic positioning drives for robots, machine tools, handling, automation, gearboxes and gear motors.

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Mexican delivery for latest 2K mill with quick-change system

Abbey International, USA, has been awarded a contract for a 2K-3.0 mill with entry equipment by a customer in Mexico. This new installation can produce squares, rectangles and tube with an OD minimum of 15.8mm (0.625") to 79.3mm (3.125").

The main feature on this mill is that changeover times for changing the forming, fin, and sizing sections of the mill is approximately ten minutes using two people. This mill is capable of a quick changeover because it incorporates the Abbey patented third stand quick-change system and driven continuous cart transfer (CCT) system.

The 2K-3.0 mill with quick-change system

This system is the one of the most productive systems offered by the company for quick change. When using the automatic or semi-automatic mill quick changeover systems, all mill driven stand spindles are automatically disconnected and reconnected to their respective drive units. To accomplish this, a third stand design is incorporated with proprietary automatic coupling location features.

This design consists of conventional front and rear stand housing assemblies which are mounted on the exchangeable sub-bases and third stand assemblies that are mounted on the fixed mill bases. The conventional stand driven spindles are interconnected to the third stand spindles through the use of specially designed quick disconnect type couplings.

The patented continuous cart transfer (CCT) is a driven cart system designed to receive sub-plated mill sections during semi-automated changeover of the mill. This eliminates the use of an overhead crane for sub-base exchange. The cart is a fabricated structure with an integral drive system to motivate it parallel to the mill line.

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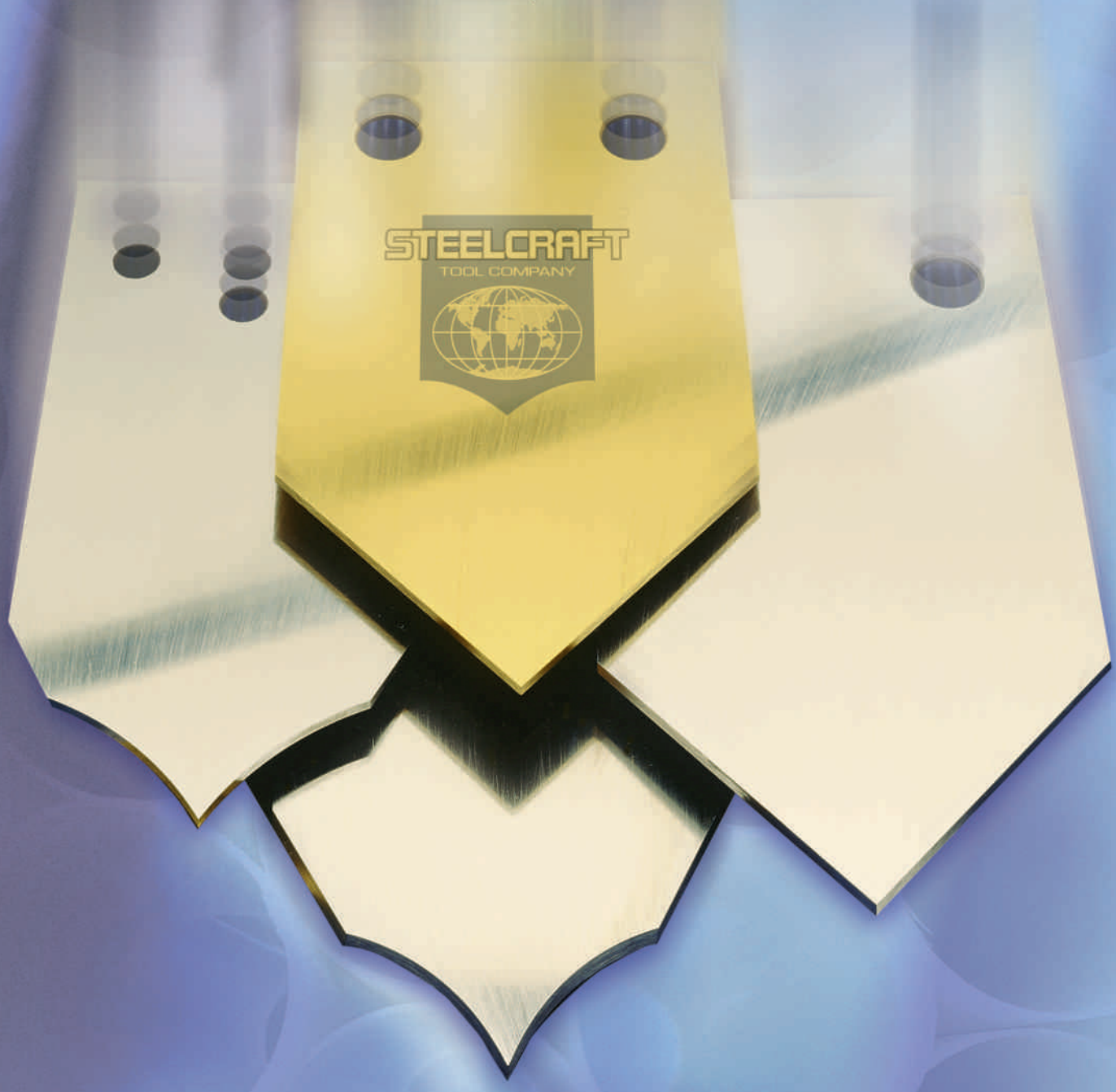

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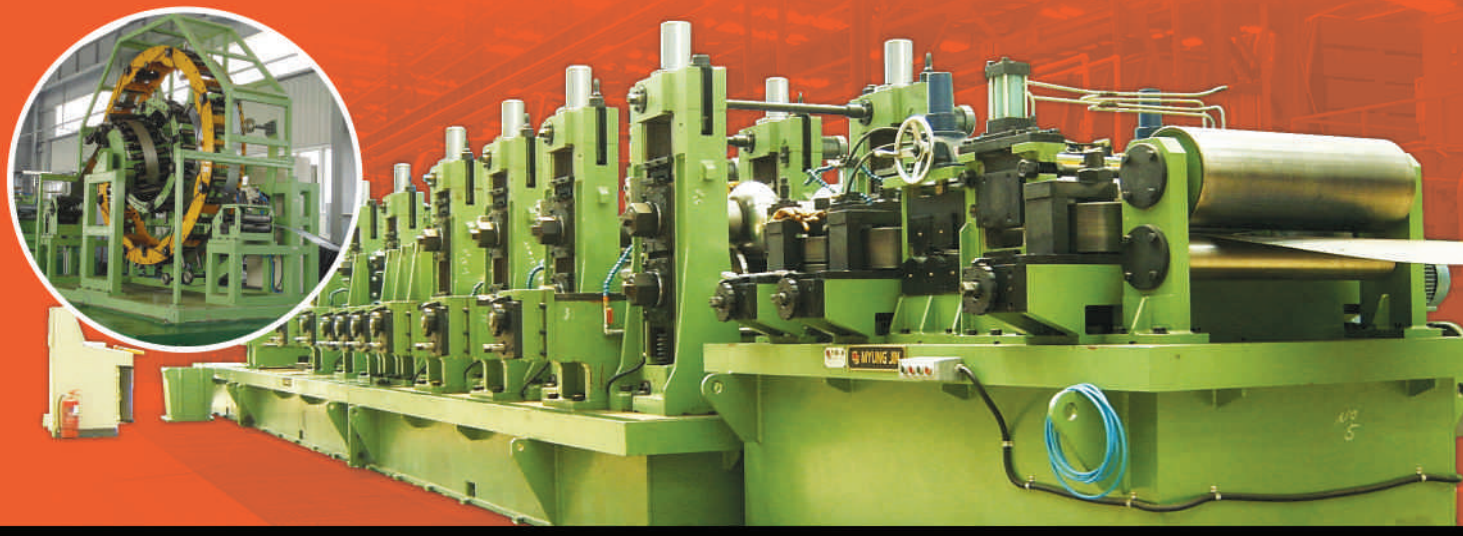
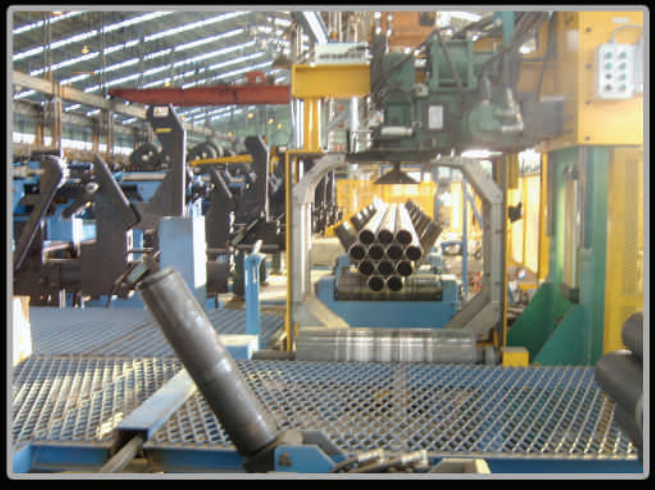


Auto packing M/C



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SMS Meer supplies fourth large-diameter pipe mill to China

Zhongyou BSS Petropipe Co Ltd, China, a subsidiary of the Baoji Petroleum Steel Pipe Co Ltd, has placed an order with SMS Meer for the supply of a large-diameter pipe mill. The new mill, which will have an annual capacity of up to 150,000t, employs the company's JCOE® process.

It will be used to produce longitudinal SAW steel pipes with diameters from 508 to 1,422mm and wall thicknesses up to 40mm in lengths of maximal 12.2m and material grades up to X100.

The JCOE® process has established itself on the market worldwide in competition with the UOE process and three-roll bending process due to its higher flexibility with high product quality and lower investment costs. It has been employed in ten pipe mills to date in recent years.

SMS Meer is to supply the key machines for the plant, such as the plate edge miller, the technological components of the crimping press, the JCO® pipe forming press, a hydraulically adjustable tack welding machine and a mechanical expander.

The pipes produced will be employed in pipeline construction and meet all the relevant API standards. They are intended for use in pipelines transporting oil and gas from Chinese rigs in the northeast of the country to the major cities in the east and southeast.

On the JCO® pipe forming press, the plate milled and crimped at the edges is gradually guided over its whole length onto the forming tool by means of manipulators. This results in an open-seam pipe with parallel longitudinal edges offering optimum preconditions for pipe welding. The JCO® pipe forming press designed as a short-stroke version operates with a maximum press force of 65 MN.

The JCOE® process is also the most suitable process for the production of small-diameter pipes with large wall thicknesses. The market segment for offshore pipelines can also thus be served. The tack welding machine with hydraulically adjustable roller beams is being employed for the first time in China. In a roller cage, the 80mm to 150mm wide gap between the two longitudinal edges of the open-seam pipe (resulting from the forming process), is continuously adjusted parallel and tack welded under inert gas.

This tack weld serves during the subsequent submerged arc welding (SAW) process as a weld pool backing. The roller beams of the roller cage are individually positioned servo-hydraulically. They can also be readjusted under load, if necessary, so that the pipe longitudinal edges are brought optimally together.

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New pipe grade aids long-term water conservation

Borealis, a provider of innovative, value creating plastics solutions, has launched BorSafeTM HE3490-LS-H, a new poly-ethylene (PE) pipe grade for pressure pipes.

This new solution expands the durability of PE pipe systems for water distribution by delivering an easy-to-lay response to the tough installation techniques facing installers and utilities. It also contributes ▸▸▸

to water savings by eliminating leaks and ensuring long-term performance for utilities and consumers. The United Nations calculated that over 2 billion people face water scarcity, making its conservation one of the most urgent global challenges.

Pipes manufactured from BorSafe are characterised by their resistance to slow crack growth – one of the key requirements for water pressure pipes. Slow crack growth can be caused by surface scratches or notches created prior or during installation, or by external point-loads on the pipes, such as rocks. The phenomenon can cause long-term weakness in pipes, allowing water to escape.

The durability of BorSafe HE3490-LS-H was tested by passing it for 18,000 hours in the Notch Pipe Test (NPT), 100 times more than required by the European standards for PE drinking water pipe systems. BorSafe also exceeds the specified German requirements, defined as Full Notch Creep Testing (FNCT).

BorSafe HE3490-LS-H is suitable for the latest installation techniques, such as old pipe relining or sandless bedding filling, which have a tougher, more aggressive impact on pipes, but deliver faster, cheaper installation with less environmental disturbance.

BorSafe grades are produced using Borealis' proprietary Borstar PE 2G technology, the latest generation of multi-modal processes that enable the molecular tailoring of PE, to provide an optimal balance between processability and mechanical strength. In addition to durability, BorSafe HE3490-LS-H benefits pipe converters, due to its extrudability.

German pipe producer Gerodur has chosen BorSafe HE3490-LS-H for its multi-layer pipe system for non-conventional installation techniques. Mr Henke, managing director of Gerodur, commented, "*Our system has been designed to answer the latest trends in installation techniques which are more demanding on the pipe. Borsafe HE3490-LS-H is the cornerstone of this system, and we have chosen it to help ensure long-term reliability and service-life to our customers.*"

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Tooling service for tube bending machine manufacturers

Bend Tooling Inc, USA, is a manufacturer of products for rotary-draw tube-bending, including inserted mandrels and wipers, single-piece poppet links for high-production tube-bending, and offset-geometry feathered edge wipers for high-pressure tube-bending. The company also offers tapered-leaf die sets for easy loading and unloading of square and rectangular tubes.

The company has drawn upon its experience to provide a new engineer-to-order tooling service for manufacturers and distributors of rotary-draw tube-bending machines. The service includes complete design-and-build of tool sets from raw data, ranging from standard sets for single-bend jobs, stacked sets with compound clamps for multi-bend applications, to elliptical tooling for hydroforming pre-bend operations.

Bend Tooling Inc now provides an engineer-to-order tooling service

Die sets are available in a number of styles: inserted, double-inserted, quick-change, integrated stack, platform, and tapered-leaf. Mandrel and wiper tooling is also available in different styles, inserted and solid-body. All Bend Tooling products are precision-machined to completion (with no hand-working), including wiper feathered edges. All die sets feature a proprietary metallurgy and heat treatment for precision, toughness, and durability. All mandrels and wipers are manufactured from high-quality nickel-aluminium-bronze, aluminium-bronze, and alloy steels.

Bend Tooling uses Datafacturing®, an automated manufacturing technology, to quickly deliver tool sets to machine-builders and distributors.

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Equipment for corrugated and spirally wound plastic pipe production

Cincinnati Extrusion, Austria, is a supplier of extrusion lines for producing smooth and corrugated pipe. In recent years, the demand for corrugated pipe has increased, particularly for wastewater and sewage transport in pipe diameters up to 1,200mm.

Pipes up to 3,000mm in diameter are manufactured by a spiral-winding process. Bauku is a German company that provides machinery for the production of spirally wound large-diameter pipe. Cincinnati Extrusion has entered into a partnership with Bauku to supply extrusion lines for spirally wound pipes, combining expert machine technology from Bauku with latest extrusion technology from Cincinnati Extrusion.

In the Bauku production process, the extruder is placed on a mobile carriage running on rails alongside several winding stations. The winding stations are designed to accommodate mandrels from 300mm to 3,000mm nominal width (a width of 3,500mm is also possible, as an option).

With different profile dies, the extruder can produce virtually any type of pipe profile and also extrude pipes with high wall thicknesses by stepless or multi-layer processes.

The standard length of pipes produced is 6m. As a rule, these pipes are extruded with a socket and spigot, so that the socket joint automatically becomes an integrated part of the finished product.

The basic extrusion line model is used to produce spirally wound pipe with diameters ranging either from 1,100mm to 1,800mm, or 2,000mm to 3,500mm. The winding stations required for each diameter range can be retrofitted on a modular basis. Lines can also be supplied that are specially designed for small pipes (300mm to 1,000mm).

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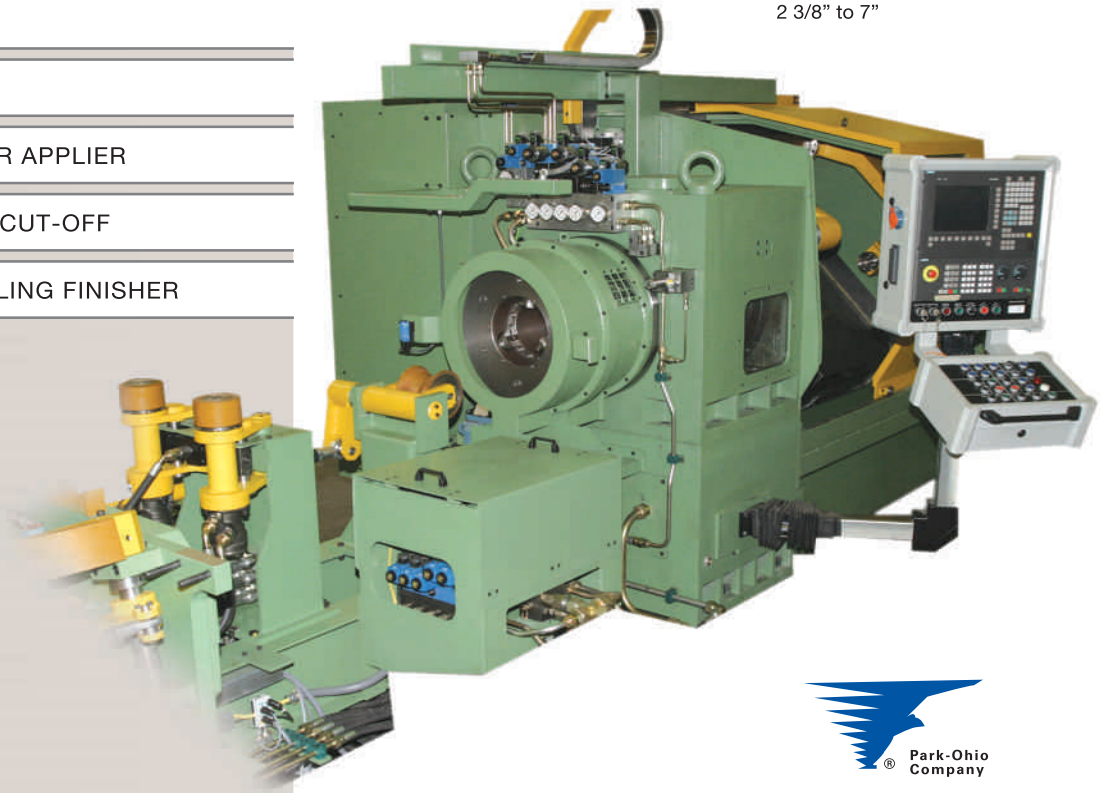
- DRIFTER
- PROTECTOR APPLIER
- COUPLING CUT-OFF
- CNC COUPLING FINISHER

MODEL

RPP07-3

60.3mm to 177.8mm
2 3/8" to 7"



Park-Ohio Company

WORLD LEADER

IN TUBULAR FINISHING TECHNOLOGIES

www.pmc-colinet.com

New 500A diesel driven welding generator

Wilkinson Star Ltd, the sole UK representative of Mosa engine driven welding and generating sets, has launched a new Mosa DSP (Digital Signal Processing) 500 PS water cooled diesel driven welder generating set. This equipment includes chopper technology complementing Mosa's existing 400A, 600A and 2 x 400A Perkins powered 1,500rpm machines.

This new multi-process (MIG, TIG and MMA) welder generator meets EEC directives. It is designed for use on pipelines producing X-ray quality welds, arduous onsite fabrication, petrochemical plants, heavy plant maintenance, offshore operations as well as onsite general purpose welding and maintenance.

The Mosa DSP 500 PS water cooled diesel driven welder generating set

It has multi-purpose DC ripple free welding capability including MMA, MIG, both solid and flux cored wire and TIG.

The constant current (CC) range is 10-500A at 35 per cent duty cycle for MMA and TIG welding, whilst for MIG welding the constant voltage (CV) range is 16-44V with 35 per cent duty cycle at 450A.

It can provide 3-phase AC auxiliary power at 16 kVA/400V/23.1 A and single-phase AC generation at 12 kVA/230V/52.2A with a single-phase option of 6 kVA/110V/54.5A. The Perkins 404 C-22G water-cooled, 4-cylinder diesel engine has a low 69dB(A) noise level at 7m. The 60l fuel tank gives up to 15 hours running time at 60 per cent duty cycle, providing 20.3 kW output.

It has as standard an electric start, hour meter, low fuel indicator, low oil pressure warning, and voltmeter. These are all super silenced to meet EU noise and safety regulations. Options include site and road tow capability, MIG wire feeder, remote controls, 15 and 20m, 50mm^2 welding cables and auxiliary power plugs as well as a voltage reduction device version.

Wilkinson Star Limited – UK
Fax: +44 161 727 8538
Email: alistair.baker@wilkinsonstar.com
Website: www.wilkinsonstar.com

Some like it hot ...

Heat-Resistant Stainless Steel Tubes

inter alia for industrial furnace construction, petrochemical industry, power stations, oil and gas industry, recycling/refuse incinerators, measuring and control technology

	1.4713	TP 327	1.4821	TP 32/27	1.4877
TP 409	1.4720	TP 309	1.4828	TP 321 H	1.4878
TP 405	1.4724	TP 314	1.4841	Alloy 600	2.4816
TP 430	1.4742	TP 310s	1.4845	Alloy 601	2.4851
TP 446	1.4749	TP 330	1.4864	Alloy 625	2.4856
TP 446	1.4762	Alloy 800	1.4876	Alloy 825	2.4858

Tubes **Bars**
Bends **Sheets**
Fittings **Profiles**

Schenk Stahl GmbH

P.O. Box 27 03 38, D-40526 Düsseldorf, Germany
Tel: +49 21 31 230-37, Fax: +49 21 31 230-35
info@schenk-stahl.de, www.schenk-stahl.de

SCHENK
HEAT-RESISTANT TUBES

Fabtech 2007: the Exhibition of *'the Big Shoulders'*

The word most readily conjured up by the mention of Fabtech is big. It is big in scope, encompassing metal forming and fabricating, tube and pipe, welding, lasers, stamping, thermal spray; and also in numbers of exhibitors (over a thousand) and attendees (over 25,000).

It is also big in ambition: to mount, every time, the most comprehensive trade show anywhere for a global constituency of industry professionals who have come to expect no less.

If asked to go on free-associating, a return visitor to Fabtech might produce the word Chicago. Poet Carl Sandburg's *'city of the big shoulders'* has provided a cheering section for Fabtech from the beginning, and has helped burnish its reputation, at intervals, ever since.

This time Fabtech, as every time, will deliver the results of a solid year of the most painstaking preparation.

> ***This year also sees the National Association of Manufacturers (NAM) teaming up as industry partners to Fabtech***

This year also sees the National Association of Manufacturers (NAM) teaming up as industry partners to Fabtech/AWS Welding.

Those heading to McCormick Place in November will find a huge exhibition of the very best in machinery, equipment, products, and services.

The miles of exhibit space, the lectures, the venues for interactive dialogue have been designed for fullest accessibility, with the overarching purpose that the visitor shall receive top value for time expended. Everything useful to see – and nothing that isn't – will be there.

Event Highlights

visit www.fmafabtech.com & www.aws.org for more information

- **Leadership summit: 12 November – *'Addressing the shortage of skilled workers in US manufacturing'***
- **Executive forum breakfast: 13 November – *'How manufacturers can find growth opportunities in the new economy'*, presented by Michael P Collins, author and consultant, MPC Management**
- **Free business improvement seminars: 12-14 November. Sessions include: *'Selecting lean building blocks'* (12 November); *'Job shop marketing'* (13 November); and *'Workforce Performance Improvement'* (14 November)**
- **Laser cutting certificate program: 12-14 November (in the North Hall of McCormick Place). This certificate program will build on fundamental knowledge of CNC operations and part design for CO2 laser cutting**
- **End user forum: November 13 – This free forum brings together the end-user welding community for a one-of-a-kind, content-rich productivity learning experience**
- **Innovation theater: November 11-14 (North Hall show floor). The Innovation theatre will showcase free, 30-minute, exhibitor-led product and technology demonstrations throughout each day of the show. A full schedule of presentations can be found online at www.fmafabtech.com or www.sme.org/fabtech**
- **Job fair: 12-13 November. This will take place at the Job Fair/Workforce Development Pavilion**
- **Professional welders competition: November 12-14 – professional welders will compete on the show floor (prize $2,500)**

FABTECH INTERNATIONAL & AWS WELDING SHOW

DATE

Sunday, 11 November –
Wednesday, 14 November, 2007

VENUE

McCormick Place South,
Chicago, IL, USA

SHOW HOURS

11 November:	11am-4pm
12-13 November:	9am-5pm
14 November:	9am-3pm

ORGANISER CONTACT

Fabricators & Manufacturers Association, International
Fax: +1 815 484 7701
Email: information@fmafabtech.com
Website: www.fmafabtech.com

For Information on AWS Welding, see **www.aws.org/expo**

TOURIST INFORMATION

www.gochicago.net
www.tripadvisor.com

FABTECH INTERNATIONAL & AWS WELDING SHOW

11-14 November 2007 – McCormick Place, Chicago, USA

EXHIBITOR LISTING

FABRICATING

A & A Manufacturing Co Inc 36022
AAA Galvanizing 31040
Abtex Corp 9151
Accurpress America Inc 9008
AccuStream Inc 10133
AceCad Software Inc 7141
Acme Refining 35029
Advance Cutting Systems 9163
Advanced Manufacturing Solutions LLC 8127
Aeromet Industries Inc 9130
AFM – Machine Tool Manufacturers' Association of Spain 31043
AKH Inc 12082
AKS Cutting Systems Inc 11070
Akyapak Machinery 18155
Albion Industries 11001
Alcos Machinery Inc 19109
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Aranda Editora Ltda 8131
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Behringer Saws Inc 11071
Bentec 11070
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The Bradbury Group 11095
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Coherent 35071
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Cosen Saws USA 8001
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Keller USA Inc....16032
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Mazak Optonics Corp....TBC
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Mecco Marking & Traceability....17000

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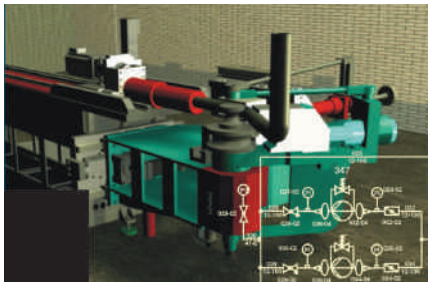
Please note: exhibitor list correct at time of going to press – for updates please contact: www.sme.org/fabtech

EXHIBITOR PROFILES

3R Software Solutions
Germany Booth 21112

With over 30 years' experience, 3R software solutions provides an extended range of software systems to assist, plan and advance tube construction and production. Typical applications involve standard tubes, but the software can also be adapted for hydraulic and pneumatic tubes in chemical, naval, vehicle and aircraft construction.

Construction activities are carried out using 3R software systems. It is also possible to take on data from other systems, including ACAD, Bravo, CATIA, NupasCadmatic, Tribon M2/M3, Unigraphics and Medusa. Furthermore, geometrical data from other 2D and 3D systems can be imported via DXF format. The company promotes a strong integration between construction, workshop and assembly and thus an effective control of material flow.



3R Software develops software solutions for tube construction and production

The configurable software works with tried and tested intuitive user interfaces, enabling fast and problem-free integration into the workshop. Expert functions assist a fully automated production of spools and the management of different related activities.

The software operates with freely configurable and mainly user-specific control data from elements such as tubes, flanges, and bends. The calculation of speed and output, taking both method and machinery into account, makes the system suitable for the construction of complex projects.

For work preparation, the system can flexibly calculate the work that will arise. The system provides initial calculations based on a tube machinery run, followed by in-depth analysis of the time allocation for each work element, so that work-load planning can be made in advance. By transferring control data directly to the machinery, it is possible to avoid mistakes in data transmission.

For bending machines, simulation software also uses a simple interface with the possibility of ensuring efficiency in production during the construction of tube bending systems.

Website: www.3r-solutions.com

Abbey International
USA Booth 22059

Abbey International Ltd is a proven source for equipment used in the welded pipe and tube industry. The company designs and builds new pipe mills, tube mills, slitting lines, drawbenches, entry coil handling, exit tube handling, cutoff equipment, and other related systems.

Abbey International is now also within the Bronx International group. The group is a single source supplier of mills and finishing equipment with over 3,800 installations in over 60 countries, in addition to one of the largest ranges of ERW mills and pipe finishing equipment available on the market.

Abbey's patented Quick Change System™ can deliver automated changeovers in as little as 15 minutes and the TBS™ forming system can be retrofitted to mills, reducing roll tooling costs and changeover times.

Through partnership with Bronx Taylor-Wilson, a builder of finishing equipment, the company offers first class equipment at competitive prices, together with broad solutions for pipe and tube manufacturing. This includes complete turnkey processes as well as individual machines.

Website: www.abbeyintl.com

Advanced Fabricating Machinery
USA Booth 23071

Advanced Fabricating Machinery (AFM) is the USA representative for a number of brand-names of tube and pipe bending machines and end-formers. The company also provides parts and tooling, service technicians and customer service representatives.

The Soco and Transfluid lines include fully automated CNC machines and semi-automatic mandrel bending machines for manufacturing applications, and manually-operated machines for fabrication and prototyping applications. AMI transfer lines can be configured for high-volume manufacturing, and manufacturing cells can be custom configured for specific applications. Transfluid end-formers provide high speed, flexibility and versatility for manufacturing hydraulic lines and other parts.

The Comac line of section rolls varies from inexpensive machines for small fab shops, to large machines that can bend up to 16" pipe or 8" angle iron. Ineco rotary-draw bending machines are suited to smaller fabrication and light-manufacturing jobs, such as handrails, custom fabrication, and medium parts runs. Stierli horizontal ram benders provide a safe and productive alternative to press brakes for bending and fabricating parts such as brackets and bus-bars, and for beam cambering and straightening.

Website: www.advancedfab.com

Ajax Tocco Magnethermic
USA Booth 22095

Ajax Tocco Magnethermic Corp is one of the world's leading manufacturers of induction melting and heating equipment, with worldwide operations in nine countries. Along with serving industries such as steel, automotive, forging and foundry, Ajax Tocco has a global commitment to the pipe and tube industry.

As a result, Ajax Tocco has designed and installed induction-heating systems that process up to 120t of high quality pipe and casing per hour with consistent quality and ovality.

According to the company, this induction heating equipment provides a reliable and flexible supply of heat, with outstanding control. The Ajax Tocco converters facilitate this flexibility with a patented, wide operating window. This allows a larger range of sizes to be processed in one induction coil size without the need for capacitor or voltage switching.

Converting the barrel furnaces to induction heating for stretch reducing, enables the use of existing handling equipment and the advantage of fast, controllable, energy saving induction heating. The results can lead to dramatic savings in space, reduced energy consumption, improved quality and the benefit of recipe control.

Ajax Tocco is at the forefront of API pipe production for the oil and gas industry. Because casing drill pipe and line drill pipe reliability is crucial, the company believes it is a highly dependable source of supply systems to harden and temper pipe, casing and couplings to full API specifications.

Heating a pipe using machinery from Ajax Tocco

An industry expert for pipe and tube heating, Ajax Tocco specialises in seam annealing, solution annealing, bright annealing, coating, bending and forming.

Website: www.ajaxtocco.com

Aristo Machines Inc
USA Booth 25098

A leading manufacturer of end-forming machines, Aristo also offers a range of integrated forming add-ons, enabling more productive use of its standard end-forming systems. Aristo provides both segmented tool sizing system and ram forming systems for tubes from ¼" to 8" in diameter.

The company's range of segmented sizing systems includes its digital (CNC) A series, and mechanical (discrete controls) B series, for industry standard and heavy duty tooling, as well as its own brand of heavy duty extended tooling for accurate sizing of bent tubing.

The company has adapted its A series digital I/O sizer for tube insertion, locking, and sizing in a single production step. Its S/SVR series includes single dimension (dies or fingers only) segmented sizing and ram forming capability in the same system. The company has used its S series segmented sizer for integrated clamping and ram forming in a single cylinder system. The collet-style clamping enables more efficient and reliable flaring of hydraulic line assemblies. Aristo designs, builds and supports its tube end forming solutions in an ISO9001:2000 compliant system.

Website: www.aristomachines.com

Axxair
France Booth 24052

Founded in 1997, Axxair began as a small family business distributing a unique model of orbital cutting machine. The company is now recognised as a key player in the orbital cutting, bevelling and welding machine market.

The CC120 orbital cutting machine for 5-121mm

Designed for all orbital tube operations, Axxair's 'Global Process' encompasses cutting, bevelling and orbital welding equipment. For cutting, the widest range of orbital cutting machines is available for tubes from Ø5mm up to Ø711.2mm diameter with 0.5-15mm thickness.

For bevelling operations, Axxair's precise and quick bevelling machines (cycle time 10 times quicker than traditional bevelling) are driven by a new motor design using carbide inserts. Tubes can be used from 17.1mm up to Ø323.9mm diameter with a wall thickness of 1-8mm thickness.

In order to be fully compatible with orbital welding, Axxair has recently launched the carbide 'J' bevel head. This head, when combined with an outside tracking system, offers very high quality preps for orbital welding machines.

For welding operations, Axxair provides a unique range of prefab orbital machines for tubes from 12.7mm up to 406.4mm

The GA10 orbital bevelling machine

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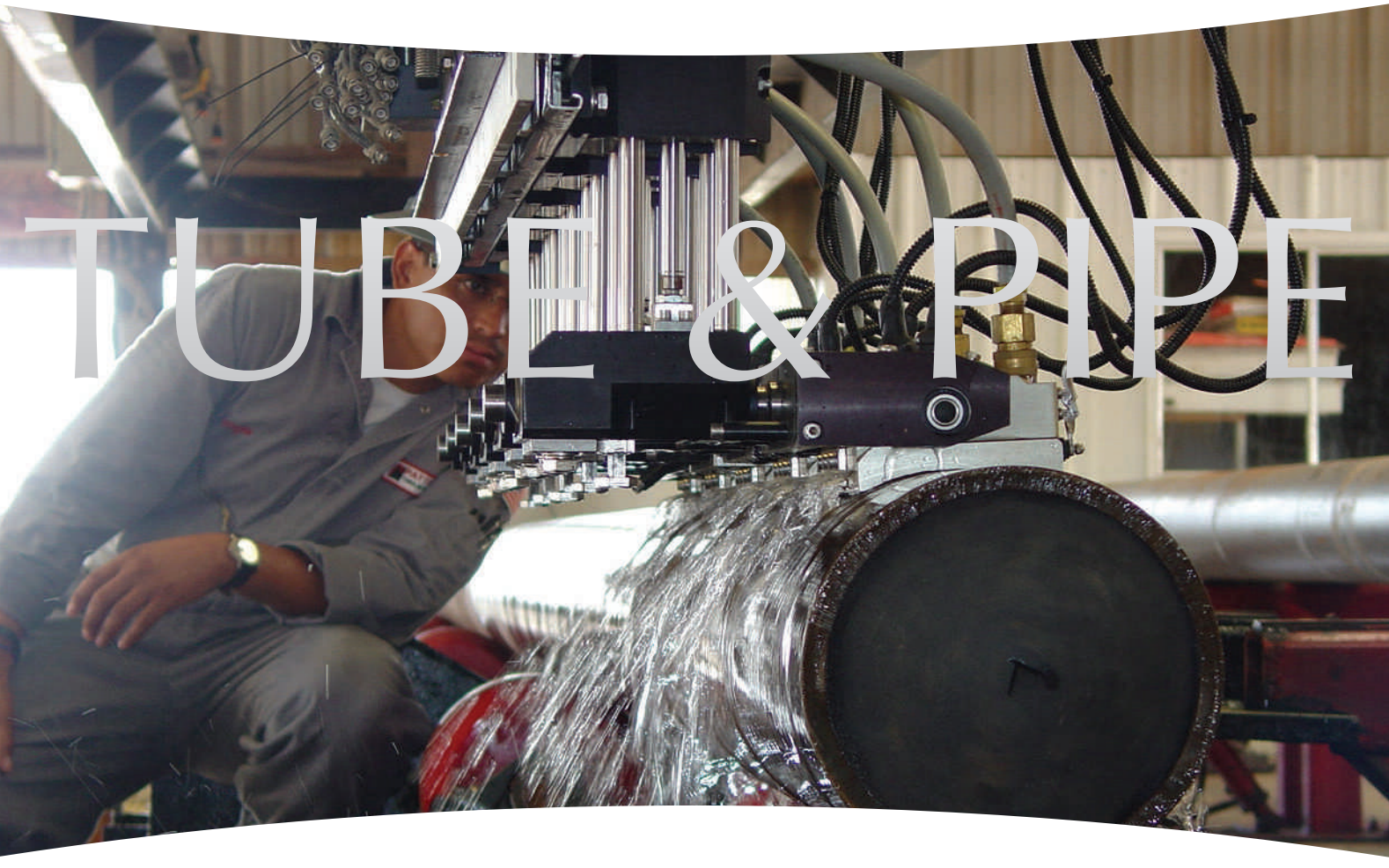


INTEGRATED NONDESTRUCTIVE TESTING SOLUTIONS

Phased Array Ultrasound

See us at FABTECH booth 7056

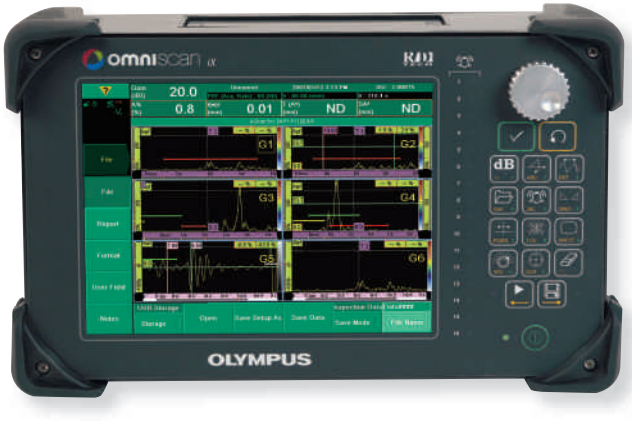
Full-Body Inspection for Rotating Pipes

Phased array ultrasound offers fast and comprehensive inspection of both surface breaking and non-surface breaking defects. Phased array provides flexibility and control of all inspection parameters.

OmniScan *i*X

Prove-up and High-Speed Ultrasonic Inspection of Internal Defects and Weld Integrity

The compact OmniScan *i*X industrial flaw detector is designed for high-speed pipe and tube inspection. This rugged, powerful instrument is available benchtop and rack-mount versions.



API 5UE Software Option

This software allows defect sizing according to API recommended Practice 5UE and is available with most EPOCH ultrasonic flaw detectors.

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diameter with a wall thickness from 0.9mm up to 8mm. These machines are completed by traditional closed and open heads up to diameter Ø168.3mm. These welding systems are sold only in the Asian and European markets.

After 10 years of intense technical development, Axxair has consolidated its position as a leading global company with the recent launch of a Korean branch as a legal joint venture subsidiary. This subsidiary is in charge of developing the southeast Asian market for Axxair.

Axxair has also established offices in Germany and Spain, and has appointed two salesmen for the local French market in order to reinforce market share in Europe. Axxair is also actively preparing to develop its activity in America by reinforcing the partnership it began five years ago with Industrial Solutions and Innovations LLC, based in Houston, Texas. Industrial Solutions & Innovation, LLC is the company's exclusive representative for sales and distribution in North America.

Axxair – France
Website: www.axxair.com

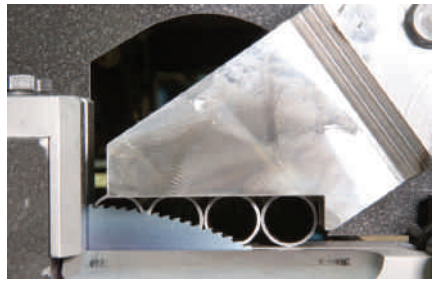
Industrial Solutions & Innovations (Axxair's distributor) – USA
Website: www.industrialsolutions-llc.com

Bewo
UK Booth 20095

Bewo, UK, will demonstrate for the first time in USA its new SCF 90 Quatro automatic circular saw tube re-cutting machine, which is capable of re-cutting tubes at up to 6,000 pieces per hour. The machine will be on display at the booth of the company's agents, Silfax NA.

The SCF 90 Quatro can cut up to four tubes at once (depending on diameter), using a high speed, servo drive controlled tube feeding carriage to transport a pack of tubes at up to 13ft/sec, to the required re-cutting length. Unlike conventional tube re-cutting solutions, the SCF does not require the use of target stops to define the required cut length. Instead, the servo drive CNC carriage allows the re-cutting list to be pre-programmed, via a full colour, graphic operator display.

Bewo's SCF 90 Quatro can cut four tubes at a time



The saw is part of a complete production cell including integrated brush deburring, non-contact tube length measuring and a 4-axis robotic pick and place tube packing system.

Website: www.bewo.co.uk

Bronx/Taylor-Wilson
USA/UK Booth 22059

Bronx/Taylor-Wilson provides metal finishing equipment solutions with a product portfolio that includes tube straightening machines in 6- and 10-roll versions, hydrostatic pipe testing machines, rotary cut-off and end facing equipment, bar section and profile straighteners, material handling and other ancillary finishing equipment.

The company's equipment utilises the latest revision of the company's highly proven Compass computer aided setting system, which uses the latest industrial electronic technology to predict optimised roll settings based on operator input.

The system provides the user with a consistently high quality product and throughput capacity, and size changeover times are reduced to under three minutes.

Bronx/Taylor-Wilson's tube straightening machine is available in 6 and 10 roll configurations

Bronx International also has within its group Abbey International, a leader in tube and pipe mill technology. The combined entities have completed over 3,800 installations in over 60 countries and possess one of the broadest and deepest ranges of ERW mills, hydrostatic pipe testers and straightening machines available.

Website: www.btwcorp.com

Burr Oak
USA **Booth 24102**

Burr Oak Tool and Gauge Company Inc has 60 years of experience in machine production for the heat transfer industry, with a range including presses, dies, tube benders, coil form, tube expanders, cutoff machines, and a new line of brazing machines. According to the company, these machines are among the fastest, easiest to operate, and safest machines on the market.

With a dedication to design excellence, Burr Oak supplies high-quality machine tools for the production of evaporator and condenser coils in the air conditioning and heat transfer industry. As a result of years of development, the company can provide machines that are flexible, accurate, and robust enough to withstand the most rigorous production requirements. Safety, speed and durability are backed up by a team of professionals dedicated to producing machines built to last with upgradeable components.

Website: www.burroak.com

CML USA Ercolina
USA **Booth 18058**

Ercolina® angle roll models CE40 and CE50 are capable of bending a wide range of profiles and materials to centreline radius as small as four times diameter of the work piece.

The Ercolina CE40 ring roll machine

All models are designed to operate in the vertical or horizontal position with roll speeds of up to twenty feet per minute. Standard universal tooling easily adjusts to most material profiles, while a digital display tracks the position of the centre roll for repeatability.

Threaded drive shafts allow fine adjustment of tooling without spacers, and the side roller system adjusts as necessary to create a coil effect in the work-piece. The units also include a foot pedal, for hands-free operation.

Hydraulic models feature programmable controls with up to eight programs and unlimited passes, while manually controlled units are equipped with a patented two-speed centre roll for rapid centre roll positioning.

In-line gear reduction in an oil bath provides high power transmission efficiency, and alloyed tempered steel drive shafts mounted in conical roller bearings reduce number of passes and increase work piece consistency.

Website: www.ercolina-usa.com

Combilift Ltd
Ireland *Booth 24080*

Combilift Ltd is a specialist in the long load handling sector. The company's versatile 4-way forklifts provide safe and space-saving handling in confined spaces, particularly in the tube and pipe, fabricating and manufacturing sectors. The design of the Combilift truck enables it to perform the work of a combination of other forklifts, saving time on double handling of product and expense on capital outlay for multiple trucks such as sideloaders, reach trucks and counterbalance forklifts.

Sideways transportation of long loads in narrow aisles eliminates the hazardous practice of high level transportation above machinery or personnel. Resting the load on the platform also increases load stability, further contributing to improved health and safety procedures.

Combilift produces versatile forklifts for safe and efficient product handling

Combilift manufactures a range of models with load capacities from 5,000lb to 30,000lb, powered by diesel, LPG or electric. The 4-wheel steer GT stand-on forklift for very narrow aisle operation is available in LPG, with 6,000lb or 10,000lb capacities. As with all Combilift models, it can be used both indoors and outside, for convenient handling of stock throughout the premises. It is also suitable for guided rail operations, to ensure fast and accurate picking and positioning with reduced risk of stock damage.

Website: www.combilift.com

Continental Cut-Off Machines
USA *Booth 22027*

Continental Cut-Off Machines, USA, will display its model #6A cut-off machine and series 500 support system at Fabtech International 2007. This cut-off machine is one of seven different cut-off machines that are offered by the company.

The company's machine range is based on the rotary concept of cutting pipe and tube without material waste. Established in 1919, this concept has developed into an effective production method for tube and pipe cutting, regardless of lot sizes.

Continental offers two types of rotary cut-off machines – manual and air operated. A variety of tube and pipe diameters and lengths can be handled efficiently by either type of machine. Manual rotary cut-off machines provide an economical option for shops with intermittent cutting operations or with frequent changeovers for cutting a variety of sizes.

Continental will exhibit its model #6A cut-off machine and series 500 support system

Air operated rotary cut-off machines allow each job to be tailored to the production rate and required end conditions with minimal adjustment. These machines can create the same cut from the beginning of a production run to the end of the run, regardless of piece count.

The series 500 tube support system permits storage of multiple tubes/pipes and easy operator access to the tube feed section of the machine. This system was designed to increase productivity and to be used where the expense of an automatic tube feeding system cannot be justified. The primary benefit is a reduction of loading time of the tubing (multiple vs. single pieces) and the improved feeding of the tube into the cut-off machine.

Continental also manufactures cut-off blades that are made from high impact tool steel. These blades are heat treated to provide top performance and long life. Blades can be resharpened 25-30 times making the cost per cut nominal compared to other methods that are used to cut pipe or tube.

Website: wwwcontinentalcutoff.com

Cypress Welding Equipment
USA *Booth 4020*

Cypress Welding Equipment Inc, a subsidiary of Weld Tooling Corporation, manufactures equipment for automatic circle burning and welding on pipe and pressure vessels. Oxy-fuel, plasma and welding units are available.

The company's MM1 automatic pipe cutter is a highlight of the Cypress range. The MM1 is a computer controlled 2-axis machine that automates the cutting of shapes, profiles and pipe holes with diameters of 2-16". The machine's pipe bed can accommodate lengths of pipe up to 6'. Additional pipe bed extensions of 8' can be added to make up to a 32' bed.

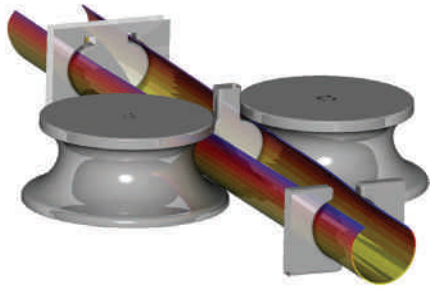
The machine rotates the pipe on its roller bed with a three jaw chuck while simultaneously moving a cutting torch back and forth along the pipe axis. Preprogrammed shapes such as saddle, hillside, lateral and miter cuts can be made by simply selecting the type of cut from the menu.

Website: www.cypressweld.com

data M Software
Germany *Booth 19108*

data M develops software to help engineers optimise tube properties and understand the strains a tube undergoes as it is manufactured and later fabricated.

This knowledge can help engineers reduce the amount of material necessary and also reduce or eliminate annealing, thus reducing energy and material costs.



The latest feature of Copra® RF is the possibility to integrate drawing dies within a roll forming tool set

Involving everyone in the production chain – the roll tooling engineer, tube mill operator, and the fabricator – is the key to making the greatest gains in efficiency. To introduce this ethic at Tube Southeast Asia, the company will present its new version of roll design and process simulation software, branded Copra® RF and Copra® FEA RF, which offers enhanced features for the design of roll tooling and the simulation/verification of the forming process.

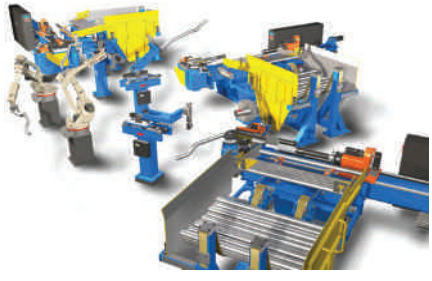
Copra® RF, for example, now supports the automatic design and analysis of 4-roll fin passes and 5-roll welding passes and avoids user's manual interaction in these specific cases. It also allows for the design of cage forming/ linear forming tooling.

In the production of extremely thin walled welded tubes the coil is often drawn to shape rather than roll formed. With the latest version of Copra® RF, it is also possible to integrate the drawing dies within a roll forming tool set. This allows the analysis of the complete forming process and to predict and optimise the final tube's properties.

Website: www.datam.de

Eagle Precision
Canada Booth 23071

Eagle will exhibit some of its latest equipment and tooling at the show, as well as highlighting its cell automation and integration capabilities. Equipment being shown will include EPT-10 (½") and EPT-25 (1") CNC tube benders. The EPT-10 is a fully programmable, 3-axis machine featuring a servo motor for all axes including the bend arm, providing accurate and quiet operation. Eagle will display the EPT-10 integrated to a Motoman robot to highlight some of the automation and integration options available.



An example of Eagle's cell automation capabilities

The EPT-25 is a fully programmable, 3-axis machine capable of both empty and mandrel bending. The standard EPT-25 is designed to handle 1" diameter tubing. The machine being displayed will include Eagle's new optional roll bending package.

In addition to manufacturing new equipment Eagle offers a full spectrum of upgrade, modernisation and re-manufacturing services. A re-manufactured CL-300 tube bender with 3-axis CNC upgrade will be exhibited at the show. The CL-300 tube bender is an example of the various upgrade and retrofit packages that Eagle has designed for older single axis machines to convert to full 3-axis CNC capability.

Also on display will be a TC-2000 tube cut-off machine, capable of cutting tubing up to 76mm diameter for most applications, with minimal cycle times. The shear blade is fabricated from high impact steel for maximum durability, and the simple design of the head and electrical components provides increased accessibility for fast tool changes. The machine to be displayed will feature Eagle's optional 'double-cut' feature, which reduces the dimple usually associated with a stab cutting operation.

An I/O 3000 inside/outside sizing machine will also be on show. The I/O 3000 is one of the company's next generation tube end-formers with all-electric operation (ie no hydraulics). The all-electric design of this machine results in clean, quiet tube sizing. A programmable control provides menu driven programs and enables data storage of 250 parts.

All Eagle CNC tube bending machines on display will be operated using BendPro G2, the company's latest bender control software, which provides a compact and powerful bending machine control solution, through an easy to use Windows interface.

Website: www.eaglept.com

Eaton Leonard Tooling
USA Booth 22105

In business for over 30 years, Eaton Leonard Tooling Inc provides large diameter bend tooling to the large diameter tube and pipe bending market. The tooling is supplied with centerline radius in multiple segments.

The company manufactures all tooling using the highest-grade materials, ensuring long tool life in the toughest environments. The ISO 9001 registered company offers draw bend tooling from 1/16-12" OD for all brand name and model tube bending machines.

Website: www.eatonleonardtooling.com

Eaton Leonard Tooling manufactures large diameter bender tooling

EFD Induction AS
Norway Booth 23037

EFD Induction develops, commercialises and supplies complete industrial heating processes, including power sources, mechanical handling equipment and control systems based on the latest IT technology. EFD Induction has emerged as a pioneer in finding new induction heating applications and solutions.

The Weldac G2 is the company's family of high-output solid-state welders. It is available with output power of 150-2,000kW and with 100, 200 and 300kHz nominal frequencies. The Weldac uses rugged IGBT transistors, which due to EFD's patented switching pattern, can now be used in high-frequency applications, such as tube welding. IGBT transistors are virtually short-circuit proof, making the Weldac a very reliable and robust equipment that will give more uptime and more output.

The solid-state Weldac welder from EFD

Apart from capitalising on the strengths of standardised IGBT transistors across the entire frequency range, the Weldac G2 system also provides continuous electronic load matching. Continuous electronic load matching secures full power output across a wide range of tube sizes, ensuring maximum welding speed for each size.

The Weldac eliminates the need for costly compensation capacitors by using diode rectifiers that result in a high, constant power factor (0.95) at all power levels. Test-verified efficiency from input at the rectifier to output at the coil is 85–87 per cent. Cooling water consumption is low, with no need for expensive de-ionized water.

Website: www.efd-induction.com

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To learn more about Weldac, its proven reliability, and the warranty, just write to us at: sales@no.efdgroup.net

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EFD® INDUCTION

Elmaksan
Turkey *Booth 24095*

With over 25 years of experience, Elmaksan is the manufacturer of an extensive machinery range including pipe and profile lines, cut-to-length lines, slitting lines, multi blanking lines, trapeze lines, open profile lines, slitting knives and spacers.

The company also offers coil process equipment, automatic packing machines, levelers, rotary shears, multiple cutting units and associated spare parts. Each of these lines can be modified to meet specific production needs of the clients.

Elmaksan offers pipe and profile lines and other tube production machinery

Elmaksan operates two large facilities, one located in Istanbul (5,000m^2) and another in Kocaeli (22,000m^2). More than 80 per cent of the total volume of production is exported abroad to 40 different countries all over the world. With a constantly expanding product range, the company's machinery is designed, manufactured and supplied according to the highest quality standards.

Website: www.elmaksan.net

Emmedi SpA/SAET
Italy *Booth 25106*

Emmedi produces high frequency in-line induction welders for the production of metal pipes, medium and high frequency equipment for heat-treatments, and seam and full body annealing systems. The company's heating equipment is suitable for in-line double wall tube brazing (for car brake circuits), special in-line bright annealing systems (for stainless steel tubes), and pipe polyethylene coating.

The company's systems are tailor-made according to the specific requirements of the end user. The company has installed more than 1,000 systems worldwide, and is certified to ISO 9001 standard.

Website: www.emmedi.it

Eurolls SpA
Italy *Booth 35047*

Eurolls SpA designs and manufactures rolls made of steel and sintered materials. The company's production covers rolls for tube mills up to 24", as recently supplied to Baosteel, China. Eurolls customers are located all over the world, and the company has production capacity of an average 4,000 rolls per month.

Eurolls subsidiaries, including Eurolls de Mexico, Eurolls do Brasil, and Iber Eurolls in Spain, are fully equipped for wire and tube rolls production and regrinding. The company can also provide training for customers' personnel, and advice on tube mill refurbishing.

The company has also introduced into its production programme equipment for roll polishing, full in-house heat treatment facilities and sintering plant, allowing Eurolls to control the entire process.

Website: www.eurolls.com

Euromáquina
Spain *Booth 24055*

Euromáquina is a leading company in the supply of second-hand equipment, with a complete brand of high quality used equipment for the tube and bar industries, This range includes tube mills, automatic bundlers, HF welders, flying saws, tube finishing equipment (chamfering, threading, hydrotesting, straightening), slitting lines, peeling and straightening machines for bars.

The company is not only a machine dealer, as it offers full advanced services and turnkey projects, such as dismantling, engineering of new civil works, revamping of old equipment, installation, start up and training in production. As agents of leading manufacturers, Euromáquina is continually updated on new technology and can obtain all necessary spares.

Euromáquina can also combine new and revamped second-hand machines in one line. The company has supplied and installed equipment and complete lines to regions including France, Italy, Germany, Spain, Hungary, Poland, Turkey, the Middle East, Mexico, Argentina and Chile.

Website: www.euromaquina.com

Gem Tool Corporation
USA Booth 22051

Gem Tool Corporation manufactures HSS, diamond and carbide cutting tools and inserts, and supplies the aerospace, automotive, and consumer products industries.

The company's standard line of tooling includes ID and OD scarfing inserts, end-prep heads, and cut-off blades, and all of the company's carbide products are made in the USA.

A selection of Gem Tool's product range

The company also offers sharpening services for its products, and has a range of tool-life lengthening coatings.

Gem Tool also manufactures PCD and PCBN tooling for a wide range of applications.

Super-abrasive tipped inserts in standard or irregular shapes can be made quickly, and re-lapping services can also be provided. The company can also manufacture PCD tipped boring tools to user's specifications.

Website: www.gemtoolcorp.com

GH Electrotermia SA
Spain Booth 31047

GH Electrotermia offers an entire range of modern high frequency power supplies and equipment for induction heating applications, from MF IGBT inverters to HF Mosfet inverters.

This complete range allows the use of the most suitable technology in every induction heating application, avoiding the need for obsolete and low efficiency technologies.

In the area of tube induction welding, which often requires frequencies up to 500kHz, the natural, most reliable and efficient component is the Mosfet transistor.

This technology is provided by the GH Electrotermia's latest developments in variable frequency and automatic load adjustment.

The company has launched Transithermic® generator solid-state welders, which are able to weld any tube specifications allowing for any tube diameter, thickness and material. These machines provide flexibility and economy through reductions in downtime and scrap material.

GH Electrotermia has headquarters in Spain, with subsidiaries in India, Germany, China, South Korea, Brazil, France, Mexico and Argentina.

The company can provide equipment and local support in every geographical market.

Website: www.ghe.es

Guild International
USA Booth 21063

Guild International designs and manufactures coil end joiners and horizontal strip accumulators, with brand names including ZipWelders™, Supercoils™ and Superloops™. The company also has complete entry equipment in their product line, including single and double uncoilers, outboard coil retainers, speed funnels and flatteners.

The company will present its range of coil end joining technology along with information and brochures for its complete product line. Guild coil end joiners together with their strip accumulators can eliminate downtime during coil changeover. Guild personnel will be available to discuss ways to speed up the coil changeover process to completely eliminate downtime.

Website: www.guildint.com

Hess Industries, Inc
USA Booth 22036

Formitt Metal Labs, part of Hess Industries, USA, will showcase its custom manufactured, water-cooled catalytic converter housing for marine electric generator applications, that eliminates carbon monoxide (CO) gas from the engine's exhaust stream.

Carbon monoxide poisoning has become a recognised risk for boaters, leading to the need for this exhaust device. As reported in the June/July 2007 issue of *Professional Boatbuilder* magazine, "*Statistical data revealed nearly 390 cases over a period of eight years in the Lake Powell, Utah area alone. According to USCG and NIOSH studies done at this lake, 64 people died from CO produced by onboard generators, 10 deaths were attributed to gas from propulsion and other engines*."

Using hollow tube spinforming and assembly technology, the dual chamber 304 stainless steel assembly secures the catalysts in the inner tube, separating it from the water cooled outer jacket. The water cooled jacket is required to meet temperature restrictions on exposed surfaces in marine applications. Formitt spinforms/fabricates the tubular parts, wraps and inserts the catalyst, assembles and TIG welds the connecting flange.

Formitt Metal Labs has developed a catalytic converter housing to eliminate CO gas

Formitt uses spinforming, flowforming and assembly technologies to create hollow tube symmetrical and asymmetrical shapes, fabrications, and assemblies using flat stock or tubing in both ferrous and non-ferrous metals, including stainless and high alloy steels.

Spinforming technology eliminates the need for welded tube end-cones, enhancing overall component quality and reliability. Formitt hollow tube fabricated assemblies may include the insertion of filtration elements, heat exchange components, catalytic elements, or others. The company's metal tube spinforming technologies are currently used in the automotive, HVAC, filtration, marine industries and others.

Website: www.hessindustries.com

HGG Profiling Equipment
Netherlands Booth 25087

HGG Profiling Equipment BV, is a manufacturer of CNC cutting machines, specialising in cutting equipment for non-flat metals, eg H-, I- and angle beam, in addition to pipe, tube and square hollow section.

By adding components to a standard concept, HGG produces machines suitable for companies in steel construction, piping, offshore construction and the petrochemical industry. Over the last 20 years, the company has supplied pipe cutting machines that cover a diameter range from 28mm to 6,000mm.

All HGG machines can be supplied with a CAD-CAM system, with connections available for AutoCAD, Pro-Engineer, X-Steel and Solid Designer. The company can also tailor-make other CAD-CAM or post-processing systems.

The company's newly developed products are first installed in one of its subcontracting companies, in order to gain practical experience with the products, and to improve them.

Website: www.hgg.nl

Hisen Enterprises Co Ltd
Taiwan Booth 25099

Founded in 1967, Hisen Enterprises Co Ltd is a manufacturer of transistor generators for pipe welding and heat treatment and high frequency machines. A new transistor generator has been developed using Hisen's latest technology that incorporates new-type transistor devices. According to the company, it has drastically reduced the size of conventional transistor generators and caters to the diversified applications of tube welding and heat treating industries.

The features of this new generator include a frequency range of 500Hz to 440kHz at an output range of 2-1,000kW, a power factor of 0.95, and power conversion of 90 per cent efficiency. In cases of short time heating, it provides increased output power to solve problems. Because transistors are used instead of vacuum tubes, the level of input power can be reduced by over 22 per cent and cooling water can be saved by up to 50 per cent.

The comprehensive solid-state and low-voltage system forms a compact design that reduces the required installation space. A reduction to one-third of the space required by other conventional vacuum tube oscillator models has thus been achieved. The water cooling circulation system (optional) helps to address concerns with water temperature levels and helps prevent problems.

In addition to Hisen's transistor generator, the company also provides quality high frequency machines such as high frequency

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pipe welding machines (transistor generator and vacuum tube), high frequency induction heaters (transistor generator and vacuum tube), high frequency preheaters for the semiconductor and melamine industry, and high frequency PVC welders.

Website: www.hisen.com.tw

International Tube Association
UK *Booth 25104*

The International Tube Association (ITA) is the world's largest association of tube and pipe engineers and its presence will be geared towards offering assistance to tube and pipe professionals. An emphasis will be placed on the membership benefits available, including support services at the major tube shows worldwide and the educational opportunities provided through technical conferences and seminars.

Existing members can ensure they are taking full advantage of the enhanced range of membership benefits. Non-members can collect details of the ITA benefits including reduced delegate fees for ITA conferences, free promotional opportunities in the ITAN newsletter, and free visitor entry and hospitality at selected exhibitions.

Members can also gain access to copies of ITA technical conference papers, and large discounts for company promotion on www.tubefirst.com (the comprehensive on-line material, product and equipment database).

International Tube Association

In addition, all members receive a free annual subscription to the officially endorsed magazine, *Tube & Pipe Technology*.

Visitors to the ITA stand will be able find out about the ITA's latest conference planned for Tube India 2008 in New Delhi on 13 February 2008.

Website: www.itatube.org

J&S Machine Inc
USA *Booth 24063*

At Fabtech, J&S Machine Inc will be showing the CR 138 IM Windows based control roll bending machine, manufactured by Tre C, Italy. The CR 138 IM is based on the advanced programming capabilities of the CNC models and the strong structure of the 130 series. Capable of bending multi-radius parts with up to 36 radii, the CR 138 IM uses the profile data stored in memory to be programmed with radius and arc length information. The servo hydraulic system provides precise positioning of

The 130 series from Tre C provides a sturdy design

The machine is capable of bending multi-radius parts with up to 36 radii

the rollers. Other size machines are also available with this net workable control.

The CR 138 IM features as standard a photo eye for starting end of part recognition and automatic encoder movement at the start and end of a program for ease of loading the material. Programmable to work in either an 'inch' or 'metric' measurement system or multiple languages, the control and its program storage fit into any shop environment. The compact CR 138 IM double pinch roller works in the horizontal or vertical plane to minimise floor space required.

Website: www.jsmachine.com

Kent Corp/Tesgo
USA *Booth 21047*

Kent Corp offers a range that includes vertical and horizontal strip accumulators, coil end welders, tube and pipe entry systems, and tube/bar end deburring machines. The company also offers tube dedimpling machines, tube reshaping turksheads, and tube bundling systems, OD scarfing inserts, in-line gauge control, and tube OD scarf choppers.

Website: www.continuouscoil.com

Kusakabe
Japan *Booth 21031*

Kusakabe is a tube and pipe mill and associated equipment manufacturer and supplier. The company provides 'total engineering' of the tube and pipe manufacturing process, from strip entry to the packing machine. The company's booth will feature a 12" rotary sizing mill, the Klearcut milling type flying cut-off model and samples of cut pipe, universal tube and pipe forming technology, and rotary disc cut-off technology with samples of cut tube.

The rotary sizing mill is a technology that replaces conventional sizing methods, and is being adopted by innovative tube and pipe manufacturers to reduce cost and improve product quality in both precision and surface finish. It is suited to TIG, laser and precision mills, as well as large pipe mills. The technology can also be used in off-line applications.

Website: www.kusakabe.com

Manchester Tool and Die
USA *Booth 23099*

Established in 1960, Manchester Tool and Die Inc (USA) specialises in the design and production of tube end-forming equipment, with strong emphasis on customisation, automation and industry-standard durability.

The company is experienced in equipment manufacturing and design for tube grooving, expansion, reduction and part-

additions to end-forms. MTD maintains a heavy emphasis on continuing product improvements, field research and launching new machine designs.

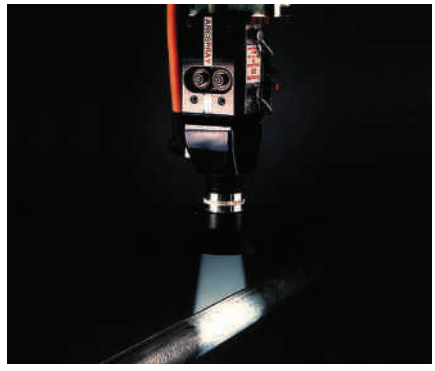
Website: www.manchestertoolanddie.com

Metallisation
UK *Booth 1123*

Metallisation provides metal spraying and anti-corrosion protection systems, and will present at Fabtech its Arc 528 metal spray pistol in an ERW repair application.

The Metallisation 528 Arc spray system consists of a heavy duty, high performance pistol, specially designed to work reliably in severe and extended operating conditions, married to a robust but simple power supply specifically designed for arc spraying. The main benefit of the Metallisation 528 system is its reliability in automated applications, where consistent operation is important.

The Arc 528 system is widely used to protect pipes from corrosion, including



Metallisation's Arc spray system

ductile iron pipes, sub sea pipes/risers, ERW tubes and structural fabrications, in diverse industries such as oil, petrochemical, construction, water supply and sewerage.

The system is normally used to apply coatings automatically, either by traversing the pistol over a rotating pipe, or by conveying the pipe or tube past the pistols. Metallisation will also present its full range of hand-held anti-corrosion metal spray systems and engineering coating solutions.

Website: www.metallisation.com

Mewag AG
Switzerland Booth 25047

Mewag is a manufacturer of bending machines including the Megalus and Gigalus brands. These machines offer a modular design, one or two heads, and automatic right to left bending, with an unlimited number of tools.

With up to 13 axes, the bending machines are fully-electric and capable of producing both simple and complex geometries, with high accuracy and speed. High-speed servo drives are used for all axes.

An electrically adjustable bending arm and sliding rail feed pressure ensures that bend pressure is programmable and the formation of wrinkles is controlled.

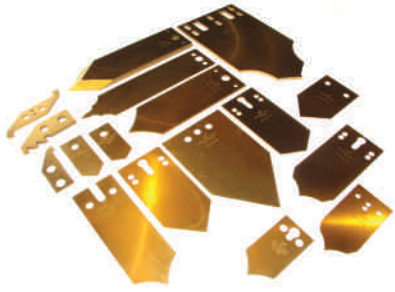
In addition to the standard programming, Mewag's Sub-program Technology also allows an additional CNC code to be inserted before or after each bending set. This ensures all axis movements and auxiliary functions can be programmed.

Website: www.mewag.com

New Form Tools
USA *Booth 22055*

With a strong history of manufacturing blades, jaws, and dies to tube producers worldwide, New Form Tools is involved in the R&D for revolutionary tube cutting solutions, especially designed for tube mills. At Fabtech, the company will display its new quick-change tool system that can be added to any existing tube cutting operation or die system.

The system has been specifically designed to allow offline or online tube cutting to save enough time to justify a rapid ROI in weeks. In calculating the downtime of a typical tube mill, these systems can be changed in less than 10 seconds or a complete change of less than one minute.



New-Form offers blades, jaws, dies and other advanced cutting solutions

This time is in contrast to the typical 5 minutes to 1 hour per tool change. Operators can have the next tool package prepared to be set in place and save mill downtimes of 1-2 hours per day.

An increased revenue stream is now possible with very little investment. The patented systems have been on trial throughout the year, and are beginning to catch on at a very rapid rate.

With change times of as little as 5 seconds for down-cut and cross-cut blades and less than 60 seconds for a jaw set changeover, New-Form Tools has created a system that is designed to become a vital component in tube mills worldwide.

The company's wider range includes blades, tool and die, automation, carbide tooling, hydroform blades, tube and pipe and rollform tooling, and titanium coatings. New-Form's technical staff are available for project discussions, long-term service and installation anywhere in the world.

Website: www.newformtools.com

Numalliance
France *Booth 23086*

Numalliance and Numamerica will be exhibiting the FX13G4 machine, which anchors the Macsoft tube and wire forming line of CNC sequential benders for producing tubular parts from coil.

The 'FX' models combine both mandrel and nose bending capabilities with a moveable nosepiece, for increased flexibility.

By adding an optional chamfering unit, finished tubular parts can be separated using a burr-free snap cut feature, to eliminate secondary end clean-up operations.

Optional versions of the company's pick-and-place robots can be used to pick the bent part after cutting and place it back into the bending tools to finish the 'back end', or move it over to ancillary equipment for automated secondary operations. The FX models can be supplied in 7mm, 10mm and 13mm capacity machines.

The company's booth will also feature, via video displays, the Numalliance-Satime fully automated process lines for high volume, complex, tube and wire forms such as those needed in the automotive, aerospace, and furniture industries. These lines, typically multiple station modular concepts, usually consist of bending, flattening, punching and welding operations with fully integrated station to station transfers.

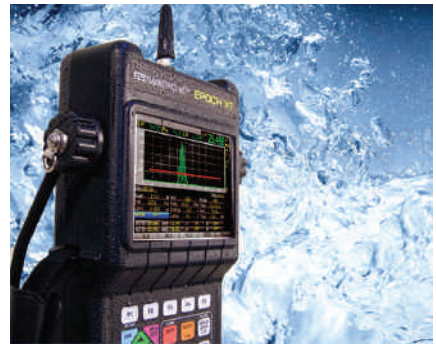
The FX13G4 will be featured on the Numalliance booth

Numalliance will also promote its Numatube 80 and Numacell products. The fully CNC Numatube 80 has an interpolated bending style for tube from 9.5mm to 80mm. The Numacell can be supplied for automated single or double end upsetting and bending of tube up to 15mm.

Website: www.numalliance.com

Olympus NDT
USA Booth 7056

Olympus NDT provides an industry-leading portfolio of NDT solutions featuring innovative ultrasonic testing (UT), phased array (PA), eddy current (ET), and related nondestructive testing technologies. The company's goal is to supply reliable and economical inspection and maintenance systems globally that enhance environmental and personal safety, security, and productivity for customers.



The OmniScan® flaw detector line from Olympus

The Epoch XT Ultrasonic Flaw Detector is designed for great inspection flexibility and for use in extreme environments. It combines a multitude of enhanced flaw detection and measurement features, a bright multi-colour LCD, versatile battery options, powerful data management, and numerous software features in a compact unit with a sealed case designed to meet IP67 requirements.

The latest Olympus model in the OmniScan® flaw detector line, the OmniScan M, provides the advantage of phased array imaging for manual testing, while keeping all the benefits of

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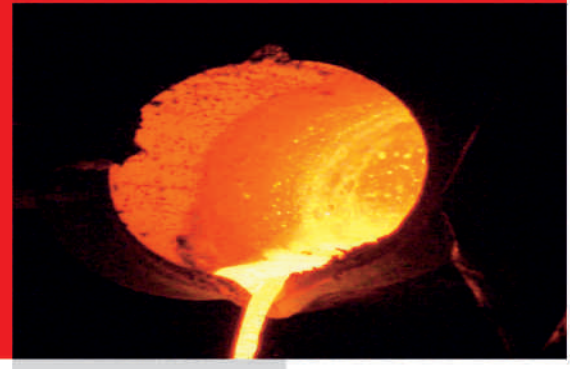

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www.messe-duesseldorf.de

Messe Düsseldorf

a proven product. The OmniScan M is fully upgradable to any other model of the OmniScan series, allowing the migration to encoded inspection, data archiving, and automated UT inspection.

The Olympus NDT head office is located in Waltham, Massachusetts, USA. The company is represented by an extensive network of branch offices and representatives in all the major industrial regions of the world.

Website: www.olympusNDT.com

Oto Mills SpA
Italy *Booth 23081*

Oto Mills develops new tube mill products in the range from 10-220mm, and offers a full catalogue of solutions for carbon and stainless steel applications.

Among the company's most recent innovations is a line of high precision tube mills designed to meet the rigorous specifications of quality automotive tubing applications.

The company's new generation of cold saw cut-offs provides an extremely clean tube end, and tight and consistent length tolerances at high speeds. In the final stage of development is a state-of-the-art automatic entry system handling up to 51" wide strip.

Website: www.otomills.com

Pines Technology
USA *Booth 25061*

Pines provides solutions to bending problems, and has more than 1,000 current customers around the world who regularly buy new machines, bend tooling, repair parts, machine control upgrades and complete machine rebuilds.

The company was established in 1943 and, before being purchased by Teledyne in 1969, was responsible for developing techniques to bend tubes, pipes, extrusions and rolled steel sections for every industry. The company's engineers developed and documented scientific data to determine how certain materials and cross sections react to the bending process.

The company provides knowledge-based services to improve its customers' chances of success.

Website: www.pinestechnology.com

Protem SAS
France *Booth 24052*

Protem SAS has been manufacturing prep welding equipment since 1980, with a number of recent introductions designed to improve production time and facilitate faster and more efficient welding. The company's wide range of standard machines is able to prepare pipe ends from 1/8" (2mm) up to 76" (2m).

A perfect end preparation is required when assembling pipes, using an automatic or semi-automatic welding process. For this purpose, Protem manufactures high-speed and heavy-duty pipe facing machines (PFM) to end prep pipe from 6-60" (HSB series) in a minimal time. These PFMs usually clamp the pipe from the inside, but due to the heavy wall thickness and reduced inside diameters often required by some applications, Protem also has a new generation of PFMs – branded OHSB – that can grab the tube from the outside.

Protem manufactures a range of prep welding equipment

The design of the OHSB allows bevelling with internal wheel trackers even with a small inside diameter. This new generation of machine can also bevel extremely heavy walls up to 70mm in a few minutes. The OHSB concept is all hydraulically controlled and can bevel cladded pipe with a very precise result on the nozzle.

Protem also has a range of stationary machines. The Protem CTA machine can cut and bevel two ends simultaneously in a few seconds. This machine is fully


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Tel.: +91-20-2712 0811 Fax: +91-20-2712 8592
Email: marketing@hinodaynet.com www.hinoday.com

mechanical to avoid the electrical worries that can occur in some countries. The Protem BB bench bevellers – which can machine any end welding preparation in a few minutes – are able to bevel pipes from 3-48" with only three machines.

Website: www.protem.fr

Rafter Equipment Corp
USA *Booth 22080*

Rafter Equipment Corp, USA, is a leading supplier of heavy wall and high yield strength tube and pipe mills.

The company's mills are used for production of pipe and tubing for many demanding applications including oil country tubular goods (OCTG), hollow structural sections, DOM and the medical and automotive industries.

Examples of products that can be produced on the company's mills include 2.375" Ø x 0.440" wall at 75,000psi yield for re-draw use, 12.750 Ø x 0.5" wall at 65,000psi yield for structural use, and 10" square x 0.5" wall at 55,000psi for structural use.

Rafter supplies mills for heavy wall and high yield strength

The mills can also be used for 6.625" x 0.322" wall at 75,000psi for OCTG, and 0.625" Ø x 0.083" wall stainless steel at 80,000psi for food grade and medical applications.

In conjunction with the high wall thickness to diameter ratios, these heavy walls demand a robust mill design, engineering expertise and sound manufacturing practices to ensure a reliable process and high product yield.

Rafter also designs and builds pipe and tube mill equipment used to produce tubing from carbon steel, stainless steel, titanium, copper, brass and other weldable exotic materials.

Website: www.rafterequipment.com

Rolleri SpA
Italy *Booth 19101*

Rolleri SpA will present its patent pending Rolleri Clamping Systems, four different clamping solutions for press brake machines with both upper and lower press brake tools.

Rol1 System is a universal clamping system for press brake tooling with quick vertical connection. Rol1 System with KDS has the same functionality as the Rol1 System, but with a special double clamping system. Rol1 PN System, an additional evolution of the Rol1 System, features pneumatic operation for immediate clamping of all the tools on the machine.

Rol2 System is the company's new system for the quick clamping of the lower tools. 'Rol2 Clamp1' is a clamp of 835mm length that allows the lower tools to be fixed with just one movement.

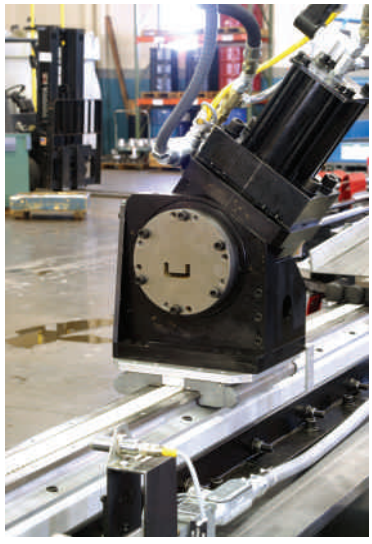
Website: www.rolleri.it

Roll-Kraft
USA Booth 23047

Roll-Kraft is a solutions provider for the tube, pipe and roll forming industry. Typical products include roll tooling made from all types of materials, mills and equipment including presses and cut-off dies, line integration on the factory floor, or at the customer's location, various custom-ised services and training programmes.

This year, Roll-Kraft has introduced three new products to the marketplace.

The company's Rapid-Konvert product line now includes a programmable indexing stacker, a side roll stand for Ardcor panel mills, and the high-speed quick-change cut-off system, which will be on display at Fabtech.



Roll-Kraft will present its technology at Fabtech

The Canadian market can now contact Roll-Kraft at its new Woodbridge, Ontario, location, as the company continues its northern expansion.

Website: www.roll-kraft.com

Shelby Welded Tube/ Middletown Tube Works
USA Booth 22100

Shelby is a leader in supplying high quality tubing to both the US domestic and international automotive industries.

The company specialises in extra deep drawn steel tube for several fabrication and coated products, cold rolled, hot rolled, galvanised, aluminised, zinc nickel, galvannealed, galvalume and 409 stainless.

The majority of these tubes are designed for highly engineered assemblies. These tight specifications are used as the benchmark for every tube manufactured.

Website: www.shelbytube.com

Sinico SpA
Italy *Booth 20111*

Sinico SpA specialises in automatic rotary transfer cut-off and end-finishing machines, suitable for producing medium and large series of metal parts from tubes, bars, coils, forgings and blanks.

Sinico machines can handle any metal material (steel, stainless steel, aluminium, copper, brass, titanium, Inconel, etc). All operations are carried out in one chucking.

Sinico's Top 1000 CNC automatic cut-off and end-finishing machine

The main features of the latest Sinico machines include quick set-up and automatic positioning of units, optimised cutting process, connection with LAN (local area network) and WAN (wide area network), and self-diagnostics with built-in graphics.

User information, maintenance data and functional diagrams are viewable on PC, and there is an option to install SPC (Statistical Process Control) and messenger (email/SMS) systems in case of machine alarm, as well as remote servicing via web cam.

Sinico machines can handle a wide range of materials

Parts can be produced within a length range of 10mm to 640mm, with diameters from 3mm to 120mm for tubes and from 3mm to 80mm for bars. The standard stock length of loaded bars is from 3,000mm to 6,500mm, while a maximum of 12,000mm can be accommodated upon request.

Website: www.sinico.com

SMS Meer GmbH
Germany *Booth 11087*

The merger between SMS Schloemann-Siemag AG and the metallurgical plant division of Mannesmann Demag AG in 1999 to form SMS Demag AG created a world leader in the construction of plants for the steel, aluminium and copper industries with a complete process chain extending from crude iron production right through steelmaking, continuous casting, rolling mill and tubemaking technologies, up to processing and finishing lines for hot and cold strip.

Within the structure of SMS Demag AG, SMS Meer was established from the former 'Tube and Copper Plants' business unit of Mannesmann Demag Metallurgy. In 2001, the 'Long Product Rolling Mills Division' was integrated into SMS Meer. As part of a reorganisation in 2003, SMS Meer became part of the 'Tube, Long Product and Forging Technology' business area of the SMS Group.

The product range of SMS Meer essentially comprises manufacturing plants and automated finishing systems for seamless and welded steel tubes (diameters from 4-1,800mm), hydraulic presses such as open-die forging presses and powder presses, and casting and rolling plants for sections, wire rod and bar steel.

This is in addition to casting and rolling plants for extrusion billets, strips, wire rod, anodes and tubes made from non-ferrous and precious metals, plants for the production and further processing of aluminium billets and slabs as well as plants for the recycling of aluminium.

Website: www.sms-meer.com

Soco Machinery Co Ltd
Taiwan *Booth 23071*

With models that extend up to Ø127mm capacity, the Soco CNC 5B series tube bender brings tube bending power and accuracy to the automotive, trucking, buses, boiler, ship building and other heavy industries.

The 5B Power Bend series tube bender has the ability for 1D bending and roll bending (2SV model), and is equipped with five servo electric/proportional servo controlled axes.

The machine incorporates a combination of automation and powerful features, including individually controllable pressure die assists for each bending stack, two speed programmable early mandrel extraction, proprietary control software with IPC and 15" touch screen, digital hydraulic temperature control unit, connection to local area network and bending simulation and collision detection software. Axes may be individually programmed during arm return mode.

Soco manufactures the CNC 5B series tube bender

With electric servo controlled and proportional servo controlled feeding, rotation, horizontal movement, bending and pressure die assistance, the machine ensures bending repeatability at 0.1°. A cooling system controls the hydraulic system's temperature and flow, resulting in stability and low maintenance needs.

Website: www.soco.com.tw

T&H Lemont
USA *Booth 22071*

T&H Lemont provides technologies for the manufacture of products such as stainless steel hypodermic needles, communication cables, flexible tubular products, high strength welded and roll-formed shapes and large diameter API pipe. The company supplies complete production systems, and offers spare parts and rebuild services for almost every machine manufactured by T&H Machine and T&H Lemont.

The company provides components and additional services to the tube, pipe and roll-forming industries. Services include tube and pipe roll design, mill alignments and operational consulting. Components offered include welders, cut-offs, entry equipment, accumulators, pre-punch, post-punch, seam orientation stands, weld boxes, edge conditioner, OD bead scarfing systems, straightening systems, single point adjustment systems and dedimplers.

Website: www.thlemont.com

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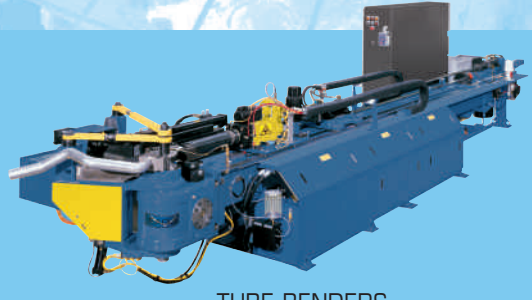
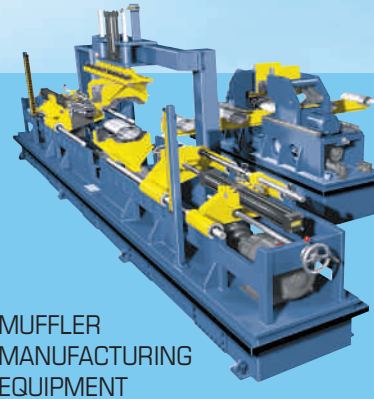


TUBE BENDERS

TUBE ENDFORMERS



MUFFLER MANUFACTURING EQUIPMENT

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Fax: +1 (519) 756-0195
Email: sales@eaglept.com

North America Parts and Service
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Fax: +1 (317) 308-2617
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Fax: +86 (0) 21 5106-2301
Email: eptsh@eaglept.com

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Email: epteu@eaglept.com

Mexico Sales and Service
Phone: +52-442-341-4783
Fax: +52-442-225-5021
Email: eptmx@eaglept.com

www.eaglept.com

Fabtech Show Booth No. 23071

Thermatool Corp
USA Booth 20027

At Fabtech, Thermatool will introduce its new HAZControl Technology. With this technology, the company can provide the ability to vary the welding frequency at the operator's console in 1kHz increments from 150 to 400kHz. According to the company, this has revolutionised the high frequency welding process.

Thermatool has now extended the capabilities of variable frequency HF welding to its HAZControl Technology™. The company claims that, for the first time, an operator will have the information required to consistently make the best weld.

The combined effects of weld power, frequency, vee length, impeder function, and wall thickness are now displayed on the operator's console in a simple way.

This development provides the mill operator with the knowledge of their exact position in the weld process window. Consequently, the operator can easily and repeatedly achieve the optimum weld HAZ.

Once the optimum weld HAZ is determined it can also be stored to ensure repeated production of quality products on every production run.

Website: www.thermatool.com

Tube & Pipe Technology Magazine
UK Booth 25104

Tube & Pipe Technology is the international trade magazine for the tube and pipe industries, published six times a year in the English language.

Covering the production, processing and utilisation of tube and pipe, each issue provides coverage of essential industry news, personnel changes and technology and product updates.

The magazine includes regular topical columns such as 'From the Americas' – an economic and industry report on North and South America, a variety of technical features, and in-depth articles highlighting the latest scientific information and manufacturing solutions.

The magazine has a worldwide circulation of over 12,000, distributed to managers, buyers, technologists, engineers and specifiers in over 100 countries. Working in partnership with the International Tube Association (ITA), *Tube & Pipe Technology* is sent out to all ITA members.

Tube & Pipe Technology is now also available as an online e-zine, which will reach even more worldwide readers, with selected content available free to all and the entire digital version available on subscription.

Readers of the e-zine can click on hyperlinks to be sent directly to websites, while advertisers are able to incorporate video-movies into their adverts.

Visitors to Fabtech can pick up a free copy of the latest edition at the *Tube & Pipe Technology* stand, together with information on subscription, advertising and the new e-zine.

Information will also be available on *Tube Products International*, the new magazine for the world of tube and pipe products and materials, read by producers, buyers and end-users.

Website: www.read-tpt.com

Tru-Cut Saw Inc
USA Booth 23039

Tru-Cut Saw, USA, manufactures the 'Aggressor' range of thin kerf, carbide tipped saw blades for cutting tube, pipe and solid ferrous materials in flying cut-off and re-cutting applications.

Available with carbide and cermet inserts, the multi-layered coated blades cut at up to 1,200 SFM and offer performance gains over high-speed steel and friction saws.

Test data on a 350mm x 2.8mm x 100 tooth blade running at 250rpm achieved a 3.7 second cut time, and was able to cut six square metres of 52100 bearing steel.

A special C-shaped hooked chip breaker on the face of carbide or cermet inserts allows faster chip removal and more aggressive cutting speeds.

Tru-Cut Aggressor saw blades range from 200-600mm in diameter

The company has its own PVD coating chamber, which allows the company to tightly control coating quality and uniformity, and allows adjustments for individual customer applications.

In addition to its Aggressor line of blades, Tru-Cut offers a full range of saw blades and services. These include custom and standard carbide tipped saws up to 3m, segmental saws and friction saws, and high speed steel saws from 100mm-600mm (M2 premium nitrite and M35 Cobalt).

The capability also includes solid carbide saws available from stock, repair and regrinding services, and PVD coated drills, taps and milling cutters.

Each saw blade sent in for repair is inspected for broken teeth, cracks, excessive wear and other visible defects. The blades are straightened to industry standard tolerances (or better), and are inspected after each repair operation is completed. All critical dimensions and tooth angles are checked, and only blades that pass inspection will be shipped.

Website: www.trucutsaw.com

Universal Tube & Rollform

USA *Booth 23062*

Universal Tube (utube) has a large selection of used tube, pipe, and rollform machinery. The company's warehouse holds over 125,000ft² of used machinery, including over 35 tube mills, 65 rollformers,

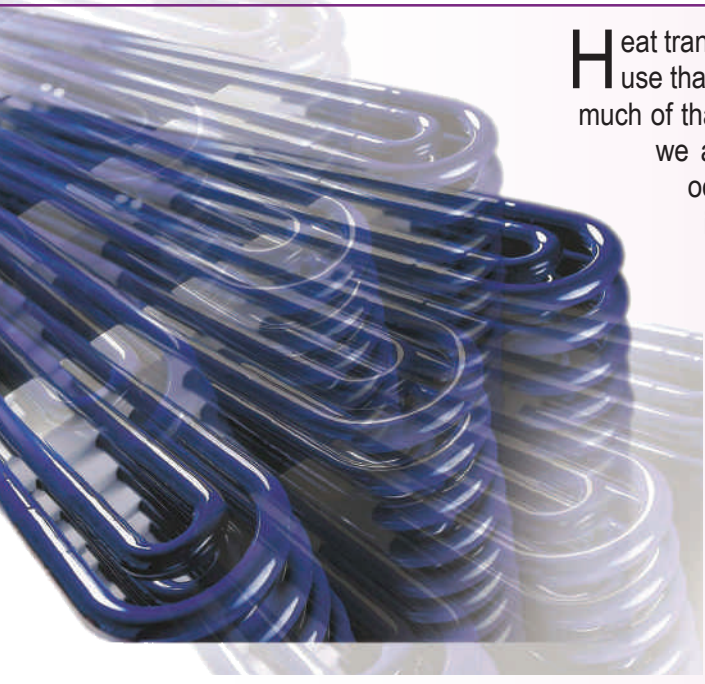
Universal Tube offers turnkey solutions using new controls and components mixed with quality used tube, pipe and coil processing machinery

35 deburring machines and 60 cut-offs in stock. New control systems and tooling can easily be added to update any line.

At its booth, the company will demonstrate its U-Trak length control systems.

Website: www.utube.com

Production of Heat Transfer Tubing



Heat transfer tubing is more closely associated with equipment in general use than many – perhaps most – other categories of tube. And because much of that equipment sees service in the very narrow zone within which we are able to alter our personal environment, it may prompt the occasional reflection on the phenomenon of heat exchange and its exploitation for domestic purposes.

An air conditioner in a heat wave; a boiler in a cold snap; for the period of the emergency these might excel even the plumbing system in the regard of the household.

Appreciation for the marvel of heat transfer tubing is well warranted. This is a product designed and fabricated to function not in one, but in two and, in many instances, three distinct environments simultaneously.

The simple terms ID and OD, designating inside and outside diameters, take on new meaning when the inside is frigid, the outside torrid, and the tube itself – perhaps coiled tight for maximum utilisation of space – is packed into an enclosure which may present heat-transfer issues of its own.

The comforts secured by heat transfer tubing may be enjoyed by the layman and tubing professional alike. Only one of them will know how they have been achieved. As with all the best magic, that is exactly as it should be.

Stainless steel and nickel alloy tubes

Founded in 1974, Italian company Tecnofar SpA is a specialist in the manufacture of stainless steel and nickel alloy tubes. With advanced technology, the company has two production units located in Delebio and Gordona, covering a total surface area of 7,000m^2.

The company produces redrawn precision tubes, both in bar and coil form, by using the TIG welding process. The company offers a modern, well-equipped department for tube cutting and is able to produce cut pieces measuring just a few millimetres in length, completely burr-free.

Tecnofar can adhere to a range of dimensional tolerances, with a stainless steel tube range of 0.3 to 76mm and wall thickness from 0.1 to 3.5mm.

Tecnofar manufactures high-quality stainless steel and nickel alloy tubes

The stainless steel tube ranges from 0.3mm to 76mm

These tubes are produced using stainless steels provided and guaranteed by leading steel mills.

ISO 9001:2000 accredited (by Italcert), the company has been certified by RINA for its welding system and heat treatment for the production range of OD 6-19mm and wall thickness of 0.4 to 1.1 mm.

Tecnofar SpA – Italy
Fax: +39 0342 684500
Email: info@tecnofar.it
Website: www.tecnofar.it

ID cleaning systems to remove heat exchanger contamination

During the various processes involved in the manufacture, storage and assembly of tube and pipe, interior diameters are often contaminated by deposits that can range from cutting oils and coolants to swarf, chips, grit, grease and all sorts of 'dirt'.

This contamination is particularly undesirable when that tube or pipe is destined for use in heat exchangers, chillers, boilers and equipment designed for food, beverage, chemical, pharmaceutical and other processing systems where 'clean' is mandatory.

Conco Systems, Inc, USA, offers a variety of solutions to this problem, stepped in accordance with degrees of contamination as well as size and material configuration of the tubes and pipes. All of the company's solutions are mechanical, and avoid the safety issues involved with chemicals, high pressure and other systems.

The company's tube shooting method, for example, is quick, efficient and productive. Using Conco's Model 200-B pump system, tube cleaners are shot through tubes at 200-300 psi water pressure. The cleaner travels through the tube at 10-20ft/sec, removing contamination and leaving a clean, polished bare metal inside diameter.

The Conco tube cleaners are sized in stepped increments from $^{5}/_{8}$" to $1^{3}/_{4}$", and are available in configurations that include nylon brush, stainless steel brush, metal bladed and stainless steel bladed. Special cleaners are available for use in U-tubes and for removing severe deposit scale such as calcium carbonate.

The extensive range of cleaners allows job-matching to the type of contamination, from oil and grease to hard deposits, as well as to the type of tube material, from copper to stainless steel and exotic alloys.

Conco's HydroDrilling system uses water flushing and rotary action to quickly and economically remove contamination from the inside diameters of tubes and pipes used in such applications as heat exchangers, chemical reactors, condensers, re-boilers and absorbers.

The system is effective in tubes and pipes from $^{3}/_{8}$" to 6" in diameter and up to 40ft in length. The system typically cleans 20ft tubes in 30-90 seconds each, spinning a selection of bits or nylon, stainless steel or brass brushes at 1,000-2,000rpm.

Conco's Excaliber portable rotating-shaft tube and pipe cleaner

The company's new Excaliber is a portable rotating-shaft tube and pipe cleaner. Pneumatically driven, it uses convenient plant air and water with simple foot pedal operation to send a rotating nylon, stainless steel or brass brush down tubes or pipes up to 60ft long and from $^{3}/_{8}$" to $1^{1}/_{2}$" in diameter.

Recent applications of Conco's cleaning systems include the STP nuclear power plant in Texas and the North Omaha Station coal-fired power plant in Nebraska, which reported severely fouled condenser tubes due to the build-up of calcium carbonate scale.

Using Conco tube cleaners designed for this specific problem, tens of thousands of tubes were cleaned in a matter of days, increasing power output while contributing to a 'greener' atmosphere. At a dairy facility in Australia and in a brewery in the USA, Conco's Excaliber systems were used to clean the tubes in critical heat exchanger units.

Conco Systems, Inc – USA
Fax: +1 412 826 8255
Email: info@concosystems.com
Website: www.concosystems.com

Duplex stainless steel tube and pipe

RathGibson, USA, is a manufacturer of precision welded straight lengths and coil, seamless, and welded and drawn stainless steel, nickel, and titanium tube and pipe.

The company offers 2205 duplex stainless steel for use in steel boilers, super heaters, heat exchangers, and condenser tubes. These applications are most commonly found in the oil and gas, chemical, petrochemical, power generation, and general commercial industries.

Sold as a dual certified material (UNS S31803/S32205), 2205 is currently RathGibson's most requested duplex alloy. The company claims that the product's duplex austenite-ferrite structure results in excellent stress corrosion cracking (SCC) resistance and room temperature yield strength compared to conventional austenitic stainless steels.

RathGibson produces millions of feet annually of 2205 tubing in both straight lengths and coil form

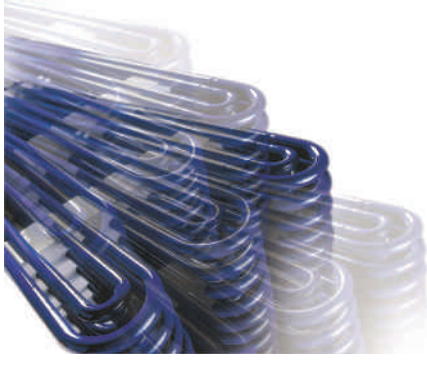
The austenite phase of 2205 allows the product to keep the ductility and formability of common austenitic alloys, such as 304, 316, and 317. The ferrite phase of 2205 brings SCC resistance. RathGibson maintains a 40-60 per cent ferrite content in its 2205 tube and pipe, to optimise these desired characteristics, as well as to provide corrosion resistance and strength.

RathGibson – USA
Fax: +1 608 754 0889
Website: www.rathgibson.com

Glass-lined steel tubes for heat transfer units

Legal and technical requirements for the operators of power stations, of refuse incinerators and special refuse incinerators to cool highly acid flue gases to the dew point range before discharge call for the use of materials that withstand corrosion. This guarantees the availability of plant and reduces payback times to the utmost. Another significant factor is erosion due to solid particles in flue gases and to the jets of steam, compressed air or water used for cleaning.

One way to reach this target is using outer glass-lined tubes. Special types of glass could be developed that meet such requirements. The advantages of glass-lining include acid resistance, diffusion prevention, scratch and wear resistance, stability to temperatures at work ranging from -60 to +450°C.



The company's process applies glass-coating powder to 25mm OD tubes

In addition, it results in good cleanability with low adherence of material and low tendency to formation of sticking deposits and crusts. Glass is also harmless to health, incombustible and environmentally friendly both during manufacturing and at waste disposal stage.

EHW Thale EMAIL GmbH, Germany, operates a unique worldwide plant that applies glass-coating powder to 25mm OD tubes. This process is undertaken via a dry electrostatic process and fired on steel tubes with special appropriate quality for coating in a semi-automated four-track production line.

The substrate material is not only coatable with glass but also meets the requirements of the pressure vessel regulations. U-tubes, straight tubes closed at one end and straight tubes open at both ends are the three different types of tube versions that can be produced, each designed for a particular area of use. The maximum length of the tubes is 12,000mm.

Since glass-lined tubes were put onto the market in 1995, they have been fitted to many heat exchangers in thermal electric power stations, refuse and special refuse incinerators and in the chemical industry. The great durability of the coating has been proven in a special refuse incinerator as compared with such materials as Hastelloy and Inconel. These inferior materials withstood the great variety of chloride attack for a maximum of three months, whereas glass-lined tubes lasted more than 24 months.

Parallel development resulted in a complete glass-lined heat exchanger with seal-free tube/tube plate connections, which is being successfully applied mainly in the chemical and pharmaceutical industries. With a length up to 6,000mm, diameter up to 600mm and heat exchange surface up to 72m², this advanced product has replaced graphite units in such processes.

Before this solution was available, it was often the case that the formation of crusts on stainless steel heat exchangers caused a problem. They could not withstand hard corrosive working conditions and special alloy installations and could not provide economical production.

The plant installed in Thale (Germany) is unique in construction worldwide, technological manufacturing sequence, quality and equipment standards. It ensures an efficient productivity as well as a very high and stable quality of glassing.

EHW Thale EMAIL GmbH – Germany
Fax: +49 3947 778 110
Email: sales@thaleemail.com
Website: www.thaleemail.de

A specialist in stainless steel

Established for over 30 years, Jürgen Witte Nederland BV is a stockist of stainless steel pipes and fittings.

One of the largest German stockists, the company has long-standing contacts with most of the renowned European and international manufacturers.

Jürgen Witte manufactures a comprehensive range of stainless steel pipe and fittings

The company's product range includes pipes and elbows (90°, 180°, SR, LR, 2,5xD), tees, reducer, stub ends, collars, and flanges to ASME and DIN.

In addition, the company provides high pressure fittings (3,000lb and 6,000lb) according to ASME.

The seamless range consists of up to 8" OD (or partly up to 10"), both thin and heavy wall, and with a schedule of 10-80s (or partly up to XXS). The welded range of products is available up to 20" OD, thin wall, with a schedule of 10-40s.

The tubes and fittings are manufactured in seamless grades of 321/1.4541, 321H, 316Ti/1.4571, 904L/1.4539, and duplex UNS S31803/1.4462, while welded grades include 904L/1.4539 and duplex UNS S31803/1.4462. Furthermore, the company can offer other high quality grades such as nickel alloys.

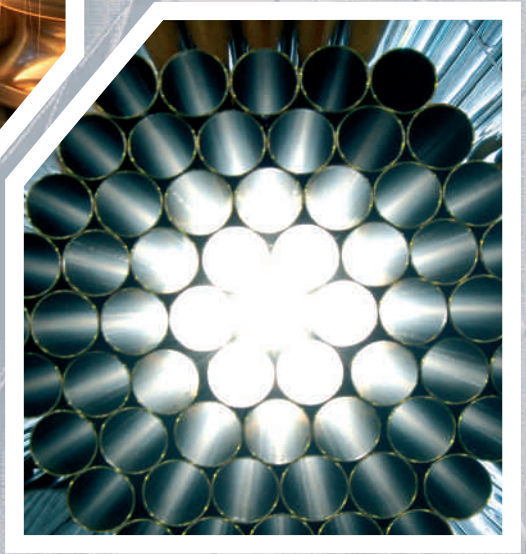
Jürgen Witte Nederland BV – Germany
Fax: +49 44 02 92 49 77
Website: www.witte-nederland.de

Premium quality stainless steel flexible hoses

Tubiflex SpA, Italy, is a manufacturer of premium quality and highly performing stainless steel flexible hoses, PTFE flexible hoses and stainless steel expansion joints. The company is one of the few worldwide manufacturers and a market leader undertaking production of flexible hoses (Splitcon®) for mini-spit portable

TUBIFICIO DI TERNI

AN AVANT-GARDE REALITY IN THE PRODUCTION OF ELECTROWELDED STAINLESS STEEL TUBES



EXHAUST TUBES

ROUND TUBES

RECTANGULAR TUBES

SQUARE TUBES

AUSTENITIC GRADES

W1.4301 - 304
W1.4541 - 321
W1.4828 -
W1.4404 - 316L

FERRITIC GRADES

W1.4512 - 409LI
W1.4510 - 439M
W1.4509 - 441LI
W1.4513 - 436LI
W1.4003 - STR12

A company of
ThyssenKrupp Acciai Speciali Terni

Factory & Commercial Offices
Strada di Sabbione 91/A
05100 Terni - Italy

Telephone: ++39 0744 8081
Telefax: ++39 0744 812902
Email: info.tubificio@thyssenkrupp.com

air-conditioners. In addition to Splitcon® flexible hoses, Tubiflex supplies a substantial range of products.

This range includes a wide choice of assemblies for hydro-thermo-sanitary appliances (Sereingaz, Minigas, Caterflex® and Boilerflex).

These products have been developed to satisfy the varying international standards, norms and requirements relating to gas, water and air conveyance, both for domestic and industrial applications.

In operation since 1951, the company has an advanced service standard with distribution to 40 countries.

The company serves a very wide range of industrial sectors including automotive, naval, petrochemical and aerospace.

Products are manufactured according to certified processes conforming to several different standards.

Tubiflex SpA – Italy
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Website: www.tubiflex.com

Tube and pipe with stress corrosion cracking resistance

RathGibson, USA, manufactures stainless steel, nickel, and titanium welded, welded and drawn, and seamless tube and pipe.

The company's Super Duplex 2507 tubing and pipe, named for its nominal composition of 25 per cent chromium and 7 per cent nickel, is used in general commercial industries where pressure and corrosion resistance is required.

"*Super Duplex 2507 is the most common super duplex alloy*," said Dave O'Donnell, director of product and process development for RathGibson. "*The duplex austenite-ferrite structure increases its SCC (stress corrosion cracking) resistance and doubles its room temperature yield strength over conventional austenitic alloys. Super Duplex 2507 can be designed with reductions in section thickness and weight to offset the alloy cost. When considering the alloy's unique characteristics, utilising Super Duplex 2507 tubing and pipe will result in a significant savings over high nickel alloys.*"

The ferrite phase of Super Duplex 2507 provides the alloy's SCC resistance. With its composition normally maintained within a 30-50 per cent ferrite range, Super Duplex 2507 also benefits from its high chromium content that is resistant to oxidising acid concentrations.

RathGibson's Super Duplex 2507 tubing and pipe offers a combination of stress corrosion cracking resistance and formability

The austenite phase of the Super Duplex 2507 is responsible for the alloy's ductility and formability. Super Duplex 2507 tubing and pipe is formed from an autogenous fusion welding of a continuous strip. Bright solution annealing restores the weld's phase balance after cold finishing or cold-forming of the weld flush with the strip. The result is a full finished welded product, which competes favourably with seamless.

RathGibson – USA
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Website: www.rathgibson.com

Nuclear tube capability from power generation specialist

The scope of Sandvik's specialist manufacturing capability for steel tubes for the power generation industry has resulted in a major order for the British Nuclear Fuels reprocessing plant at Sellafield, UK. The order is for high purity, 18/10/L, nitric acid grade stainless steel tubes in a range of sizes from ½" to 6" nominal bore for a heat exchanger type application.

Key to obtaining the order was Sandvik's track record in producing tubes for nuclear use and its total control of the manufacturing process, from steel melt to the finished product. Steel is specially melted for nuclear applications to ensure its high purity. Strict quality control and inspection routines are followed at every stage of the tube manufacturing process.

Sandvik's track record of supplying the nuclear industry extends to over 30 years as one of the world's leading manufacturers of the steam generator tubes used in nuclear processing. In this time, more than 30,000km of tubes have been produced for nuclear plants in 20 countries around the world.

Tube production is undertaken on a mill, specially designed for producing long length U-bent steam generator tubes. This also allows for tube finishing and packing to be completed to the high cleanliness and nuclear tube quality standards demanded by the industry and customer specifications.

Sandvik's stainless steel tubes will be used at the British Nuclear Fuels reprocessing plant in Sellafield, UK

Also in Sandvik's nuclear tube programme are feedwater heater tubes used in the power generation process in both nuclear power and fossil fuel fired stations. Whilst the materials commonly used for this application are copper alloys, carbon steel and type 304 stainless steel, Sandvik's duplex stainless steel Sandvik SAF 2304, is available as an alternative, offering strength and corrosion resistant advantages.

In an application in a fossil fuel fired power station in the USA, Sandvik SAF 2304 tubes have been used successfully as a replacement for carbon material. Because of its higher strength, this has allowed a tube wall thickness reduction of approximately 40 per cent.

In a nuclear power application in Sweden, Sandvik SAF 2304 has again been used successfully to replace carbon tubes, which failed frequently due to steam erosion.

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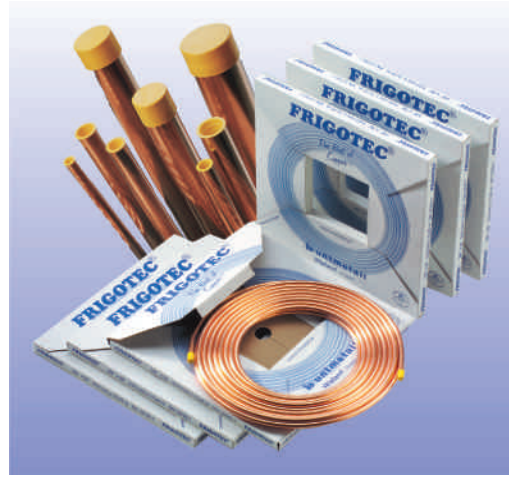
The cool solution for refrigeration, air-con and heat exchangers

buntmetall amstetten GmbH, Austria, manufactures the seamless drawn Frigotec®-KS-copper tube, which is ideal for transportation of technical gases (including R407-C and R410-A) in refrigeration installations, refrigeration and air-conditioning systems. It is also suitable for heat exchangers.

Available in straight lengths or coils, the dry and clean inside surface of the Frigotec®-KS-copper tube is one of its outstanding characteristics. Frigotec®-KS-copper tubes fulfil the requirements according to EN 12735-1 for copper tubes, which are required by the refrigeration and air-conditioning industry. DIN 8905 or ASTM B 280 will be replaced by EN 12735-1.

The tubes are made of high-quality copper and a dry, clean, non-oxidising and fat-free internal surface. This ensures top grade quality and secure finishing, achieved through constant controls according to the quality assurance system ISO 9001/ EN 29001.

The tubes are supplied in standard dimensions of 6-108mm or 1/4 to 4 1/8" OD, with wall thicknesses of 0.8-3mm dependent on the outside diameter.

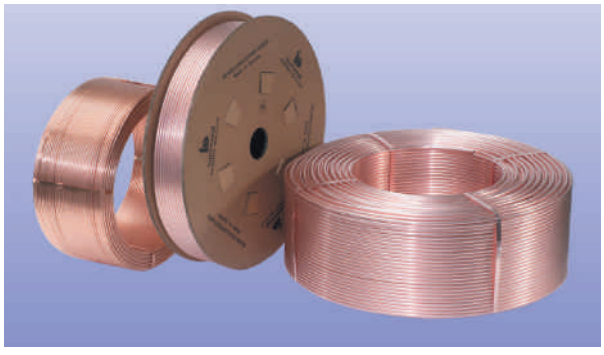


Seamless drawn Frigotec®-KS-copper tube

Tubes for industrial use can also be supplied with a wall thickness up to approximately 40mm. Most dimensions can be delivered short-termed ex stock.

Level-wound, thin-walled copper tubes (LWC) are also available for refrigeration and air-conditioning technology. These thin-walled copper tubes are produced according the latest state-of-the-art technique and guarantee

Level-wound, thin-walled copper tubes (LWC)



special advantages to the processors of refrigeration and air-conditioning technology. The extended lengths of the level-wound coils guarantee low waste during the processing and a long machine running time.

Using high quality pre-materials and a 100 per cent eddy-current test, buntmetall ensures the highest quality for industrial processing. The internal surface of the tubes is absolutely blank, clean and dry.

The highest requirements for flexibility and the expansion capacities for usage in the production of refrigeration and air-conditioning systems are therefore fulfilled.

LWC tubes are individually produced according to specific requirements. Dimensions available include an outside diameter of 4-22mm, a wall thickness of 0.28-1.75mm and coil weight of 145kg, 215kg and 430kg (hard or soft).

buntmetall amstetten GmbH – Austria
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Bending and forming equipment for demanding nuclear application

Eagle Precision Technologies Ltd, Canada, a worldwide leader in the design and manufacture of tube bending and forming solutions, has successfully supplied equipment for use in a demanding nuclear application. The company was chosen to supply a 5" capacity multi radius bender, a heavy-duty rotary swager and all of the associated tooling for use in the manufacture of reactor feeder tubes for a nuclear power plant refurbishment.

The bending application was demanding and required compliance to strict ovality and wall thinning requirements, of less than 7 per cent ovality and 12 per cent wall thinning on a 1.2 D CLR bend. The bending machine was designed for rigidity and the capacity to handle heavy wall schedule 80 pipes of 30ft in length and up to 3.5" in diameter.

Eagle's 5" capacity multi radius bender has been selected for a nuclear tube bending application

The machine also needed to be suited to bending of multiple radii and compound bends with minimal tool changeover. This is essential for any project with pipes as heavy as these.

The rotary swager utilises Eagle's unique swaging technology that uses sophisticated hydraulic pulsation of tooling to uniformly reduce heavy wall pipe sections without any tool marking to allow the pipes of the feeder portion of the reactor to be assembled to each other. This machine has a much smaller footprint and produces less noise than traditional hammer type swage machines.

Eagle Precision Technologies is a leading manufacturer of CNC tube and pipe

The bender is designed to handle heavy wall schedule 80 pipes of 30ft in length and up to Ø 3.5"

benders, tube and pipe end-finishing equipment, muffler manufacturing equipment and tooling. The company is a global supplier with a history of over 45 years of machine building experience and an installed base of more than 8,000 pieces of equipment in more than 60 countries.

Eagle Precision Technologies Ltd
– Canada
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Advanced capability for heat transfer tubing

Winner Stainless Steel Tube Co Ltd, China, is a leading manufacturer of stainless steel welded structural tube, industrial pipe, boiler, heat exchanger tube, sanitary tube, sheet, plate and coil.

With facilities located in Guangzhou, the company manufactures products on four Italian online bright annealing lines, used mainly for boiler and heat exchanger tubes.

The Winner size range for boiler and heat exchanger tubes is from ½" to 4" OD with varying wall thicknesses. The products are manufactured according to ASTM, JIS and DIN standards.

With plans to install a total of sixteen bright annealing lines, Winner has also installed a range of other advanced equipment. This equipment includes a CNC forming machine, inside bead removal equipment, advanced online bright annealing system, online eddy current test equipment, and online marking equipment.

The company's products have been exported worldwide for many years. Winner is also ISO, PED and ADW approved by TUV.

Winner Stainless Steel Tube Co Ltd – China
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From the **AMERICAS**

International affairs

Who owns the Arctic?

A frozen area heats up – and with it international rivalry over vast energy resources

Some time ago this column noted the renewal of interest in the fabled Northwest Passage, the ice-bound Arctic Ocean route which defeated generations of explorers but seems likely to yield, within eight years, to the advance of global warming. The emphasis then was on the opening up to commercial navigation of the route connecting the Atlantic and Pacific across the top of North America. Ancient maps and crumpled treaties took on new importance. The competition was on for potential savings in time and expense to move freight between Asia and Europe.

Now, another motivation has taken over. The Arctic holds an estimated one-quarter of the world's untapped energy reserves, and Russia is actively pressing its long-held claim to a 463,000-mile parcel of it: about half the size of Western Europe. How actively? On 2 August, two Russian ships reached the North Pole after plowing their way through deep ice for more than a week. The Russian legislator and veteran polar explorer Artur Chilingarov descended 14,000ft in a mini-submarine and dropped a Russian tricolor cast in titanium onto the seabed.

"It's like putting a flag on the moon," Mr Sergei Balyasnikov told the Associated Press, in a none-too-subtle jab at the United States. Mr Balyasnikov is a spokesman for the Moscow-based Arctic and Antarctic research institute that organized the expedition.

Like the US, Canada was initially dismissive of Russia's Arctic homesteading as *"just a show"*. The website of Canadian Television quoted the minister of foreign affairs, Peter Mackay, as saying, *"Look, this isn't the 15th century. You can't go around the world and just plant flags and say 'We're claiming this territory.'"*

Even so, and despite Mr Mackay's assertion that Canadian claims in the Arctic are *"well established"*, Canada moved quickly to assert its presence in a scrum that increasingly recalled the Gold Rush of 1849 in the American Old West. Just days after the Russians staged their submersible performance at the North Pole, Canadian Prime Minister Stephen Harper made a three-day visit to the region. Lest anyone mistake his purpose, it was clarified.

"Our government," said a spokesman for Mr Harper, *"has an aggressive Arctic agenda."*

As does Denmark. As does Norway. As does the US.

The Canadian prime minister, under mounting domestic pressure to check Russia's importunacy, had already announced plans to spend about C$3.1 billion (US$2.9 billion) on the construction of up to eight patrol vessels capable of breaking through Arctic ice. As reported in the *Financial Times* (London) on 8 August, Mr Harper was expected to name the site for a long-promised deepwater port in the region, as well as to reassert Canada's claim over Hans Island, at the entrance to the Northwest Passage.

Mr Mackay, the Canadian foreign affairs minister, had earlier declared that the Russians were *"fooling themselves if they think dropping a flag on the ocean floor is going to change anything."*

In fact, that *'flag'* seems already to have become a rather potent agent of change; or, at least, of the galvanic political activity that precedes it. And titanium has a long shelf life. Even in salt water.

- Washington's reluctance to submit to UN authority may complicate the position of the US in the matter of the Arctic oil reserves. The 1982 United Nations Convention on the Law of the Sea limits the five nations on the Arctic Ocean – Russia, Norway, Canada, Denmark (by way of Greenland), and the US (by way of Alaska) – to exploitation of 200 miles of adjacent seabed. They have the option of claiming more territory if they can prove that their continental shelves are geographically linked to the floor of the Arctic, and thus go farther out into open sea.

In 2001, Russia became the first of the five nations to file a claim, asserting that the underwater Lomonosov Ridge is not a chain of mountains in international waters but rather an extension of the continental shelf off Siberia. Investigation of the Russian claim continues. If the US holds itself aloof from this dispute mediated by the UN, its highly prized autonomy could cost it dear. In the increasingly fierce rivalry over the Arctic, it could find itself at a disadvantage – in numbers and in influence – to seafaring countries voluntarily conducting themselves under widely accepted international norms.

Steel

In a forced sale, Mittal's Sparrows Point will go to a metals distributor

The world's largest steel company, Arcelor Mittal, has agreed to sell its Sparrows Point steel plant near Baltimore, Maryland, to a venture led by the metals distributor Esmark (Chicago Heights, Illinois). The US Justice Department, citing antitrust concerns, in February ordered the Dutch steel maker to sell Sparrows Point to preserve competition in the production of tin-plated steel. According to news reports 3 August, the Esmark-led bid was chosen over one from the Brazilian steel maker Companhia Siderúrgica Nacional (CSN).

Founded in 2003, Esmark has grown by acquiring other steel companies and, in November 2006, edged out CSN to win control of the West Virginia steel maker Wheeling-Pittsburgh. According to E2 Acquisition Corp, the venture buying Sparrows point, its partners include an unspecified European steel maker and a South African company. Terms were not disclosed.

Esmark will gain the only fully integrated US steel mill with direct access to the sea, enabling it to import raw materials more cheaply. With a rated capacity of about 3.9 million tons of steel products a year, Sparrows Point accounted for 17 per cent of Mittal's North American output.

- Mittal Steel USA is seeking permission to build a nearly 75-acre landfill for sludge from its mill on company property less than a mile from the Indiana Dunes National Lakeshore, a protected area on Lake Michigan maintained by the National Park Service. As reported by the *Chicago Tribune* (14 August), the landfill would store up to 1.8 million tons of sludge from past steel mill operations now stockpiled above ground on property along the lake, together with 150,000 to 400,000 tons of sludge per year from ongoing operations. Mittal officials said the material cannot be recovered and recycled.

The projected landfill would have a liner to keep the sludge from contaminating groundwater. Mittal also would be required to monitor the landfill for 30 years after it is closed and capped with native grasses. Indiana Dunes has attracted fierce protective sentiment since 1899. The environmental movement in the US frequently makes reference to this comment by the late Senator Paul H Douglas, of Illinois: *"When I was young I wanted to save the world. In my middle years I would have been content to save my country. Now I just want to save the Dunes."*

Canadian steelmaker Stelco finds a buyer in Pittsburgh: United States Steel Corp

In the second major acquisition for US Steel this year, the big producer said on 26 August that it would purchase Canadian steel maker Stelco for US$1.1 billion and retire most of Stelco's US$760 million in debt. As reported by Len Boselovic of the Pittsburgh *Post-Gazette,* the move, which will boost the annual production capability of the largest domestically owned integrated steel producer in the US to about 33 million tons, is expected to produce annual pre-tax synergies of more than US$100 million in 2008.

The acquisition follows on the heels of US Steel's $2 billion purchase on 14 June of Lone Star Technologies Inc (Dallas, Texas), the producer of welded pipe for oilfield applications. Now, with Stelco, the American steel giant will strengthen its position in the automotive sector. Slabs produced at Stelco's Lake Erie and Hamilton plants, in Ontario, will support USS facilities producing both flat-rolled steel for the auto and appliance industries and tubular steel.

Charles Bradford, an industry analyst with Bradford Research/Soliel Securities in New York, told the *Chicago Tribune* that the deal will also likely increase US Steel's exposure in the construction market and reduce its reliance – as a percentage of total business – on warehouse stores that buy in bulk. Mr Bradford noted that the cross-border connection makes good sense geographically, as Stelco's Lake Erie Works is near a US Steel facility in Detroit.

US Steel chairman and chief executive officer John P Surma made plain that the company intends to capitalize on this aspect of the Stelco purchase. He said, *"With major facilities located on both sides of the Great Lakes, this acquisition will significantly increase our ability to respond to market demands and our customers' needs."*

The purchase, which requires the approval of US and Canadian regulators, was expected to close in the fourth quarter.

Of related interest . . .

Sounding a sour note two days after US Steel's announcement of its acquisition of Stelco, Standard & Poor's on 28 August revised its outlook on USS to negative from stable (a negative outlook is generally taken to indicate that the rating will be lowered further over the ensuing two years.) The ratings agency now gives US Steel a 'BB-plus', one level below investment grade.

The Standard & Poor's statement read: *"Although the acquisition [of Stelco] enhances [US Steel's] position in the North American steel market, where market conditions remain relatively favorable, we are concerned that the company is further depleting its cash cushion, adding meaningful additional debt to its balance sheet, and taking on significant additional pension and OPEB liabilities in an uncertain economic environment."* (NB: OPEB is defined as 'other post-employment pension' obligations).

In other news of US Steel, the company on 17 August announced formation of a Texas-centered distribution network for sales of oil country tubular goods in the US. The initiative, which grew out of the USS acquisition of Dallas-based Lone Star Technologies and its related companies earlier this year, named the following as authorized United States Steel OCTG distributors: Cinco Pipe & Supply, Energy Tubulars, JD Rush, Pipeco Services, Premier Pipe, Red Man Pipe & Supply, Republic Supply International, Alexander Steel Sales, Sooner Pipe, and Toolpushers Supply.

The distributors will be responsible as well for selling both seamless and electric resistance welded (ERW) tubular goods into OCTG markets. Joe Alvarado, USS vice president-Tubular, said, *"US Steel is now the largest supplier of OCTG in the United States, and we are committed to marketing our products in North America through a selective, authorized distribution network."*

Elsewhere in metals

High demand and soaring prices for copper set off a near-epidemic in the US of theft of metal for scrap

Record-level prices for copper, attributed largely to the building boom in Asia, have caused theft of scrap metal, copper in particular, to spread rapidly throughout American industry. Normally a problem in developing counties and war zones (electricity remains crippled in Iraq because looters steal copper cable as quickly as it is installed), theft of metal for scrap is now committed in nearly every state of the US. Over the 18 months to midsummer – a period during which copper prices briefly reached $4 a pound, highest in recent memory – metal theft reached alarming proportions.

As reported in the *New York Times* (July 31), thieves have stripped the wires out of phone lines, raided air-conditioning systems in schools, and pulled catalytic converters from cars, then sold the stolen metal to scrap recyclers. Hardest-hit have been California farmers, whose copper-intensive irrigation systems over broad acreages tend to be in remote places where law enforcement is stretched thin.

According to the Agricultural Crime Technology Information and Operations Network (ACTION), a grassroots project that supplements official crime prevention agencies in the San Joaquin Valley, metal theft from farmers in California rose 400 per cent in 2006, over 2005. And through the end of June 2007 there were nearly 1,000 incidents of scrap metal theft on farms, causing losses of more than $2 billion. ACTION (Visalia, California) has mounted a vigorous counterattack, incorporating new technologies, computer analysis, a crime data base, training, networking, and community education.

- Copper thieves in California are believed to work their way from the north through the Central Valley, to Long Beach, south of Los Angeles, where they sell to recyclers who quickly get the metal to the port and onto a ship. No doubt the victimized farmers would welcome a statewide law like that enacted

Aug. 1 by Minnesota, requiring scrap dealers in the state to keep detailed records of all transactions. Sellers must show state-issued ID's. Dealers must pay them with checks or electronic transfers and photograph them and their cars.

On 31 August, a Minnesota recycling company called police to report having bought two pieces of scrap that might have come from a statue of Buddha stolen days before from an outdoor temple shrine. The 7-foot statue had been made in Thailand for the Thai Buddhist Center of Minnesota, in Elk River; valued at $10,000, it was finished in copper-suffused bronze. A statewide alert to scrap dealers was issued, together with a photo of the stolen statue. Within 48 hours of the theft, detectives had a suspect in custody.

Old factories, equipment, and vehicles from the US continue their polluting ways in developing countries

Criticism of the United States by environmentalists normally turns on the country's reluctance to take a proactive role in the international effort to control 'manmade' climate change. Now, the *Boston Globe* has drawn attention to an area in which the US is having an outright negative effect on that effort: the shipment to poorer nations of equipment and vehicles, substandard by US norms, to go on fouling the air and warming the atmosphere for many decades.

Globe staffers Beth Daley and Maria Cramer described the dismantling, completed in June, of a shuttered coal-fired power plant that had belched hundreds of thousands of tons of heat-trapping gases into the air of a 19th-century mill village on the Connecticut River. The event was a cause for celebration in New England and perhaps also in Guatemala, where almost every component of the 2,600-ton plant is to be rebuilt to power a textile mill that will export its output to the United States ('US castoffs resuming dirty career," 19 August).

Other examples of American transplants were given: a 1950's-era paper-making machine operating in Egypt; a 1992 school bus on the roads of Costa Rica; a rock-crushing machine reassembled in Colombia. According to the *Globe*, *"From 4-ton trucks to 40-ton boilers, US vehicles and equipment are finding a second life in developing countries – postponing meaningful reductions in greenhouse gas emissions by inefficiently using energy or directly emitting carbon dioxide."*

There is nothing underhanded about these transactions. The *Globe* reporters explain that, when a factory closes or a school bus fleet is retired in the US, its parts often enter an international marketplace. Through online auctions and a series of middlemen, the vehicles and machines are sold and shipped around the world, usually to countries that cannot afford cleaner technology. There, the used equipment can have a second act longer than its first.

But according to Armond Cohen, executive director of the Boston-based national advocacy group Clean Air Task Force, *"This clearly isn't what we want to happen. It's troubling that we'd be handing down the remnants of our industrial-era technology rather than helping these places with cleaner options."*

- The *Boston Globe* article cited above – sixth in a series examining the effects of climate change and possible solutions

– acknowledges that the sale of outmoded machinery and vehicles to poorer countries resists easy analysis. Few people, even economists and environmentalists, are willing to condemn countries with developing economies for seeking bargains in the machinery of production. Also, in many instances the 'newer-old' heavy equipment runs cleaner than the altogether antiquated original, and may even greatly exceed standards prevailing in the new locale.

But the international trade in retired equipment and vehicles was estimated at $150 billion annually as long ago as 2003. The earth's atmosphere is no doubt neutral on the subject. The question is whether the nations of the earth, advanced *and* developing, can afford the same lofty indifference.

Automotive

US drivers, who burn 385 million gallons of gasoline a day, turn toward cars offering greater fuel economy

With fuel prices around $3 a gallon, many American car buyers are shifting toward smaller, more efficient models. By late summer, smaller cars had won market share from larger cars, and car-based sports utility vehicles (SUV's) had taken share from larger trucks and pickups. Writing in the Detroit *Free Press,* Justin Hyde noted the extent to which that trend – supported by better technology – is bringing about a 'greener' automotive industry. According to a federal estimate, the average fuel economy of new vehicles built in the US is very nearly at the highest level ever.

Mr Hyde, a member of the Detroit paper's Washington staff, said that auto makers and environmentalists are hailing a projected increase in fuel efficiency for 2007 model-year vehicles as a sign of progress toward reducing US dependence on foreign oil. But he also observed that the improvement could cause automakers some trouble by providing new ammunition to backers of tougher federal fuel economy standards ('Vehicle fuel economy surges toward record," 31 August).

While the lawmakers will have to fight it out, the Union of Concerned Scientists claims that the American consumer has already cast a decisive vote against gas-guzzling cars. David Friedman, director of the group's clean vehicles program, told Mr Hyde, *"It's clear consumers are feeling pressure of higher gas prices, global warming and oil insecurity, and making do with the choices they have."*

On the basis of sales estimates from automakers, the National Highway Traffic Safety Administration (NHTSA) calculated that 2007 models, including both cars and light trucks, would average 26.4 miles per gallon, surpassing the previous peak of 26.2mpg in 1987. The increase of 1 mile per gallon (mpg), or 3.9 per cent, from the 2006 models follows two years of no change in the fleet average.

The NHTSA says the average fuel economy in 2007 model-year cars is expected to rise by 1.2mpg to 31mpg, while the light truck average is expected to rise by 0.7mpg to 22.9mpg. Domestically

built cars are expected to increase their fuel economy by 0.4 to 30.5mpg, while cars imported for sale in the US are expected to post the largest gain – 1.2mpg – to 31.7mpg.

- In its fall term Congress was set to resume consideration of an energy bill that includes a standard of 35mpg for all vehicles by 2020. The auto industry prefers a more flexible target of 32 to 35mpg by 2022, saying the 35mpg target is unworkable. Mr Friedman, for the scientists, and other environmentalists maintain that auto makers could improve fuel economy 4 per cent a year every year if they were to use available technology wisely.

Elsewhere in automotive . . .

› Citing a slump in sales of pickups, General Motors of Canada said it will cut about 1,100 jobs at a truck plant in Ontario. GM on 30 August said it would cut production of two pickup models from three shifts to two in Oshawa, starting in January. Of the five GM plants in North America producing pickup trucks, only the Oshawa plant has three shifts; hence the decision to economize there, according to David Paterson, vice-president of GM Canada. After losing more than $12 billion over the past two years, General Motors Corp is in the middle of slashing more than 34,000 jobs and closing 12 plants in North America.

› GM said 22 August that it had cut production at six plants that make large sport utility vehicles and pickups, citing fuel prices and market competition. The change was to remain in effect for the rest of the year. A GM spokesman said in Detroit that the company had eliminated previously scheduled overtime production at plants in Arlington, Texas; Janesville, Wisconsin; Fort Wayne, Indiana; Flint, Michigan; Silao, Mexico; and Oshawa, Ontario (Canada). [These earlier Oshawa cuts are not included in those mentioned in the first item, above].

› In a rare piece of good news from an auto parts maker, the Canadian company Magna International reported a 36 per cent rise in second-quarter profit on increased sales worldwide. Magna (Aurora, Ontario) said its net profit rose to US$262 million from US$193 million a year earlier. Quarterly revenue rose 6 per cent to US$6.7 billion from US$6.3 billion. *"Whether we look at North America or Europe, we're starting to see improvements,"* Don Walker, co-chief executive of Magna, said on 10 August. *"So it's not just in one area, it's pretty much throughout the whole organization."*

› Things also began to look up for Delphi Corp (Troy, Michigan) when members of a union representing about 2,000 of its hourly workers voted to ratify a new four-year contract with the auto parts supplier. Seventy-five per cent of the membership of the International Union of Electronic Workers-Communications Workers of America at locals with Delphi employees voted in favour of the deal, the union announced on 18 August.

The bankruptcy court had earlier approved Delphi's new agreement with its biggest union, the United Auto Workers, which represents 17,000 of its workers. Delphi, the former parts division of General Motors, which spun it off in 1999, gained protection from its creditors in October 2005. The company has said that agreements with its unions are crucial to its effort to emerge from bankruptcy; also that it needs union concessions if it is to compete against suppliers whose labour costs are lower.

Auto production in Mexico picked up in the April-June period after a dismal first quarter, but by late summer output still trailed last year's. According to the Mexican Automotive Industry Assn, in the first seven months of 2007 Mexico produced 1.1 million vehicles, down 1.4 per cent compared with the same period of 2006. Exports of cars and trucks were flat. Vehicle production in Mexico is dominated by the Big Three – Ford Motor Co, General Motors Corp, and DaimlerChrysler – which export most of their Mexican-produced cars and trucks to US showrooms. Analysts say that Detroit's shrinking share of its home market is crimping one of Mexico's most important industries.

Work force

The UN says American workers are the most productive anywhere

According to a report released 3 September by a United Nations agency, the US leads the world in labour productivity. The International Labor Organization (ILO) said that US workers produce $63,885 of wealth per year each, more than their counterparts in every other country. Ireland is second at $55,986, followed by Luxembourg at $55,641, Belgium at $55,235, and France at $54,609.

A country's productivity is determined by dividing its gross domestic product by the official number of employed persons. The UN report draws on figures for 2006 or, for some countries, the most recent data available.

The ILO said the US also exceeds Japan, Switzerland, and all 27 nations in the European Union in the amount of wealth created in an hour of work. Norway, not a member of the EU, generates the most output per working hour: $37.99. The US is second at $35.63, and France is in third place at about a half-dollar behind the US.

In 2006, the report said, the US employee put in an average 1,804 hours of work. That compared with 1,407.1 hours for the Norwegian worker and 1,564.4 for the French. There was an astonishing differential between these totals and the hours worked in Asia. In 2006, workers in seven economies – South Korea, Bangladesh, Sri Lanka, Hong Kong, China, Malaysia, and Thailand – put in an average of over 2,200 hours, but at lower productivity rates.

Even so, productivity in China and other East Asian countries has doubled in the past decade and is accelerating faster than anywhere else, the ILO report said.

Immigration

The X factor in the American presidential campaign: disaffected US citizens of Hispanic background

The immigration bill that went down to defeat in the US Senate in June was a poor thing at best: cobbled together to placate

competing interests, it satisfied no one – except perhaps those who hold that, given the state of the country's policy on illegal immigrants, any change is for the better.

Opposition to the bill turned on two main objections: putting illegal immigrants already in the country on a path to citizenship would forgive them for violating US law (the 'amnesty argument'); and, providing more opportunities for workers to enter legally would take jobs away from American citizens (the 'cheap labor argument"). The former tended to resonate with conservatives; the latter, with liberals. Together, they blocked any comprehensive approach to immigration reform.

There is no shortage of analysis of the probable fallout from the failure. But one aspect will likely long outlast the sour triumphalism of the Republicans in the Senate, who represent the conservative element. In its editorial 'The Grand Failure' (29 June), the *Los Angeles Times* noted that the Republican Party of President George W Bush may pay a higher price than the opposition Democratic Party. The editors cited a USA Today/Gallup poll that shows Latinos gravitating to the Democrats, just as they abandoned the Republicans in California after an earlier state governor pushed an anti-immigrant agenda.

During the primary campaign that determines the nominees who will vie to succeed Mr Bush, the Democratic and Republican candidates avoided the immigration question if they could. Over the months leading up to the general election in November 2008, they will have to grasp the nettle – together with some important statistics. According to the Pew Hispanic Center in Washington DC, Hispanics made up 8.6 per cent of the nation's eligible voters in 2006, up from 7.4 per cent in 2000.

Around the companies . . .

› Dofasco Tubular Products Corp. (Hamilton, Ontario) on 8 August announced the signing of a definitive agreement for the sale of its stainless steel laser-welded tubular products plant in Elizabethtown, Kentucky, to another Canadian company, Samuel Manu-Tech Inc, for US$28.5 million. The tube maker is a wholly owned subsidiary of Dofasco Inc, a member of the ArcelorMittal steel producing group.

› Samuel Manu-Tech (Mississauga, Ontario) is a value-added processor and distributor of metals and industrial products and services. On 14 August it announced the acquisition for US$8.75 million of Northland Stainless Inc (Tomahawk, Wisconsin), a designer and manufacturer of stainless steel pressure vessels, tank heads, and related components.

› Schulz América Latina (São Paulo, Brazil) has announced plans to build two more stainless pipe mills, both in Rio de Janeiro, at a cost of $66 million. The *Preston Pipe Report* (Kemah, Texas) said the welded pipe mill is expected to turn out 5,000 to 6,000 metric tons per year (mtpy) of 8" to 36" pipe, some 40 per cent of it for export. That mill was scheduled to come onstream in October. The seamless pipe mill is set for commissioning in December 2008.

Dorothy Fabian, Features Editor (USA)

Cutting, Sawing & Profiling Technology

Anyone who has used a scroll saw to build a model airplane will be familiar with some of the demands of profiling: turning a blade without snapping it, applying enough pressure but not too much pressure, working to a design that is both a pattern and a set of strict dimensions.

Automatic control and repeatability have brought the cutting of a profile to a high degree of refinement. But even in earlier times, the process would not have presented the same kind of challenge as cutting a tube. After all, presuming a hollow section is not meant, a profile is – reassuringly – a solid; whereas a tube is part something and part nothing. Cutting it imposes the necessity of taking account, in one operation, of a solid and a void. Given the choice, a sensible person would prefer to saw through a tree limb.

Cutting and sawing of tubulars have benefited enormously from the advance of technology, which permits the application of special expertise over a range of materials and sizes that widens all the time. A pipette held between thumb and forefinger in a laboratory is not *essentially* a lesser cutting challenge than an oil transmission pipe which dwarfs the man standing alongside it in a desert.

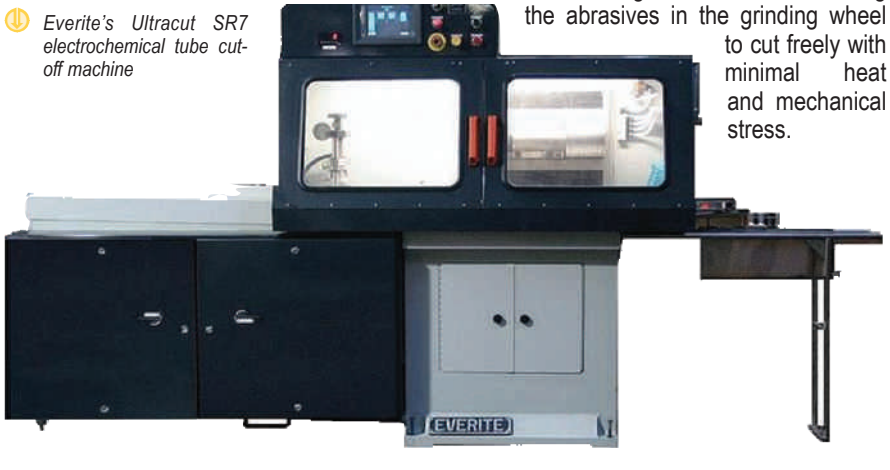
Blade selection. Blade pitch. Blade metallurgy. Rake. Saw tuning. Vice pressure. Coolant application. Band speed. Feed force. Feed pressure. Stack pattern. These are only a few of the factors that determine a perfectly cut or sawn tube, whatever its size or composition or purpose. Fortunately, our industry accesses state-of-the-art technology that accommodates all of them.

Electrochemical cut-off machines for burr free tube

True burr free cut-off can easily be achieved on the unique Everite electrochemical tube cut-off machines. By combining the stress-free principles of electrochemical erosion of metals with the precision of abrasive grinding, burr free cuts can be achieved that are fast, clean and completely accurate.

Almost any conductive material can be cut effectively with electrochemical grinding (ECG). Material hardness and machinability have very little impact on cutting speed or blade life.

The process is quite simple – low voltage, high current DC power is applied between the conductive grinding wheel (a cathode) and the workpiece (an anode), with an appropriate electrolyte solution flowing to complete the electrochemical process. The material begins to oxidize, allowing the abrasives in the grinding wheel to cut freely with minimal heat and mechanical stress.



Everite's Ultracut SR7 electrochemical tube cut-off machine

The results are no burrs and very little blade wear. This technology has been widely used for cut-off of small gauge stainless tubing. The advances in wheels and process controls have expanded the use of ECG into a variety of applications such as aerospace, automotive, analytic and temperature control equipment, medical and dental devices, surgical tools, catheters, guide wires and body implants.

Tube materials such as stainless, high temperature nickel alloys, Nitinol, titanicam, zirconium, and alloy steels are commonly cut using Everite ECG machinery.

The Ultracut SR7 is available with programmable automatic feed for high production cutting or manual feed for lower quantities. The machines are now offered in an abrasive version using rubber bond abrasive wheels for applications that can tolerate small burrs.

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Website: www.everite.net

Rotary tube cut-off machines for seamless tubes

Cutting and finishing equipment manufacturer, Reika GmbH & Co KG, Germany, has reported increasing sales as a result of the current boom in the tube industry. Vallourec & Mannesmann, Tenaris, Interpipe and Mittal have purchased several machines for tube cutting in their finishing lines/tube processing departments.

Reika machines cut seamless tubes with high tensile strength, and are equipped with standard carbide inserts which can be purchased from tool suppliers worldwide. The cutting process is dry, and in the case of high alloys a mini-cooling system can be activated. Benefits of Reika machines include high output and low tool cost, which is only 20-30 per cent in comparison to carbide saws.

Reika's cuff-of machine and finishing line

In finishing lines, the cut-off machine can be equipped with tube optimising software, treating each seamless tube individually. After length measuring of each individual tube, the tube is precisely positioned to the required length and cut.

Fixed length and random length cutting is standard, in addition to sample cutting and flexible end cutting. The system operation is simple, requiring only the input of length. The company claims that customers have experienced a reduction in scrapped material of approximately 2-3 per cent.

The cut-off machines and finishing lines are available in a diameter range from 10mm to 630mm.

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Website: www.reika.de

Manual and air-operated rotary cut-off machines

Continental Cut-Off Machines, USA, manufactures seven different cut-off machine models based on two methods of rotary cut-off machines – manual and air operated. The company's machines utilize the rotary concept of cutting tube and pipe without material waste. In use since 1919, this concept has developed into an effective production method for tube and pipe cutting, regardless of lot sizes.

A variety of pipe and tube diameters and lengths can be handled efficiently by both manual and air-operated machine. Manual rotary cut-off machines provide an economical option for shops with intermittent cutting operations or with frequent changeovers for cutting a variety of sizes.

Air operated rotary cut-off machines allow each job to be tailored to the production rate and required end conditions with minimal adjustment. These machines can create the same cut from the beginning of a production run to the end of the run, regardless of piece count.

Rotary cut-off machines and cut-off blades from Continental

A highlight of the company's range is the model #6A and series 500 support system. The series 500 tube support system permits storage of multiple tubes/pipes and easy operator access to the tube feed section of the machine.

This system was designed to increase productivity and to be used where the expense of an automatic tube feeding system cannot be justified. The primary benefit is a reduction of loading time of the tubing (multiple vs single pieces) and the improved feeding of the tube into the cut-off machine.

Continental also manufactures cut-off blades that are made from high impact tool steel. These blades are heat treated to provide top performance and long life. Blades can be resharpened 25-30 times making the cost per cut nominal compared to other methods that are used to cut pipe or tube.

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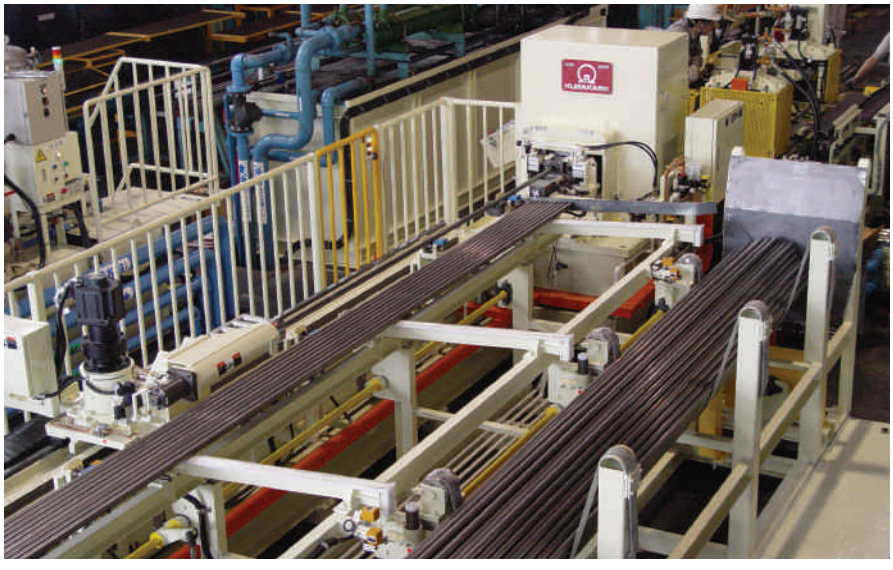
Rotary disc cut-off machine

Kusakabe, Japan, a leading tube mill manufacturer, has gained worldwide acceptance for its innovative rotary disc cut-off machine. This machine is especially suited to the cutting of stainless steel and high tensile steel tubes where it is claimed to outperform saw cutting.

The high speed cutting head and the servo controlled cutting disc movement has enabled the cutting to be precisely controlled. This has resulted in less tube deformation and lower loads on the cutting disc and increased cutting disc life. These developments have made rotary disc cutting one of the most cost effective cutting methods for tube and pipe. This technology is available in both inline on the tube mill and offline as a recut machine.

Kusakabe's rotary disc cut-off machine



The offline machine can be supplied fully automated from tube bundle to finished packed cut parts. The control system facilitates high production rates with the flexibility of fast length and tube size changes. The disc control system positions the cutting blades automatically for each diameter and wall thickness change with the press of a single button.

The optional end facing and chamfering system is part of the cutting mechanism. There is no need to transfer the tube to another station for these operations.

With 45 years of experience, Kusakabe is an innovative company working with the tube and pipe industry to develop technologies to provide solutions for ever increasing user demands.

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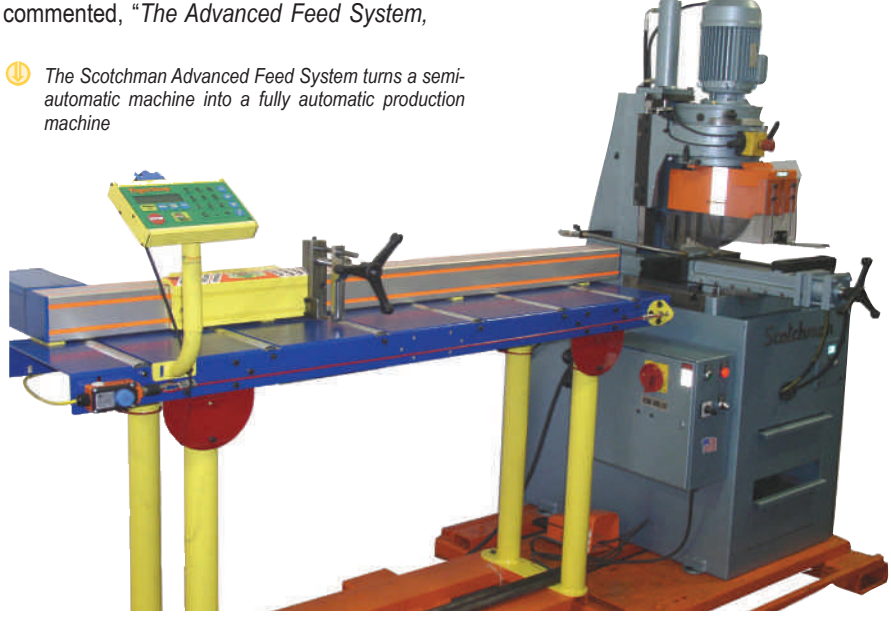
Advanced feed system for cutting excellence

Scotchman Industries, USA, manufactures an advanced feed system designed to allow companies to increase productivity, decrease set-up time, reduce operator error and eliminate waste.

Scotchman president, Mr Jerry Kroetch, commented, "*The Advanced Feed System, coupled with a Scotchman circular cold saw, turns your semi-automatic machine into a fully automated production machine. It is really easy for any operator to enter cut lists into the controller. Next, secure the material in the indexing clamp and hit start. That's all there is to it. The Advanced Feed System automatically moves your material to position, automatically clamps the material, and cycles the machine.*"

The Scotchman Advanced Feed System turns a semi-automatic machine into a fully automatic production machine



Operators can either manually enter dimensions into the controller or pull a cut list from the controller, which can store up to 99 programs. Cut list information can also be downloaded directly from a PC.

One-off cuts are performed by keying in the desired cut length in inches, fractions or metric, and pressing start. Mr Kroetch claims that the system can cut production time in half, virtually eliminating set-up time.

The system can be used as a programmable stop system or a fully automatic programmable push feed system with the optional material clamp. Scrap can be eliminated by using the optional optimising software, which calculates how to best optimise the material for the highest yield.

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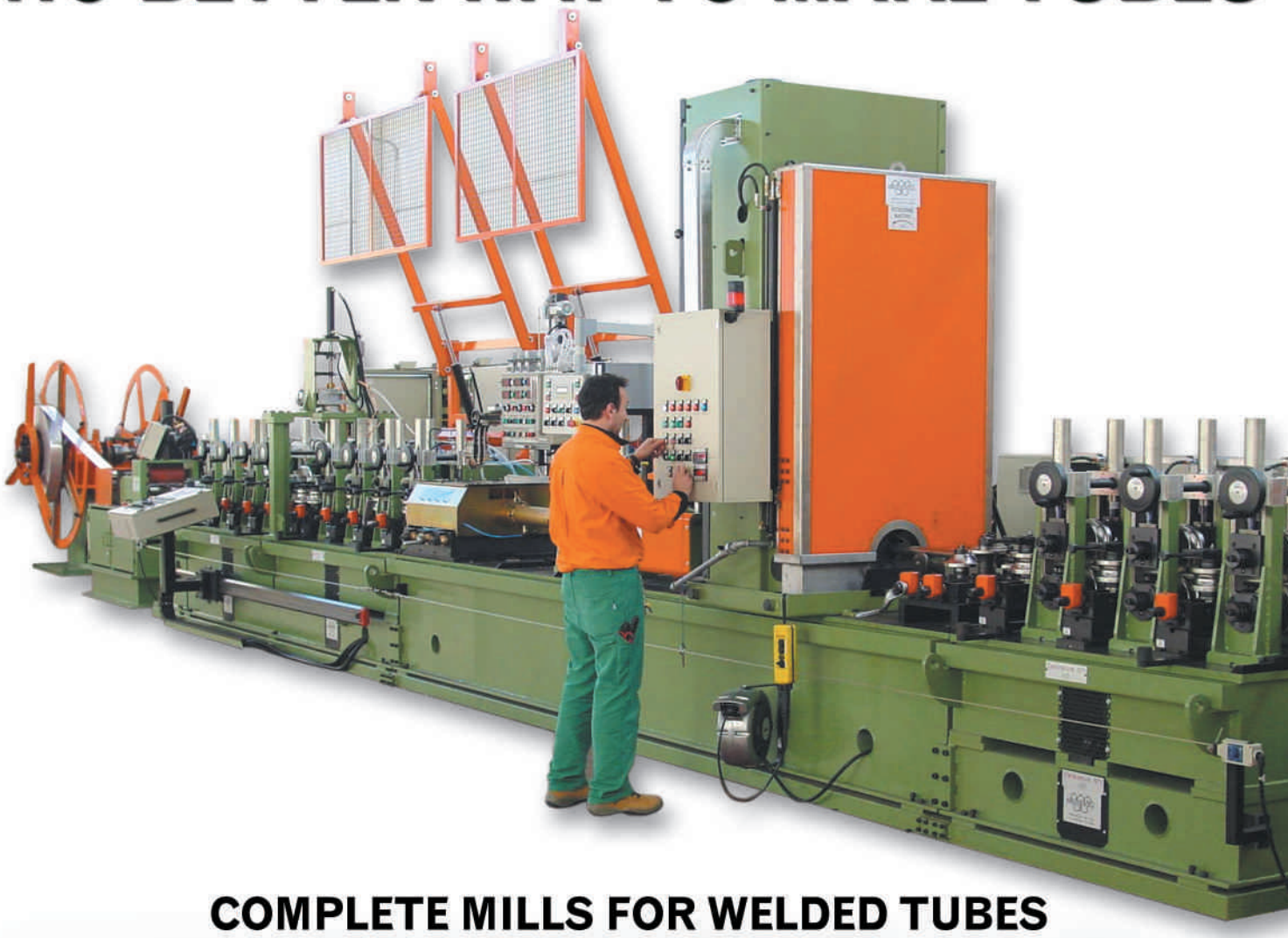
olimpia80

ENGINEERING

NO BETTER WAY TO MAKE TUBES



COMPLETE MILLS FOR WELDED TUBES

TIG	PLASMA	LASER	HIGH FREQUENCY

OLIMPIA 80 s.r.l. Engineering
ZONA INDUSTRIALE: Cà Verde - 29011 BORGONOVO V.T. (PC) - Italy - Tel. +39 0523 86.26.14 / 86.28.80 - Fax +39 0523 86.45.84
olimpia@olimpia80.com • www.olimpia80.com

Combination laser cutting system ideal for sheet/tubular components

BLM Group's LT Combo 'combination' laser cutting system is designed for laser cutting of both sheet and tube in cases where production volumes are small or factory floor space is restricted.

This versatile 'two-systems-in-one' solution provides automatic laser cutting of tube from 16-225mm diameter and sheet ranging in size from 3,000mm x 1,500mm to 3,000mm x 8,000mm. It takes less than three minutes to change automatically from a tube machining configuration to flat steel sheet machining – and vice versa.

With a modular design, the LT Combo can be configured to suit individual requirements in terms of productivity, floor space and degree of automation involved. This makes the LT Combo highly suited to job shops where short batch runs are the norm or for longer-run production applications within sub-contractors and OEMs.

The LT Combo laser cutting system changes automatically between tube machining and sheet machining

Often in these situations, unmanned machining is possible because of automation levels up to the integration of multi-column pallet warehousing.

Tubes up to 225mm diameter and flat steel sheet up to 3,000mm by 8,000mm can be machined on the BLM Adige LT Combo laser cutting system

An integral database with a complete range of cutting parameters guarantees repeatability of cutting quality, with the machine control generating the optimum working parameters (cutting power and speed) at any point in the machining cycle.

Machining of flat sheet is completed to a positioning accuracy of 0.05mm and a positioning repeatability of 0.03mm, while 3D design and programming of tubular components and complex tubular structures (frames) is simplified with Adige CAD/CAM Artube software.

Programs can be completed in minutes rather than hours, drastically reducing the time and cost of translating a completed design into a prototype or a full-scale production component.

The end result in either case is improved product quality, especially when the opportunity is taken to re-engineer existing designs of sheet/tubular structures to gain the maximum benefit from the dimensional and profiling accuracy of the LT Combo laser cutting system.

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Cut-off machines for optimising production capacities

Sinico SpA, Italy, produces flexible, modular machines for use in the automotive, bicycle and motorbike industries. These machines can be used for hydraulic components, electric motors and power transmissions, chains, earth moving machinery and contract machining.

The company's cut-off unit features the AVTC™ electromechanical drive system, that allows a constant amount of material to be removed by continuously varying the feed speed. The software automatically generates the ISO program for the ideal cutting speed curve based on the set type of tube (size and shape).

Sinico's cut-off machine can be used to manufacture parts from 10-40mm in length

The main advantages are reduced cutting time, increased service life of the saw blade, reduced noise levels, and the ability to use saw blades with carbide inserts.

Parts can be produced in lengths from 10-640mm, with diameters ranging from 3-120mm. The stock length of loaded bars is from 3-6.5m as standard, or up to 12m on request.

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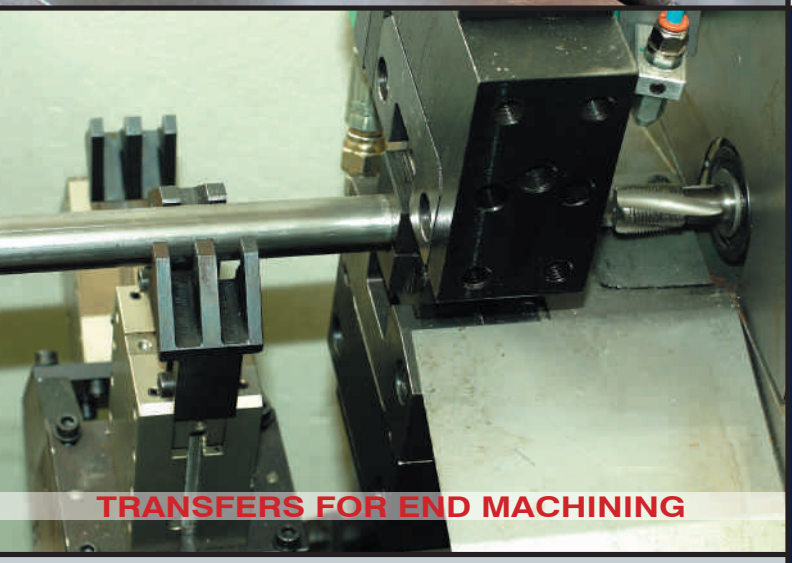
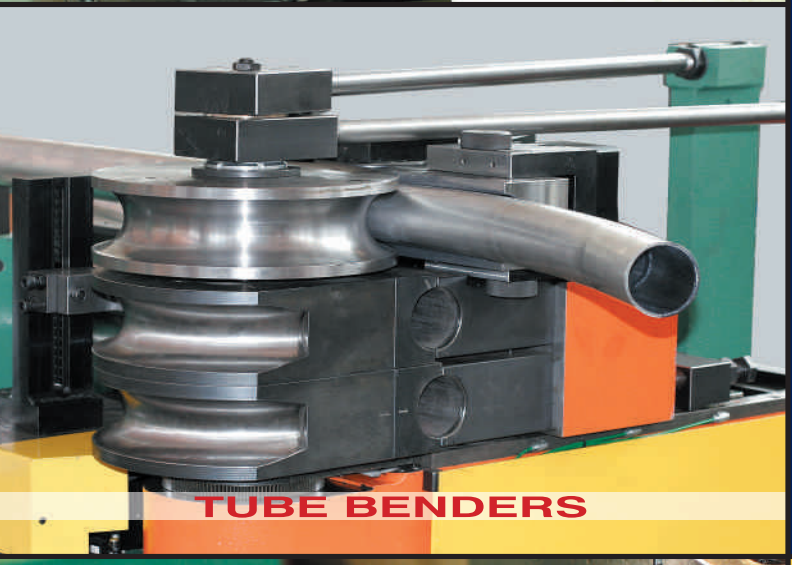
Website: www.sinico.com

TUBE CUTTING LINES

MEASURING SYSTEMS



TRANSFERS FOR END MACHINING



TUBE BENDERS

PEDRAZZOLI

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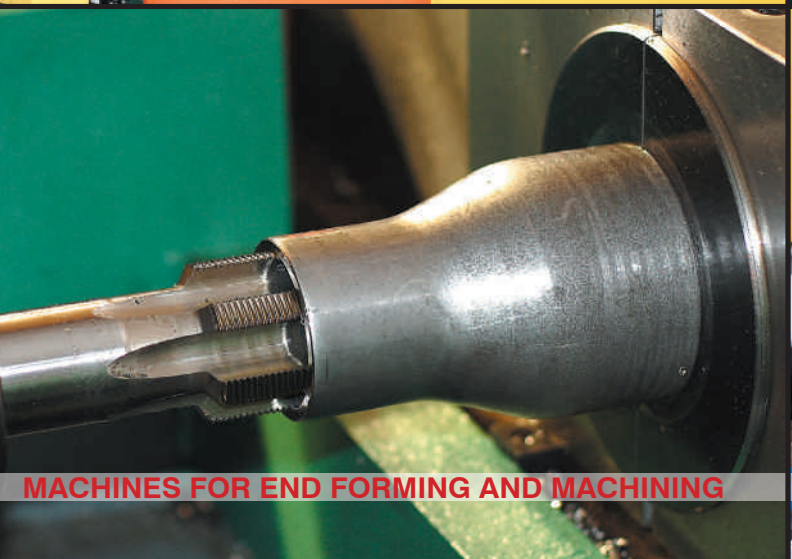


MACHINES FOR END FORMING AND MACHINING

DEBURRING SYSTEMS

Highly advanced 3D laser tube cutting

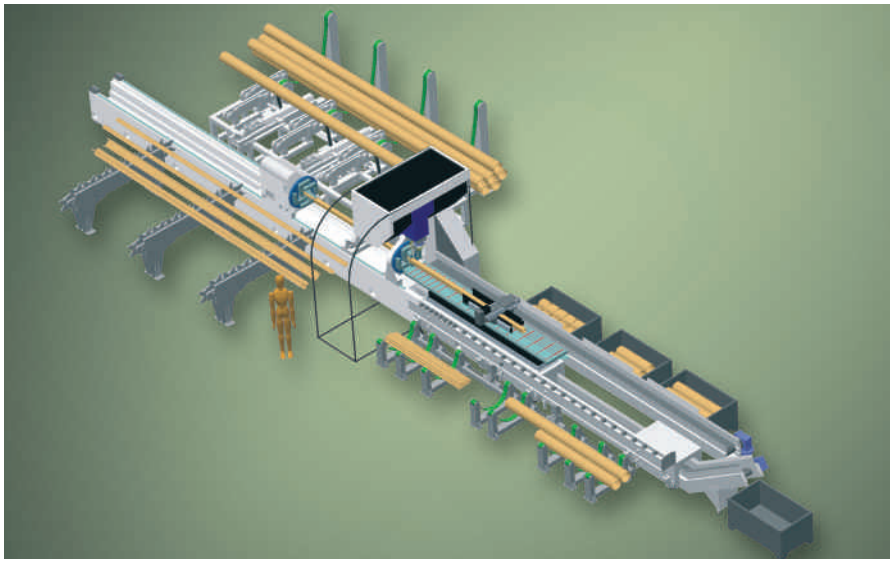
Tube Tech Machinery Srl, Italy, produces the FL 250 3D for laser tube cutting of diameters ranging from 20mm to 254mm. It is equipped with numerical control CNC 840D, Siemens drives and motors, and Heidenhain optical lines and transducers.

According to the company, particular care was taken in choosing components for maximum reliability, including guides, bearings, cross and pre-charged roll mandrels, circulating screws and precision reducers.

The FL 250 3D is equipped with a double tube loading system: one from bundle and one from chain. The first is composed of an automatically rewinding belt lifting structure and singliser with double motoring and automatic adjustment to the tube diameter.

The second, which is also suitable for loading open section profiles, is composed of chains with V supports. The chain feed speed automatically adjusts to the tube diameter and weight.

Tube Tech Machinery's FL 250 3D can accommodate tubes up to 254mm in diameter



Three independent manipulators allow mandrel feeding from both loading systems. Two mandrels are used for the tube machining, one mobile with four sliding and self-centring jaws, and one fixed with four idle rolls.

A tempered and rectified precision helical toothed rack activates the advancement, operated by brushless motor and precision reducer with slack recovery system. An extraction system which removes smoke and cutting dust is accommodated inside the mobile mandrel.

Finished pieces are handled according to length, dimension, quantity and type of machining by an intelligent discharge system that enhances the machine productivity and reduces the dead time of the finished part stocking.

FL 250 3D is equipped with a 3D laser head that can orientate the beam in any direction within a semi-sphere. Torque direct-drive motors operate the head movements, without any mechanical transmission, while a capacitive sensor controls the exact distance between the nozzle and the cut surface. System pressurisation and integrated cooling ensures working precision.

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Automatic cut-off saw with small sawblade

Pressta-Eisele GmbH, Germany, manufactures equipment and solutions for the machining of aluminium, copper and brass profiles with the shortest cycle times and smallest tolerance. The company produces automatic saws and sawing centres, together with punching machines, milling machines and drilling centres.

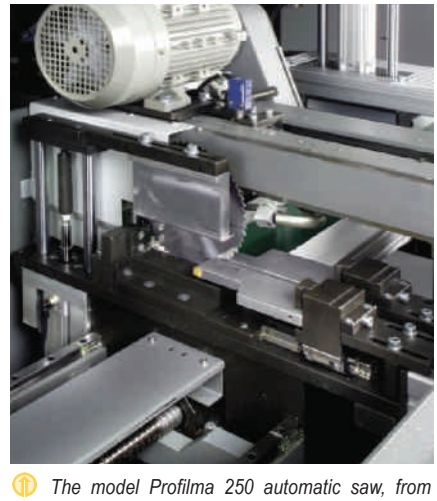
The company has launched a new automatic saw, branded model Profilma 250. The machine can use Ø 250mm tungsten carbide blades with a thickness of 1.6mm (0.0635"), or Ø 200mm blades with a thickness of 1.2mm (0,0476").

The very small sawblade is the NE Plus Ultra, which offers a cycle time of 3.5 seconds (depending on profile).

In comparison with common blades, a saving can be made of up to 2.5mm material per cut. For instance, a charge of 1 million cuts, which is standard in the automotive industry, saves about 2,500m of aluminium material.

There is a material feed of up to 1,000mm by ball screw spindle and servomotor, while an oscillating unit can be used for cuts up to 3,000mm. The machine is powered by a motor (3KW, 400V, 50Hz); infinitely adjustable RPM from 1,500-3,750 and high precision guides are further basics to achieve a cutting accuracy of ±0.06mm.

The saw blade moves above the table from back to the front which grants a cutting range of 90 x 200mm. In addition, there is an excellent flow so that the swarf can be extracted easily. Vertical and horizontal clamps on the infeed and outfeed are fitted as standard with this model.



The model Profilma 250 automatic saw, from Pressta Eisele

Operation is undertaken by SPS control Siemens S7-300 with a 5.7" touch-panel.

Pressta Eisele GmbH – Germany
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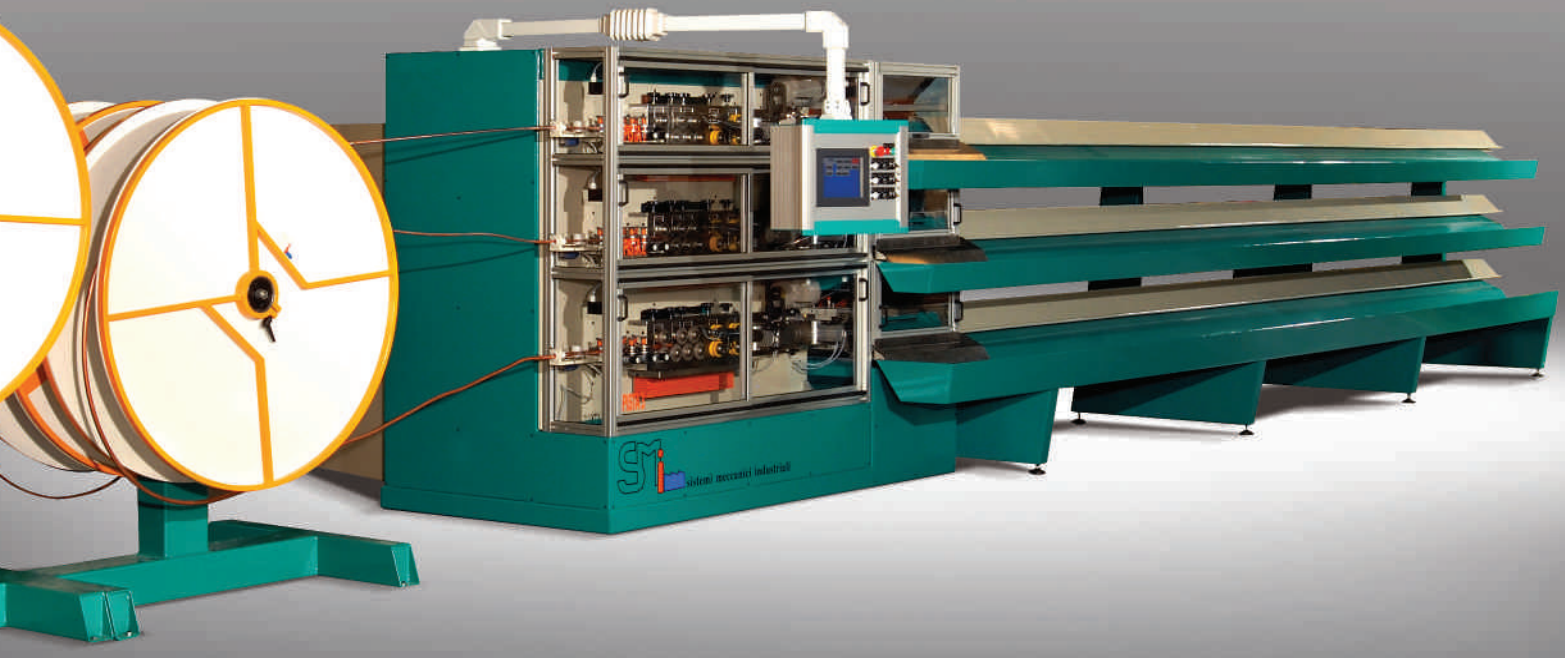
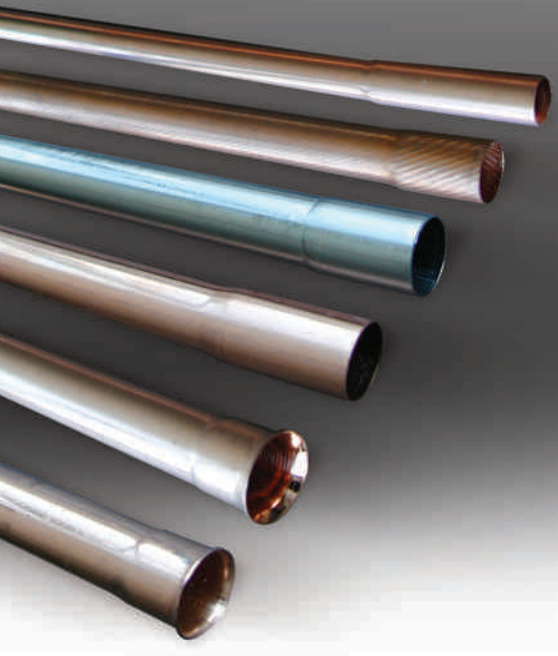
E-PILOT UDINE

PROGETTAZIONE E COSTRUZIONE MACCHINE AUTOMATICHE TAGLIA TUBI, PIEGA TUBI SENZA ANIMA, SAGOMA TUBI, BOMBATRICI, CURVETTATRICI, MONTANELLI, MANDRINATRICI, RIFILAFORCINE, FORACOLLETTORI.

PLANNING AND MANUFACTURING OF AUTOMATIC MACHINES, TUBE CUTTING MACHINES, TUBE BENDING MACHINES WITHOUT MANDREL, SHAPING MACHINES, END SEALING MACHINES, RETURN BENDS MACHINES, RINGS-ASSEMBLING MACHINES, TUBE EXPANDING MACHINES, HAIRPINS TRIMMERS, TUBES DRILLING



MTS22 T LINEE DI TAGLIO - CUTTING LINES



SISTEMA QUALITÀ CERTIFICATO UNI EN ISO 9001/2000 SINCERT DNV

SISTEMI MECCANICI INDUSTRIALI S.R.L. 33030 Varmo (UD) Italy via dell'Olmo - tel. +39.0432.778801 - 778644 - fax 778411 www.smisrl.it - info@smisrl.it

Flexible tube profiler provides high-volume laser cutting

BJF Profiling (formerly BJF Lasers), UK, has strengthened its production capabilities with the recent acquisition of a Trumpf Tubematic tube laser cutting machine. The flexible tube profiler provides high-volume laser cutting of multi-profile tube and pipe. It can handle miter cuts, angle cuts and form cut outs.

The new laser tube cutting technology allows BJF to process tubes at far lower manufacturing costs in comparison to conventional methods such as sawing, drilling, milling and punching. It eliminates the need for multiple machine tools that are used for these more traditional techniques. BJF's key markets include civil engineers, specialist engineers, fabrication industries, general engineers and machine manufacturers.

Tube elements are an important component of today's assemblies and machine construction, and are used in different shapes and sizes as components in pipe work construction, frames, supports and trusses. Their strength and lightweight structure mean they are economic to produce. The use of laser technology lowers manufacturing costs, ensuring a form of profiling that is faster and more accurate than alternative techniques.

The Tubematic uses a finely focused laser beam as the cutting tool with the resulting smooth cut edges. In one single operation, holes and complex contours are produced and the tube cut to size for a completely finished part. The tube profiler can also adjust to different materials and part geometry at the touch of a button.

Mr Bernie Faiers, managing director of BJF Profiling says, *"The benefits of laser tube cutting include almost unlimited cutting configurations, the elimination of stack up tolerances inherent in multiple operations, no tooling charges and reduced lot sizes. This machine complements our laser cutting of cylindrical tubing and rectangular boxes."*

The Trumpf Tubematic tube laser cutting machine

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Trumpf Group – Germany
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Tube® Düsseldorf

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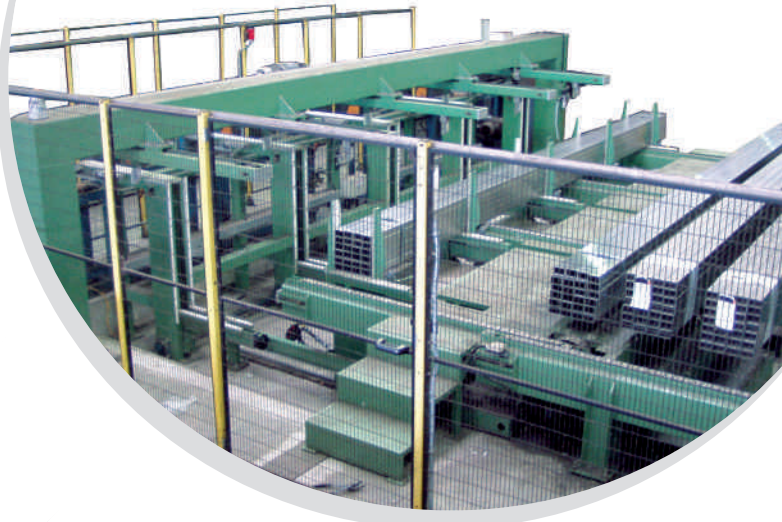
I·M·E·C·

TUBES

mod. 150 SBM
Square Tubes
Brushing Machine

Packaging System



Reliable & advanced machinery for tube industry

Off line and on line Tube finishing machinery
Bundlings handling systems

Packaging systems

Round / rectangular / square tubes,
brushing / polishing machines

Facing and / or chamfering machinery

Transport systems: roller conveyors or catenaries

Scarfing machine

Re-winding system for tube & wire

Variable geometry vices for bundle forming

Loading and unloading system for satinning machine

Special custom built machinery

mod. 180 RBM
Round Tubes
Brushing Machine

I·M·E·C·
TUBES

I.M.E.C. TUBES s.r.l.
Via Querzoli 3/E · 47100 Forlì (FC) · Tel. (0039) 0543.85271 · Fax. (0039) 0543.483374
sales@imec-tubes.com · www.imec-tubes.com

Automatic 2-axis pipe cutter with CNC

Cypress Welding Equipment, USA, manufactures a highly efficient automatic pipe cutter, branded the MM1. The MM1 is a computer controlled 2-axis machine that automates the cutting of shapes, profiles and pipe holes with diameters of 2-16".

The machine's pipe bed can accommodate lengths of pipe up to 6'. Additional pipe bed extensions of 8' can be added to make up to a 32' bed. The machine rotates the pipe on its roller bed with a three-jaw chuck while simultaneously moving a cutting torch back and forth along the pipe axis.

Preprogrammed shapes such as saddle, hillside, lateral and miter cuts can be made by simply selecting the type of cut from the menu.

The diameters of the pipe being processed are then also entered into the menu and the run button pressed to cut a pipe. In addition irregular or uncommon shapes can be plotted, programmed and saved for future use.

This machine can save fabricators time and money. It eliminates the need for templates and layout, reduces fit-up time and makes immaculate machine cuts.

The MM1 automatic pipe cutter from Cypress Welding Equipment

Cypress is a subsidiary of Weld Tooling Corp, and manufactures equipment for automatic circle burning and welding onf pipe and pressure vessels. Oxy-fuel, plasma and welding units are available.

Cypress Welding Equipment Inc – USA
Fax: +1 412 331 0383
Email: jwhite@weld.com
Website: www.cypressweld.com

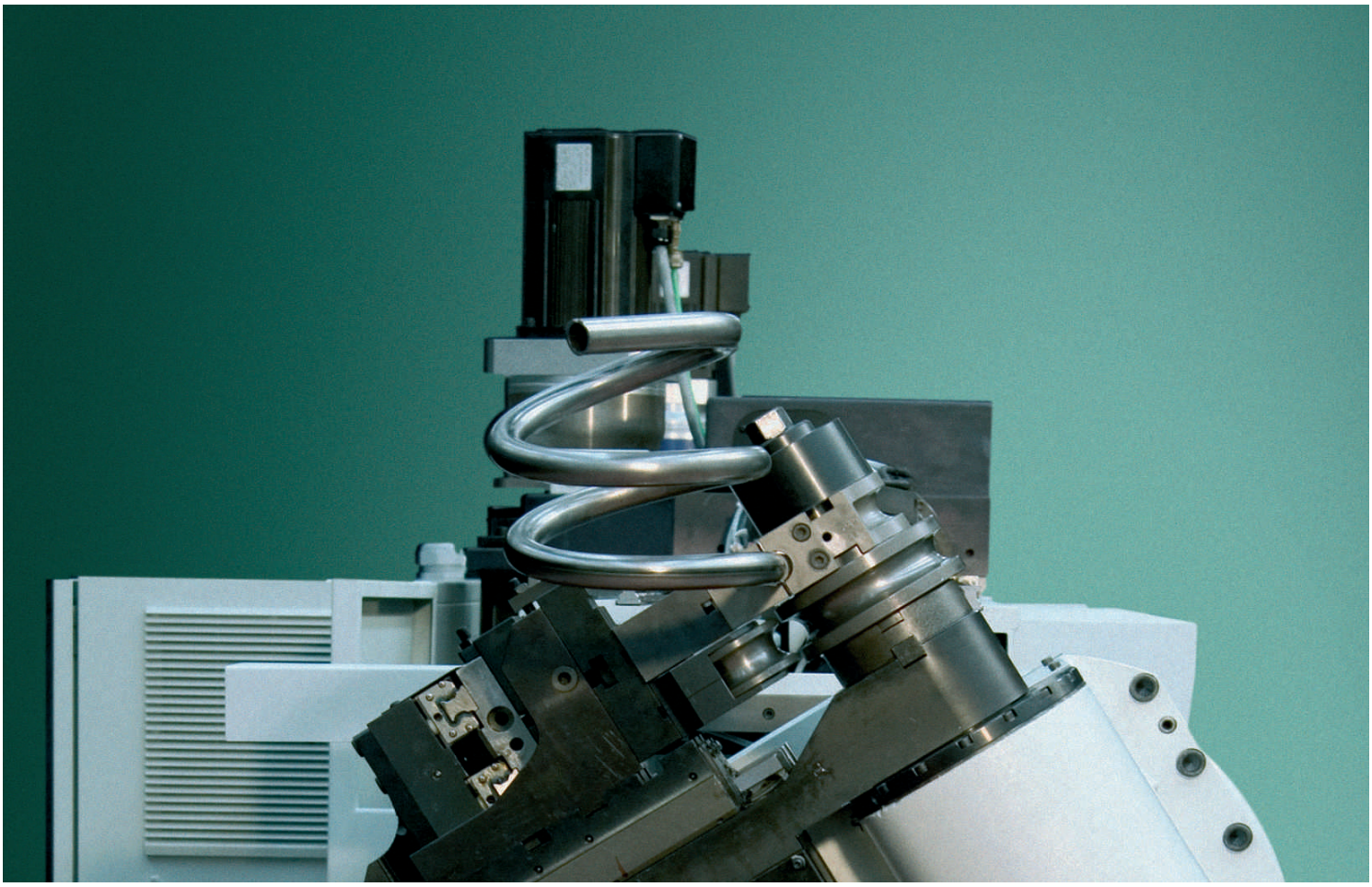
Orbital pipe cutter for copper pipe and light alloys

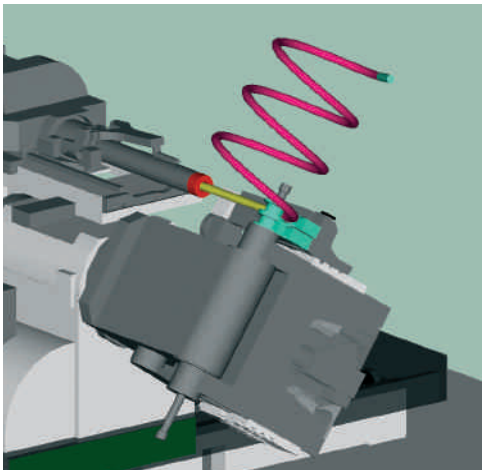
Sistemi Meccanici Industriali (SMI), Italy, manufactures an orbital pipe cutter that allows the orbital cut of copper tube, light alloys or carbon steel, starting from coil. A special pneumatic pull creates a tension on the tube allowing a burr free and chipless cut.

The advantage of this system is that it optimises the cut according to the tube diameters, and the tuning system allows the cutting of different diameters with a very short tooling change time.

The machine can cut copper and aluminium with thickness up to 1.5mm, or iron FE37/ Inox with thickness up to 1mm. With a pull apart strength of 8,300N and a cutting speed of 82m/min, the machine can cut diameters from 1.7mm to 22mm, in lengths from 25mm to 99,999mm.

Sistemi Meccanici Industriali Srl – Italy
Fax: +39 0432 778411
Email: info@smisrl.it
Website: www.smisrl.it





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The powerful and unique 3D visual graphic software is highly refined, yet easy-to-use, with a real-time visual component simulation.

The precise “controllability” of the **12 electric axes** ensures repeatedly accurate, high quality bends; to say it deskills the tube bending process is an understatement indeed.

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Automatic cutting centre with intelligent motion system

Pedrazzoli IBP SpA, Italy, manufactures the MCL 120 IMS automatic cutting line, capable of cutting different section tubes up to a diameter of 120mm in the case of round shapes. Featuring high speed cutting cycle and sturdy construction, the line is suitable for cutting large thickness tubes and high-resistance materials.

The automatic loader can bear more than 4 tons and has a high movement speed. The MCL 120 IMS can fit blades from 140mm to 370mm diameter, and the cutting speed can be adjusted from 38-287 rpm. The automatic programmable bar stop ensures precision, even when quickly changing cutting measures.

A patented discharge system allows fast unloading of cutting pieces and maintains the correct position of the material after the cut, making it easier to attach the machine to other working units.

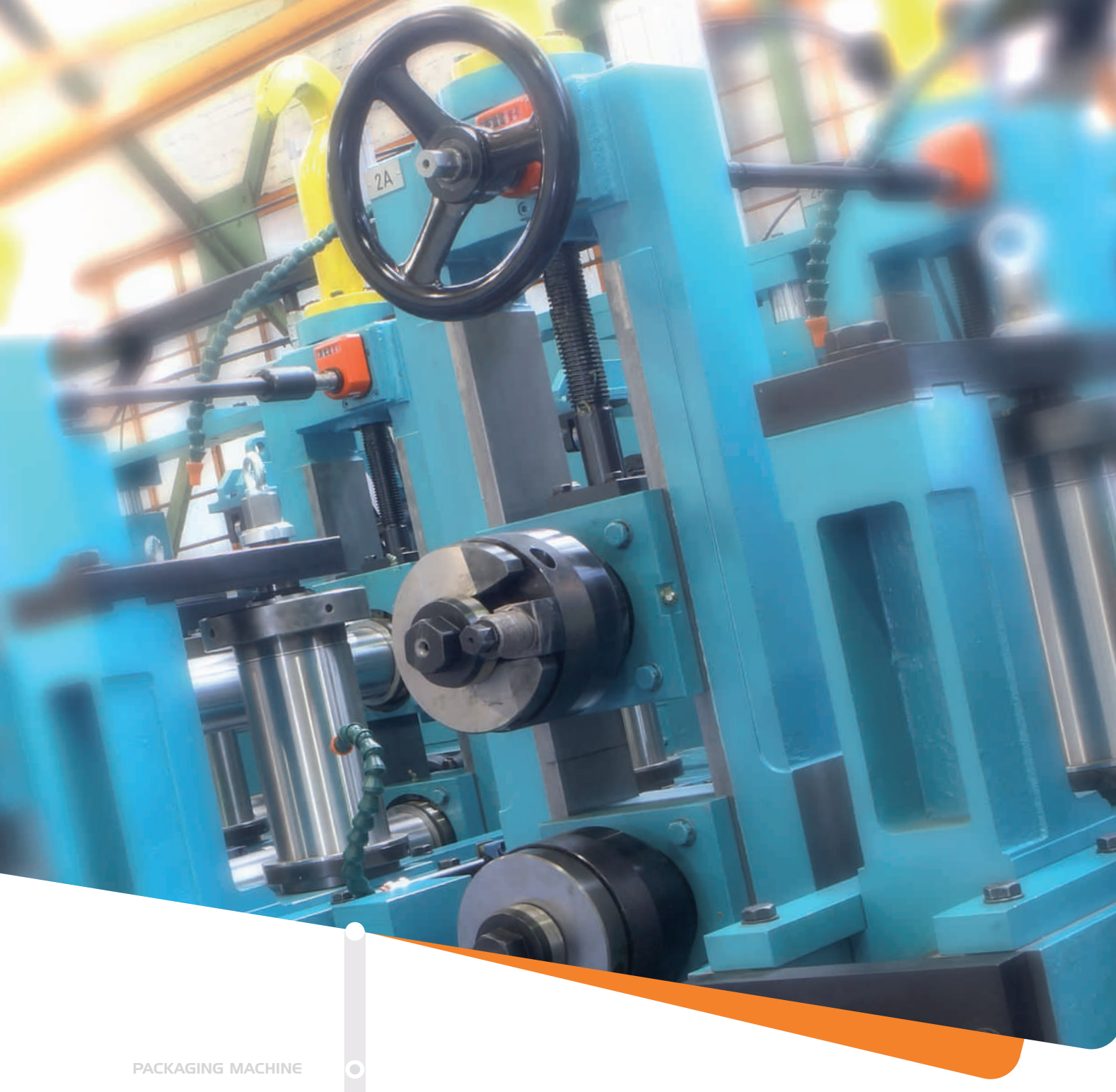
Pedrazzoli's IMS control (Intelligent Motion System) allows the feeding speed, thrust torque and cutting speed to be modified during the work cycle. This software helps the operator to choose the kind of blade to use, to optimise cutting length and to regulate cutting speed.

Pedrazzoli's MCL 120 IMS automatic cutting centre

The cutting head of the MCL 120 IMS

The MCL 120 IMS automatic cutting centre can be integrated with end-deburring working, washing and drying system, dimensional control system, and collection units by adding standard accessories.

Pedrazzoli IBP SpA – Italy
Fax: +39 0424 509049
Email: ibpexp@pedrazzoli.it
Website: www.pedrazzoli-ibp.com



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The Leading Manufacturer of High-Technology Tube Production Equipment

Safe and economic production of complex tube constructions

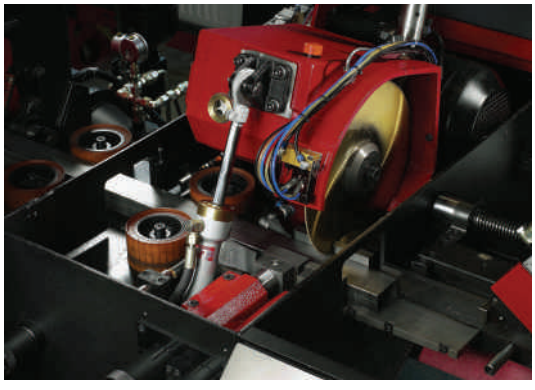
Heinz Kettler GmbH & Co KG, Germany, manufactures a wide range of products, from fitness equipment to garden furniture. The company's tube plant supplies components to the whole group. After tube production on its own welding lines, the second manufacturing step is the cutting of fixed lengths.

This requires flexibility because of the wide range of products manufactured. The company uses a sawing line from sawing technology specialist RSA, Germany.

The high performance Rasacut saw cuts single tubes with a diameter up to 90mm and rectangular tubes up to 70x80mm. Fully automatic deburring of inside and outside edges of tubes is carried out by an integrated automatic deburring machine.

Mr Klaus Wedekind, works director of the Kettler tube mill, commented, "*The Rasacut is manufactured stably and therefore able to cope with high strain without compromising precision. The perpendicularity of the cut and high precision of fixed lengths with a tolerance of ±0.2mm lead to further cost reductions. The pre-production fitting accuracy shortens the lead time of the end forming, the bends and the welded constructions.*"

The Rasacut sawing line forms the core of Kettler's production of fixed lengths



According to Mr Wedekind, short set up times, easy operation, high process reassurance and modular systems are important criteria for an investment which ensures flexible production during day to day running, and also in view of future demands for production.

The Rasacut sawing line has a set up time of approximately five minutes for a complete format change, and is simple to operate. Optional modules for chamfering, measuring, cleaning and stacking of workpieces can be added.

Kettler uses the most modern sawing and laser technology, as well as punch presses and bending machines for tube and sheet, and possesses equipment for galvanising and powder coating. More than 90 different electrically welded sections are produced on modern HF welding lines according to DIN EN 10305-3 and 10305-5 in the range of 14 to 65mm.

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Fax: +49 2351 995 300
Email: rsa.d@rsa.de
Website: www.rsa.de

Heinz Kettler GmbH & Co KG – Germany
Fax: +49 2922 8707 768
Email: k.wedekind@kettler.net
Website: www.kettler.de

High power cold circular sawing plants

Maschinenfabrik Liezen und Gießerei GmbH (MFL), Austria, is a manufacturer of high power cold circular sawing plants. The company's plants are designed for the sawing of stainless steel, ferrous and non-ferrous material in the form of billets, tubes, profiles and plates.

The company's custom-made solutions are used for specific applications such as tube or profile layers, billets or plate sawing plants. Each machine is designed to use carbide tipped saw blades, which ensure an accurate and high capacity, with reduced costs and long tool life.

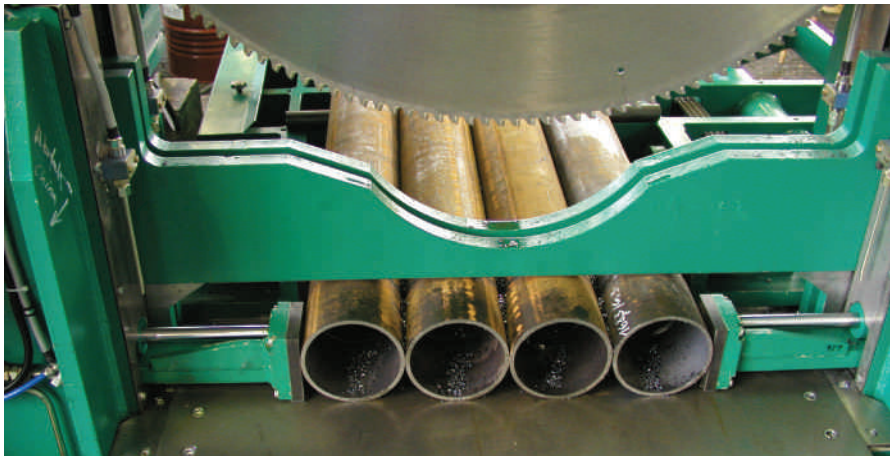
MFL can supply sawing machines for round materials and tubes from 30mm to 800mm in diameter, using a saw blade up to 2,200mm in diameter. The largest square dimension that can be cut with MFL sawing machines is 720mm.

The company also manufactures sawing machines for cutting aluminium plates. Other new developments include a layer sawing machine with a layer width of 1.5m, used for cutting tubes, I- and U-beams, sheet pilings and angles. A steel slab (plate) sawing machine is also available.

For manufacturers of railway rails, the company produces combined rail sawing and drilling machines. This kind of machine cuts and simultaneously drills a hole into the rail, ensuring short cycle times for the cutting and drilling process. Another application for MFL sawing machines is the cutting of coupons, tensile and other samples for quality control.

MFL also supplies for the chip removal process and delivers turnkey plants and single machines for the modernisation or increased performance of tube production.

Tube layer sawing using MFL technology



Maschinenfabrik Liezen und Gießerei GmbH – Austria
Fax: +43 7613 8883 30
Email: saegen.fraesen@mfl.at
Website: www.mfl.at

Products for the complete sawing process

DoALL Sawing Products, USA, manufactures all components of the sawing process – saw blades, sawing machines, cutting fluid and material handling systems – designed to work together for maximum productivity.

The company's range of saw blades includes bi-metal, tungsten carbide-tipped, carbon steel and grit edge. Sawing machines range from general purpose, production, vertical contour, mitre cutting, circular carbide, or custom-designed saws for specific applications. Cutting fluids produced by the company include cutting oils, soluble oils, semi-synthetics and synthetics.

The 4100NC power saw from DoALL Sawing Products

DoALL's Solutions and Applications Manager (SAM) can provide technical sawing advice, such as which blade to use, what speed and feed rate is best, or which machine to use for a particular application.

DoALL offers its complete product line and numerous value-added services through local distributors that provide factory trained service and repair technicians, application engineering, training programmes and financing plans to meet user needs.

The company can also supply material handling systems for sawing or automated storage and retrieval. DoAll is the authorised distributor in North America for Remmert, a European manufacturer of automatic bar/sheet storage and retrieval systems.

DoALL Sawing Products – USA
Email: info@doallsawing.com
Website: www.doallsawing.com

Range of disposable tools and cutters

E-Chain Industry Co Ltd, Taiwan, is the manufacturer of a branded range of disposable tools and cutters. These cutters are developed by a large team of highly experienced technicians, with precise technical production equipment used to accurately manufacture products.

The company's main product range includes face milling cutters, side mills, end mills, tool holders, boring bars, threading, super insert drills, and rapid drills.

In addition, the company offers roughing cutters, power milling cutters, and high-speed face milling cutters.

With a strong sales base in its home market, E-Chain is interested in developing trade on an international level, and is currently looking for an overseas agent.

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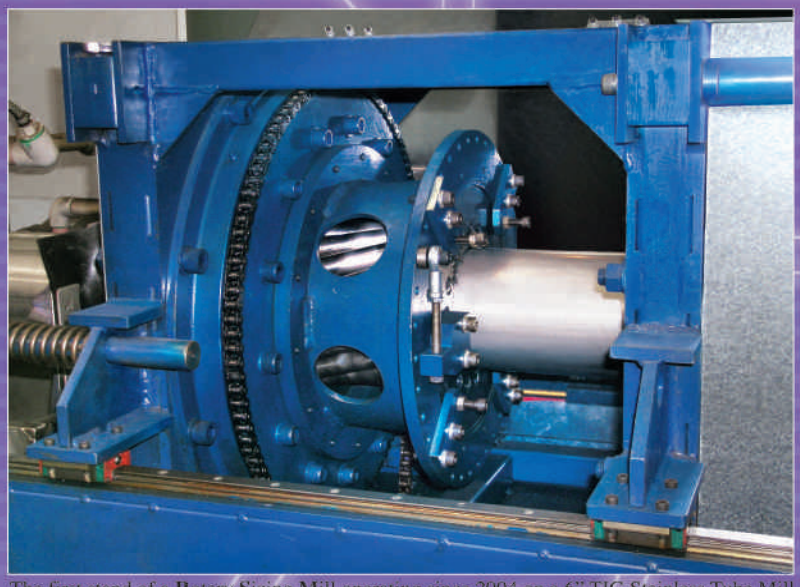

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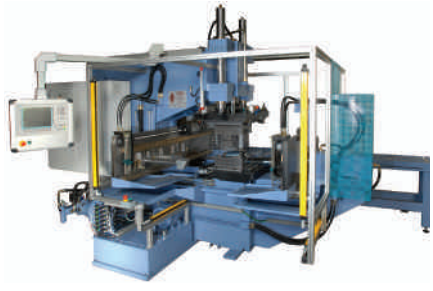
Special cutting machines for cut and recut operations

EMS, France, is the designer and manufacturer of special tube cutting and end-forming machines. The company supplies solutions for tube cutting and forming problems in the automobile, heating, sanitary and other tube related industries.

The company's EMS cutting machines are essentially used to recut bent tubes for applications such as exhausts. Alternative technology is also available to cut or recut hydroformed tubes.

The model CT machine is used for chipless cutting without material tearing, based on a combination of two knives: one vertical to pre-cut the tube, and one horizontal to make the main cut. The model CTR machine operates with a rotating head and recuts without burrs from inside to outside.

EMS provide a range of cutting and end-forming machines



EMS technology is based on a range of techniques including extrusion, expanding, reduction, pushing, segment head and mandrel forming. This is enhanced by the company's own tooling developments.

Acknowledged by leaders in the European automobile industry, the company's tube end-forming and cutting machines are reputed for their robustness and reliability.

Based on the highest quality hydraulic and electrical components, the machines are designed in accordance with user specifications.

EMS – France
Fax: +33 3 8891 0537
Email: e.m.s.sa@wanadoo.fr
Website: www.ems-sa.com

New orbital flying cut-off machine

MTM, Italy, has launched the new Comby orbital flying cut-off machine for a clean cut of heavy section tubes.

The Comby range includes three models, covering outside diameters from 63mm to 323mm. The wall thickness on such applications is normally in the range of 3mm to 12.7mm.

The main features of the Comby range include cold saw cutting process (clean cut) on heavy sections. The machine involves a simple cutting process, carried out by two combined axes for each cutting head.

The Comby has electrically actuated cutting heads, that operate like a milling-machine. The machine employs small diameter HSS and TCT blades (independently from the tube OD). It also takes advantage of a rack and pinion carriage accelerating system.

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www.otomills.com

Tough and speedy new miter band saw

Peddinghaus Corporation, USA, has introduced a new band saw for structural applications, branded the 1100 DG. The saw is a response to steel construction industry requirements, which involve increasingly challenging designs from today's architects. The 'green design' of many new buildings that meet environmental demands, often means that these buildings include lots of angles, taper, slopes, and inclines.

To provide the necessary products for modern construction, manufacturing facilities need to employ fast and accurate sawing technology. If this technology operates smoothly at full speed it is claimed to increase overall shop throughput by over 25 per cent.

The new 1100 DG structural band saw features a machine base that remains stable while the saw head pivots up to 60° right and left. With a large 1,100mm wide x 510mm high opening, the machine has enough width capacity to take on any sized job. At the machine's heart is a rugged 54mm x 1.6mm thick blade that ensures hours of accurate, fast cutting.

Incorporating auto mist blade cooling, the machine offers technology that means no flood coolant mess, no clean up, freezing, smell, environmental or hazardous spilling or run-off onto the floor. A linear guidance design provides a stable, smooth running design for years of operation and trouble-free maintenance.

The fastest, most accurate saw times available are provided by an overhead blade approach to the beam, with 3° blade attack angle powered by a 10.2HP motor and tough gearbox. This capability is supported by auto blade feed compensation: as the cutting load is sensed when cutting, the feed rate automatically adjusts for varying flange/web thicknesses.

An efficient design provides a range of functions automatically at the touch of a button, including clamp material adjustment, blade guides adjustment (for material width), and fast and accurate adaptability to material height. In addition, auto feed compensation is available for effective flange/web cutting, together with automatic end-of-cut sensing and saw blade/head return.

The new Peddinghaus 1100 DG miter band saw for structural applications

The saw can be used in tandem with a Peddinghaus structural drill, such as the Advantage model PCD 1100, which results in a productive cell that decreases labour and overhead costs.

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Increasing the performance of bi-metal band saws

Sägen-Mehring, Germany, has launched a new range of metal band saws, branded RIX-Formula SPF, to service the industry's increasing requirements for higher performance metal sawing machines and cutting tools.

Higher specific cut rates are now required in the industry, with more cm² of cut area per minute and higher tool life, resulting in precise and spotless cross sections. The ultimate aim is to achieve less cost per cut.

In the past a degree of ground has been covered to achieve such developmental aims. For cutting tools such as metal band saws, the advancements are well documented. Bi-metal band saws are usually made from modern alloyed cutting materials (ie high speed steels). The backing bands feature a high resistance against tensile stress, alternating bending load and torsional stress.

However, further improvements of this component have become increasingly difficult. Setting and tooth geometries are well developed and are, in many cases, specifically conceived for predetermined application areas, mainly for wear-resistant steels and alloys.

Further improvements were expected from the use of tungsten carbide as cutting material. However, it appears that this breakthrough has not been widespread in its application. Nevertheless, it is widely believed that band saws with tungsten carbide tips can be used economically. This is especially the case if robust sawing machines with high drive capacities are available, and if shortest possible cutting times are the top priority.

In the search for new and efficient ways to improve performance, due to existing experiences with precision cutting tools, coating processes and cutting edge treatments were developed. It took time until technically passable methods were introduced for the coating of 'coil ware', with efficent and easy treatment methods for saw teeth.

These technical developments have been met by the RIX-Formula SPF range of metal band saws from Sägen-Mehring. At the heart of this range is a new complex SPF-coating and a multi-step procedure to improve cutting edge coatings. In this way, higher temperature resistance and red hardness can be reached. Higher cutting speeds, larger feed values and outstanding cross section qualities are the result. This is particularly the case with very hard steels, austenites and high-temperature alloys.

Extended application tests were carried out at a big saxon steel distributor, which revealed a number of advantages of this range. Economic and efficient cutting speeds and cut rates could be achieved, close to the values and even better than those reached by TCT band saws.

Even high-tensile steels can be accurately cut with a cutting speed of more than 60-70m/min. On a cutting length of 700mm, a tolerance of less than 0.1mm is possible.In addition, these high cutting values had no negative effects on cross sections. Finely structured and spotless cross sections are of considerable advantage to the user.

Sägen-Mehring – Germany
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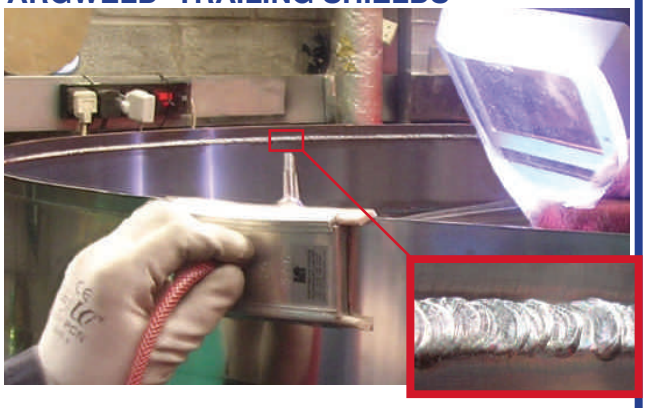

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Laser equipped machines for cutting tubes and 3D shapes

An increasing number of manufacturers are taking advantage of laser-equipped machines for cutting tubes and 3D-shapes. Sheet laser cutting is still the most popular application: the more complex the contours, the higher the gain in time and the more economical compared to conventional methods like sawing and punching.

The clean edges without burrs, the silent machining process and no tooling costs are extra advantages that also apply for cutting tubes and 3D-shapes. Laser welding and cladding are less known but have equally interesting advantages.

Balliu designs and manufactures laser cutting machines, laser welding machines and laser cladding machines for a wide range of applications.

These machines are both highly automated and robust. First of all, the company can analyse a specified production process to see if its standard LD and SLF sheet and tube laser machines can be integrated into the production flow.

This Megacut 5A system is a 5-axis laser cutting/welding machine. The right pallet changer on the picture is used for sheet material, the left table is used for 3D-applications

In some cases, adaptations are necessary: they go from the integration of automatic feeding- and unloading systems to additional NC-axis.

Balliu can also develop custom made projects. In one particular case study, Balliu provided a high volume tube-cutting machine using a CO2 laser with a robot unloader for the automotive industry. In another example, the company supplied a diode-laser cladding machine for cladding long tubes for the oil industry. Other projects include use of YAG or fibre lasers.

This SLF 110 has an auto loader for tubes up to 13m. The unloader can handle and unload parts up to 5m

Part of a European holding of machine manufacturing companies, Balliu installs over 90 per cent of its machines outside Belgium, covering the five continents. The design, manufacturing and commissioning of the laser machines is undertaken in Lokeren.

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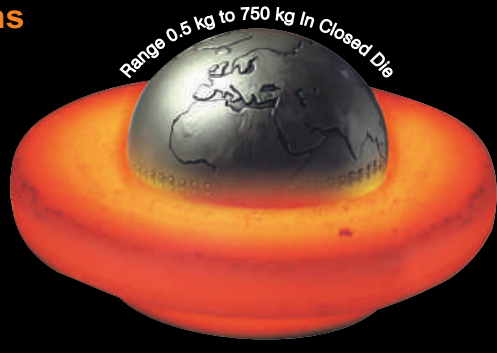

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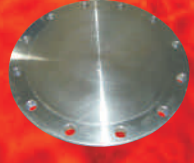

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SCF 90 Quatro cutting line with complementary washing system

Bewo, Netherlands, has secured an order to supply the first SCF 90 Quatro sawing line to its first customer in the USA.

This order comprises an SCF 90 Quatro automatic circular sawing machine complete with integrated DB 90 wire brush deburring, SCC 90 non-contact optical cut-to-length measuring machine and SCP 90 (4 axis) robotic 'pick and place', two station packing system.

The SCF 90 Quatro has the ability to cut up to 4 tubes at once (depending on the diameter). It employs a unique servo technology tube transport carriage system, which enables multiple tubes to be clamped and transported through the sawing machine at up to 4m per second (13ft per second) to the required cut length. The tubes are then clamped and cut without the requirement of length or target stops.

The CNC control of the servo drive allows for pre-programming of the required cut lengths and quantities, via the machine full colour, graphic operator control. From this single multi functional panel the entire production line is controlled, including setting, operating, management and machine diagnostics.

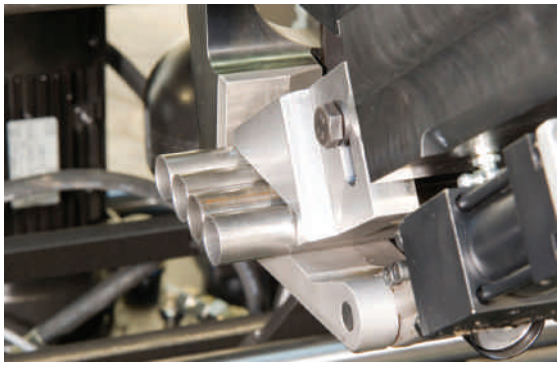
The Quatro has many features supplied as standard including proportional blade feed control, blade management programs and an electronically monitored blade cutting position to reduce the effect of blade distortion on cut-to-length tolerances.

Due to the extremely high output rates of the SCF 90 Quatro, all of the potential ancillary equipment has being completely redesigned to cope with up to 6,000 cut pieces per hour.

The DB 90 wire brush deburring machine offers completely automatic setting of both the deburring length and brush height with servo drive control of the interlink between the saw and deburrer. A new option with the deburring machine is the use of a servo driven, high-pressure air nozzle unit to follow the movement of the cut length blowing out any loose chips from inside the tube.

After deburring, the cut length passes through the new SCC 90 non-contact, optical length measuring system. Two high-speed camera units view both tube ends as they pass through the machine, calculating the exact length of each individual tube. These cameras are operated via specially developed software to recognise the tube ends and disregard any dust or debris.

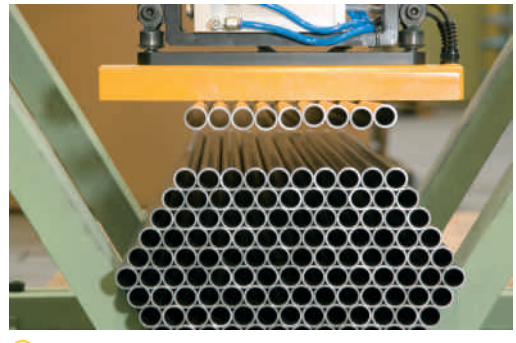
(Bottom) the SCF 90 Quatro sawing line for 6,000 cut pieces per hour; and (below) the SCFQ carriage clamp



Operation information is stored in the operator panel which gives a live full colour bar chart of every individual cut length, constantly updated SPC calculations. Should there be a tube out of length tolerance, the machine will automatically discharge this tube onto an optional scrap conveyor.

Cutting, deburring and measuring cut-to-length tubes is only an advantage if the production line can facilitate the handling and packaging of tubes at the rate of up to 6,000 pieces per hour. These output rates have required the development of the SCP 90 (4 axis) robotic pick and place packing system. The cut pieces are collected automatically after measuring in a specially designed servo controlled holding area.

The operator display allows the operator to choose the shape and type of packing that may be required, eg square pack into a box or a hexagonal pack into racks. As the tubes enter the servo controlled link, the required layer is formed and, once completed, raised for the magnetic 'pick and place' robot arm to collect and transport to the required pre programmed packing position.



The machine comes complete with a non-contact optical cut-to-length measuring machine and SCP 90 (4 axis) robotic 'pick and place'

In order to keep the cutting line in production, the pick and place unit can be supplied with two (or more) packing stations, allowing the operator to offload a packed station whilst the machine is still in production filling the following station.

Another ancillary operation now available for exacting, chipless applications is a truly unique high-speed tube washing system. Although washing systems for tubes are not new, they all have the same basic constraint in that they cannot function much above 3,000 pieces per hour.

The latest washing unit from Bewo has been designed specifically to wash and remove any debris from both inside and outside the tube and dry the tubes at rates of up to 6,000 pieces per hour. This results in a complete turnkey solution where all of the ancillary equipment, brush deburring, length measuring, tube washing and packaging can operate at the same rates.

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High performance circular saw blades

Gebr Lennartz GmbH & Co KG, Germany, is a manufacturer and exporter of high performance circular saw blades. These blades are used for the cutting of carbon steel, alloy steel and stainless steel materials, as well as non-ferrous metals, specialising in tube and pipe cutting.

The company offers a full range of saw blades and services, including standard carbide tipped, segmental, hot/friction, band saw blades, and Ohler circular cold sawing machines with vertical feed and multiple clamping device for tubes up to 600mm.

The Lennartz range of carbide tipped circular saw blades for cutting steel products, first produced in 1966, ranges from 200mm to 2,200mm diameter.

The company's ECOmax tube circular saw blades feature newly developed tooth form combined with wear resistant carbide grades and special coatings for cutting high tensile tubes. Such saw blades are used on flying cut-offs and stationary sawing machines.

The advantages of ECOmax are smooth cutting surfaces and less burr, high cutting speeds and feedings, high endurance and re-sharpenable blades. ECOmax blades are available in diameters from 250mm to 690mm.

Gebr Lennartz GmbH & Co KG
– Germany
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Email: info@lennartz.de
Website: www.lennartz.de

New line of saws for carbide cutting

Behringer Saws, USA, is a manufacturer of high performance automatic and semi-automatic bandsaws and circular cold saws. The company's equipment is designed to achieve a combination of speed and accuracy of cutting, with cost-effectiveness via long blade life.

Behringer offers a wide selection of models, enabling the company to provide customers with systems that deliver the appropriate size ranges, options, and material handling requirements for their particular applications.

The company conducts research, design and testing, and controls the manufacturing process internally, with its own foundry and machining centres, to ensure quality and availability of materials.

The Behringer dual column horizontal design can handle demanding cutting applications and high production requirements.

The company's latest technologies include saws designed specifically for carbide cutting in the new line of HBM model saws.

This technology allows users to get the most out of their investment in carbide blades, by using a saw with the appropriate motor, gearbox, and rigidity.

Behringer Saws, Inc – USA
Fax: +1 610 286 9699
Email: sawing@behringersaws.com
Website: www.behringersaws.com

Infeeding, cutting and commissioning plants

Rolf Schlicht GmbH, Germany, is an expert in infeeding and precise cutting in and out of the extrusion line, specialising in a product range up to 100mm in diameter.

Advantages of the company's Multicut cutting plants include high accuracy, cutting capacity up to 400-2,800 cuts/minute, high line speed, clean cut face, flexible handling, simple change of parts, and clearly arranged control.

The company's caterpillars are characterised by quick change of belts without tools, latest drive technology by direct servo-drive, large delivery programme by belts with 25-200mm width, and high haul-off speed of up to 250m/min.

Special equipment can be supplied as per customers' requirements. The company also provides service and supply of spare parts.

Rolf Schlicht GmbH – Germany
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Rolf Schlicht manufactures the Multicut range of cutting plants

Cutting and bevelling machines from Italy

GBC Industrial Tools SpA, Italy, manufactures portable pipe cold cutting and bevelling machines with a range of 1-60", plate bevelling machines, pipe bevelling machines and hydraulic torque wrenches.

For pipe cutting applications, the company offers three different product lines. The GBC Supercutter range (6"-60") features steel body, heavy duty split frame, and is suitable for large pipe sizes with heavy walls, and for exotic materials.

The company's MCA Cutter range (1-30") is built with an aluminium body and a lightweight, low profile, split frame, and is suitable for onsite applications where high portability and easy handling are required.

The GBC pipe orbital cutter range (¼"-12") features a bench type design, and is suitable for small wall thickness tubes. It is ideal for square and burr free cutting, in applications where clean results are required, such as in the food and semi-conductor industries.

GBC can also supply tailor-made machines, and tooling for pipe cutting, outside bevelling (simple or compound), root face and counter-boring.

GBC Industrial Tools SpA – Italy
Fax: +39 030 7356629
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High quality range of saw blades

SW Wil, Germany, is a market leader in the technology of sawing and cutting techniques. The company has one of the most powerful and largest ranges of circular saw blades to cut almost any object or surface.

The company's range includes HSS blades from Ø 40-700mm, HSS-segmental blades from Ø 400-1,800mm, TCT-tipped blades from Ø 250-2,000mm, and friction blades from Ø 300-2,000mm.

Highlights of the SW Wil range are the SwissCut HR friction saw blades, TCT blades and the new SwissCut T, the world's biggest solid HSS (700mm).

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Cutting and bevelling prep for orbital tube welding

Protem is the manufacturer of a range of advanced machinery for tube cutting and bevelling, and other operations such as drilling, facing, threading, boring, core drilling and stud removal. The company's equipment is often used for high-quality end preparation before orbital welding of tubes.

There are a range of different pipe end preparation methods for metal tube and pipe. These methods vary from the simplest, eg the flawed hacksaw and file method, through grinding and flame/plasma cutting, to the high-end of CNC production machinery, which can turn out hundreds of finished tubes or pipes per hour.

Dedicated end preparation machinery can prove invaluable in certain areas. The first is at the end of a tube or pipe production line. A customised end preparation system, matched to the speed of a line, can give the manufacturer a better finish than a saw cut end.

On occasion, end preparations have to be created in an environment that precludes normal methods. This may be underwater or in an irradiated area, or possibly in a situation where a human operator cannot be employed due to inaccessibility or danger to life. For such difficult applications remote-control machines are needed.

In situations where it is not permitted to touch the inside of the tube, for example with an electrochemically polished tube, portable machines employ special clamping collets to grip the workpiece. Others might use a system of jaws similar to a chuck. For smaller sizes the collet system is the optimal solution.

The CTA cutting and bevelling machine range from Protem

Another subcategory of the collet method is chain fixing, the biggest advantage of this being that it's practically without limit of diameter. The principal disadvantage of the chain method is that it is difficult to set up and sometimes the cutter may wander, resulting in a spiral instead of a prepped end.

In a case study, Dragados Offshore used portable bevellers from Protem to prepare duplex pipes in an offshore oil and gas project. The advantages of using high-tech portable tools were evident when Dragados Offshore SA was asked to build an LNG processing plant on Melkøya Island as part of Statoil's Snøhvit project.

In the past, the company had prepared large diameter hard-alloy pipes (stainless steel duplex and super duplex, P91 etc), using several methods, including cutting by flame or band saw, manual bevelling with abrasive discs or using a lathe. These methods proved unproductive, pollutive, low quality and inconvenient.

Dragados Offshore asked Kalmia SA and its partner Protem to propose a method of machining pipes that avoided all these problems. Most of the conduction of this plant had to be constructed in duplex and super duplex pipes to handle high pressures in corrosive weather conditions. The weld preps were to be made in different configurations (30°, 37°, 30" and 'J' shape) and in different sizes and materials.

Protem's portable tube cutting and pipe bevelling machine

Kalmia and Protem supplied portable tools for working pipes ranging from 1-42". Low-speed bevellers were provided using high-speed steel tool bits for the lower sizes, and high-speed bevellers using carbide inserts for the bigger sizes. Most of the tools were supplied with hydraulic drives, due to a more stable working torque. Dragados Offshore thus worked all weld preps in hard alloy tubes with Protem portable bevellers.

The most important advantage of this method was a noticeable increase in productivity. The enhanced accuracy and repeatability of these machines leads to a reduction in the number of components needing to be scrapped and a reduction in the number of weld defects.

Accurate end profiles mean that more advanced welding processes can be employed. Many automated welding systems need very accurate fit-up, and are very unforgiving if there are inaccuracies in the weld preparation.

If an estimator can judge more accurately the time taken to perform end profiles, the total time allowed for the operation can be more easily quantified.

This makes it easier to calculate labour costs and make a correct price quote. In most cases therefore it is of considerable benefit for companies to invest in the most advanced equipment available to enhance quality and productivity.

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Heat exchanger maintenance and retubing – can you afford to wait?

Daniel S Janikowski, corporate technical sales manager, Plymouth Tube, USA

Abstract

In summer 2006 the USA experienced record power production, spot shortages, and high selling prices. It meant that a one day summer outage to plug leaking tubes could have resulted in significant financial impact on the bottom line. Allowing a unit to operate a day or two with the leaking tubes may have resulted in damages exceeding a million dollars.

Lost megawatts due to exchanger and turbine inefficiency can cause a dramatic loss of income. This article details some of the possible damage mechanisms, prevention tools, and payback justifications for making the preparatory changes before the problem hits.

Introduction

Managing a power plant today requires many decisions that can have a major impact on the bottom line. Making the correct decision can make heroes of the management team. The wrong decision can end in disaster. Today's fuel costs have increased dramatically, with natural gas having increased from $2.00 per decatherm to over $14.00 at recent peak times (Figure 1).[1]

Today's contract prices for coal including transportation costs are approximately double that of a few years ago. Any change in operation, such as fouled tubes, can result in a costly heat rate increase. A major condenser, feedwater heater, or boiler tube leak can cause 1 to 3 days of lost power. Derates during peak periods due to inefficient heat exchangers or copper deposits on the turbine blades can turn a very profitable year into one just marginal.

Tube Failures

A number of potential failure mechanisms are possible in power plant heat exchanger tubing. The mechanisms common in copper alloys are quite different from those for stainless steels and high performance alloys. They are described separately below.

Copper alloys

Steam Side attack

The most common damage mechanisms for copper alloys from the steam side are ammonia grooving and stress corrosion cracking.

Ammonia grooving – when hydrazine and similar derivatives are used to assist with oxygen scavenging, these degrade into ammonia compounds. Admiralty, aluminium brass, and to a lesser extent 90-10 copper nickel, are sensitive to selective corrosion by ammonia compounds. As these are considered non-condensables, the steam drives them into the centre of the condenser – the air removal zone. The ammonia combines with the condensate and concentrates on the support plates, running down the surfaces. The ammonia solution attacks the tube surface adjacent to the support plate creating grooves.

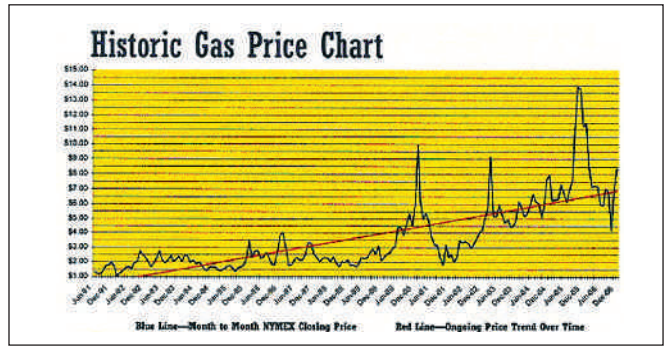


Figure 1: *Natural gas prices over the last 6 years*[1]

Stress corrosion cracking (SCC) – when the tubing has relatively high stresses, another mechanism can speed the failure process, stress corrosion cracking (SCC). Both admiralty and aluminium brass are susceptible to ammonia induced SCC. The stresses are commonly developed during the tube straightening operation during manufacturing. This failure mechanism can occur quite rapidly. A condenser having tube failures caused by both ammonia grooving and SCC is not uncommon.

Cooling water side

Erosion-corrosion – copper patinas formed underwater are usually oxy-hydroxide based and are therefore soft. High water velocities can erode the soft patina exposing the base metal below. A new patina then reforms, and when it reaches a critical thickness, the cycle repeats. This is called erosion-corrosion. For admiralty and aluminium brass, the commonly accepted maximum water velocity to prevent this mechanism is 6ft/second.

However, it is common to see failure in localised areas although the average velocity may be less than 6ft/second. Turbulence causes localised high velocity; a common example is inlet end erosion. Local obstructions, such as mollusk shells, can also cause localised high water velocity resulting in very quick failure. It is not uncommon to experience tube perforations due to this cause within a few days of inlet screening problems.[2]

H_2S and sulphuric acid attack – low pH and the presence of sulphur compounds will dissolve protective patina exposing fresh metal. This causes corrosion rates to increase several orders of magnitude. Polluted, stagnant waters create hydrogen sulphide that is generated from the decomposition of marine organisms. When H_2S is present, the copper alloy patina cannot reform its protective surface.

Today, new power plants are rarely permitted to use clean fresh cooling water and treated wastewater has become one of the

few cooling options available.[3] When cooling water sources are switched from fresh to treated wastewater, failure of 90-10 copper-nickel tubing often starts within 6 months of the change. Even water containing relatively inert sulphur ions can become aggressive when sulphate reducing bacteria (SRB) are present. The SRB will convert the sulphate ions into the more aggressive species.

General Corrosion and Copper Transport

The patina that forms on admiralty brass, aluminium brass, and copper-nickel, is porous and allows copper ions to gradually diffuse into the water, even under the best conditions. Copper ions are toxic to many aquatic organisms. This is the key reason that copper based paints are placed on marine structures to prevent biological fouling. As the copper dissolves, the tube wall gradually thins. When water conditions are ideal, dissolution rates are slow and 25 year tube life is not unusual. However, the copper transport can still be significant enough to have impact at other locations.

For example, the tubes removed from a typical 300MW admiralty tubed condenser at time of replacement will weigh about 50 per cent of the original tube weight of approximately 400,000lb. This indicates that the 200,000lb of copper alloy has dissolved. Both the condensate and the cooling water discharge are candidates. Copper concentrations in condensate can range from 0.2 to 10ppb depending upon location.[4]

Although this concentration appears to be very small, when one considers mass flow rates of millions of pounds per hour range, the over transport can be quite significant. In the closed steam side, it deposits at locations where steam has an abrupt change of volume. Depending upon the plant design, this is often on the boiler tube surface [5] (see figure 2), or on the high pressure turbine blades. When the copper plates on the boiler tubes, it can initiate catastrophic liquid metal embrittlement of the steel.

The situation is aggravated as the deposit layers shown in figure 2 act as an insulator raising the boiler tube temperature. When the copper is in direct contact with the boiler tubes, the melting point can drop to as low as 2012°F as opposed to the typical steel melting temperature of 2700°F. When the copper plates on the turbine blades, the turbine efficiency drops and overall plant output is restricted. Although not dramatic, the financial impact can be significant.

On the cooling water side, Federal discharge limit in most areas is 1ppm, a relatively easy target to meet unless the tube is actively corroding. However, in many localities, regulators are recognising that 1ppm in the hundreds of thousands of gallons per minute that are discharged can amount to a significant amount of copper. In those regions, limits of 40PPB or less are being imposed. This target is significantly tougher and may require expensive polymer treatments to reducing the corrosion rate.

Stainless Steels

Steam side

All stainless steels, both the commodity grades (TP 304, TP 316, and derivatives), and the higher performance versions are resistant to the majority of boiler chemicals including all of the hydrazine derivatives. At higher temperature, one mechanism does cause premature failure, chloride stress corrosion cracking (SCC).

SCC – stainless steels containing 2 per cent to 25 per cent nickel are susceptible to cracking when a combination of stress, chlorides, and temperature are present. Those containing 8 per cent nickel (TP 304) are most sensitive. The minimum critical temperature for TP 304 is approximately 150°F. Because the metal temperature in condensers and lower temperature BOP exchangers is below the critical temperature, it is extremely rare for TP 304 and TP 316 to fail from this mechanism in those exchangers.

SCC can occur in feedwater heaters when the steam chemistry has had a chloride excursion. Usually, this occurs when a condenser tube leaks and the plant continues to operate. The damage can be extensive, sometimes requiring replacement of the heater. The failure mechanism has also become more common in plants that have switched from base load to cycling modes. The chlorides concentrate in regions that alternate between wet and dry, primarily in the desuperheating zone or in the adjacent area of the condensing zone.

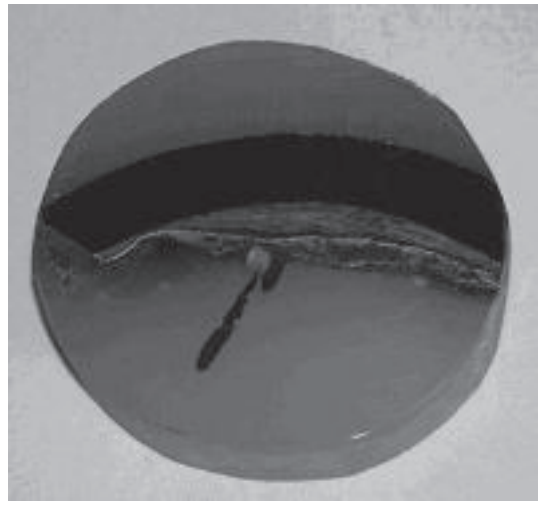
Cooling water side

Pitting and crevice corrosion – TP 304 and TP 316 are susceptible to pitting, crevice corrosion, and MIC related crevice corrosion in many waters normally considered benign. TP 304 and TP 316 should not be considered if the cooling water has chlorides that exceed 150ppm and 500ppm respectively. An expert should also consulted if the manganese levels are higher than 20ppb or iron levels exceed 0.5ppm. Like copper alloys, TP 304 and TP 316 should not be considered candidates if treated wastewater is the cooling water source. A detailed discussion this topic and SCC can be found in the paper by Janikowski.[6]

Titanium

Titanium grade 2 is normally considered immune to any of the pitting and crevice corrosion mechanisms common in the power generation cooling circuits. One exception may be the crystallisation equipment used in zero discharge plants. In this equipment grades 7 or 12 may need to be considered. However, because of its low modulus of elasticity, it is susceptible to vibration damage. This can be prevented by proper design.

Figure 2: *Alternating copper metal and iron oxide layers on boiler tube. Courtesy Hoffman*[5]



Fouling

Condenser tube fouling is a common cause for increasing heat rates and can be expensive. Fouling can be due to either biological factors or scaling. The layers are thermal barriers that raise steam saturation temperature and turbine back pressure. Even nuclear plants that have low fuel costs and megawatt restrictions can be affected as fouled heat exchangers result in higher fuel burn rates that can shorten the time period between refueling outages. It would not be unusual to see additional fuel costs of $250,000 annually for a mid-sized coal fired plant [7], and more for plants with higher cost fuels, such as gas or oil fired.

Another, and potentially larger concern, is the damage of the tubing under the deposit due to under-deposit or crevice corrosion. Once the surface is covered, it is no longer flushed with the bulk cooling water and the contaminates, such as chloride or sulphur concentrate. With a drop in pH, the acidic condition attacks the passive surface layer initiating a corrosion cell. As this cell encourages further concentration, attack can be very rapid. It is not unusual to see through wall attack in 3 weeks on an improperly laid-up 0.028" thick TP 304 condenser tube.

Scaling, due to the heating of cooling water saturated with calcium carbonate, gypsum, or silica, can precipitate surface deposits that can significantly lower heat transfer. These constituents have inverse solubility which means that they become less soluble as the water temperature increases. Often, the deposits are thicker in the latter passes, or higher temperature section of the condenser. It is common in some plants with cooling towers or cooling lakes with high evaporation rates to see cleanliness factors, when calculated by the HEI Condenser method, to be in the 50-65 per cent range. A good overview on this scaling is detailed by Howell and Saxon.[8]

The Value Comparison

Many operations do not summarise the total costs relating to a problem heat exchanger. Justification for cleaning and/or retubing starts with a defendable value comparison summary. It should be based upon a 'life cycle' basis and not solely on the lowest initial cost. Operation of many existing power plants are expected to be cost justified for another 20 years. The analysis should be developed for the remaining life time of the plant.

The individual components that can be used for building the analysis include:

- Initial tube cost
- Installation costs
- Fuel savings based on higher thermal performance
- Lower cooling water chemical treatment costs
- Reduction of lost generation due to turbine efficiency losses
- Reduction or elimination of boiler tube and high pressure turbine cleaning costs
- Elimination of emergency outages/derates to plug leaking tubes.

The following is a model example that can be followed to help determine the true cost of running with the existing tubing versus comparing the cost of replacement with new tubing. Although developed for a steam condensing application, the pattern can be used for feedwater heaters, or balance of plant exchangers.

The example is based on a condenser for a 300MW coal fired plant currently using 16,400 1" OD x 18 BWG (0.049 average wall thickness) 90-10 copper nickel tubes that have an effective length of 42.2ft. The steam load is 1,480,000lb per hour with an enthalpy of 950 BTU/lb. On this unit, the turbine exhaust area is 375ft^2. The circulating pumps provide a design flow of 114,000gal/min that result in a design head loss through the tubes of 19.58ft.

At this time, 6 per cent of the existing tubes are plugged. Scaling is minimised through aggressive water chemistry controls providing an HEI [9] cleanliness factor of 85 per cent. The condenser was designed for an inlet water temperature of 85°F, which is a common inlet water temperature in early summer and early autumn. However, it can be higher during mid-summer.

In this model, tube leaks are now occurring approximately twice per year, particularly during peak summer season (hotter temperatures increase corrosion rates). Every 4-5 years the high pressure steam turbine needs to be cleaned due to copper plating on the turbine blades. During this time frame, the overall drop in plant capacity is 21 megawatts. The original tubes lasted 22 years but because of change in cooling tower operation and new water sources, the expected life of the new 90-10 copper nickel tubing may only be 10-15 years.

As this is a closed cooling tower plant, the service water has been chemically treated with ferric sulphate to assist repassivation of the copper nickel after excursions of cooling water chemistry due to efforts to keep the tubes and cooling tower clean. This cooling water is aggressive to many alloys requiring selection of an alloy resistant to high chlorides and microbiological influenced corrosion (MIC).

The alternative candidates that this utility is considering are titanium grade 2, AL6XN® high performance austenitic stainless steel (UNS N08367), and SEA-CURE® high performance ferritic stainless steel, all proven to have a good track record in similar water. TP 304 and TP 316 are not candidates for this condenser as the chloride levels commonly climb over 700ppm, and Mn and Fe levels are high.[6]

The HEI Standards for steam surface condensers [9] are an excellent basis for comparing the thermal and mechanical performance of the various tube materials. In addition to determining back pressure, the potential for vibration damage, and changes in uplift can also be evaluated. The initial results of the analysis are included in table 1.

When titanium or stainless steel tubing is selected for a condenser retube, it is common to choose 22 BWG (Birmingham Wire Gauge) or 0.028", as the tube wall replacement. Stainless steels have a higher modulus of elasticity than copper alloys. Because of the higher modulus, thin wall stainless tube can be as stiff than the thicker wall copper alloy. This minimises the impact of vibration. Although titanium's modulus of elasticity is lower than copper alloys, the high material price requires titanium to be used in thin walls, as well. This requires a change in design philosophy.

The combination of thicker ID and OD patinas on copper alloy tubes designs that use lower cleanliness factors than the stainless stainless steels or titanium. Compared to 85 per cent commonly measured for clean copper alloys, the stainless steels and titanium traditionally exhibit HEI cleanliness of 95 per cent or better. In many cases, the stencil on stainless and titanium tubes that may have been in service for several years may still be read. For our calculations, 95 per cent is used.

Although the original design flow was 114,000gal/min, flow will vary as the head loss changes. The low head/high volume pumps used for circulation water purposes have mass flow rates that are highly sensitive to head loss. For example, the 1.5 foot head increase caused by plugging 6 per cent of the tubes may result in a typical 2 per cent decrease in cooling water mass flow.

Conversely the 3ft head decrease by changing to 0.028" wall thickness tubing from 0.049" wall original tubing can result in a typical 3 per cent to 4 per cent increase in mass flow. In order to be conservative, this includes 3 per cent in the calculations. If available, the specific pump curve(s) for the plant should be used. The cooling water velocity is calculated to determine the temperature rise in the tube. Although normally considered to have a significant impact on the condenser performance, the cooling water mass flow is actually the key factor for removing heat.

In this analysis, the design inlet water temperature has been used for the basis. When the plant has an undersized condenser and this condenser is limited during peak summer conditions, it is possible to consider using the maximum inlet water temperature for the analysis. When this is done, the results accentuate the different material thermal performance.

After the cooling water, steam flow, and tube alternative parameters have been determined, the saturation temperature is calculated and the back pressure is found using the steam tables. A lower back pressure, or better vacuum, is desired, which increases turbine efficiency. For this condenser, the 6 per cent plugged tubes created a back pressure increase of 0.06" Hg. HEI predicts a very significant back pressure drop of 0.16" for titanium and slightly lower than 0.15" for the super ferritic S 44660. With higher thermal conductivity, the drop in pressure for the super austenitic N08367 is approximately half at 0.08".

Over the years, many different vibration methodologies have been developed to calculate a 'safe span' that results in no tube damage. Each of these uses a different series of assumptions. The HEI span reported in table 1 assumes that the condenser tube will vibrate and that the support plates shall spaced to keep the vibration amplitude equal to or less than $^1/_3$ of the ligament spacing.

When two adjacent tubes are vibrating, the design allows for an additional clearance of $^1/_3$ of the ligament preventing tube-to-tube collisions. Although the absolute value for a safe span for a specific tube material may vary significantly depending upon the method used, the different methods are in relative agreement of the proportional span relationship between alloy and wall for the same OD. If the specific method predicts a longer span for a proposed tube selection, this alternative is considered more conservative, or safer.

If the method predicts a shorter span, the alternative selection is riskier. In this analysis, HEI predicts a span of 36.87" for the Cu-Ni. The calculated span for titanium is almost 5" shorter which suggest that the risk of vibration damage is high, unless other preventative measured are used. N08367 has a slightly shorter calculation which suggests a slight increase in risk for vibration damage.

Only the S44660 has an HEI calculated span longer than the Cu-Ni. The most common solution to preventing vibration problems is the installation of 'stakes' mid-span between the support plates. Wedged between the tubes, the stakes are additional supports. Any vibration criteria has strengths and weaknesses and a qualified expert should be consulted to ensure that proper staking is used with any tube option.

Copper-nickel has the highest metal density of any traditional condenser tube candidate. When combined with the thick initial wall thickness, all of the alternates will result in a condenser of

Table 1: *Comparison of thermal and mechanical of various condenser tube candidates for a 300 MW unit using HEI Standards for Steam Surface Condensers*

Alloy		90/10	90/10 – 6% plugged	Ti Gr 2	N08367	S44660
Wall	Inches	0.049	0.049	0.028	0.028	0.028
Cleanliness		0.85	0.85	0.95	0.95	0.95
Cooling Water	Gal/min.	114,000	111,720	117,420	117,420	117,420
Velocity	Ft/sec	6.98	7.28	6.56	6.56	6.56
Inlet Temp	°F	85	85	85	85	85
Back Pressure	In. Hg	2.94	3.00	2.78	2.86	2.79
HEI Calc. Span	Inches	36.87	36.87	31.39	36.26	37.56
Vibration?		Original	Original	Much more likely	More likely	Less likely
Uplift	Lb	0	0	(203,885)	(113,704)	(122,225)
Est. Fuel Cost	$/MBTU	$2.50				
Est. US$ saved /year from 90/10 based on 0.1 in Hg = 15 BTU/KWHr			($58,968)	$157,248	$78,624	$147,420

significantly less weight. The difference in pressure across the large turbine exhaust area can create significant uplift. When this condenser is at 1.5" of back pressure, the uplift due to the vacuum is approximately 700,000lb. If another tube is selected, the drop in tube weight could result in damage to the supports. Switching to titanium tubing results in a weight reduction of 204,000lb. If titanium is selected, the specialist should be consulted to check if reinforcements are needed in the anchoring areas.

The change in back pressure will have an impact on heat rate, and ultimately the change in the amount of fuel that will be used. As this is a coal fired plant, the assumption has been made that the delivered cost for the coal over a 20 year period will average $2.50 per million BTU. For this plant, it has been determined that for each 0.1" of Hg change in back pressure, the plant will save or require 15 BTU for each kWHr.

Currently the increase in back pressure due to the current 6 per cent plugged tubes is costing about $59,000 per year in additional fuel costs. If switching the tube material, it is then possible to calculate an additional fuel savings of $157,000 per year if titanium is chosen, $79,000 per year additional if the super austenitic N08367 is selected, or $147,000 additional per year if the super ferritic S44660 is final choice.

Now that special considerations have been taken into account for each material, a few more assumptions need to be made to complete the value comparison summary. The decision was made to expect the plant to be commercially viable for approximately 20 years. Although there is a risk that the water chemistry may become more aggressive, there is a belief that chemists have enough control over the cooling water. This will ensure that tubes are kept clean and pH and biological content is controlled so that 90-10 copper nickel will last the 20 year period without an additional retube.

The other material candidates have an excellent track record for doing the same, even if in cases of water chemistry excursions. The budgetary tube costs have been requested from the tube suppliers leading to an estimate which has been included in this summary (detailed in table 2). During discussions with potential tube installers, it has been found that the cost to install the various alloys is not significantly different (approximately $250,000).

The consultant involved in this project has recommended some staking due to the lower stiffness of the titanium and the N08367 tubing; this is significantly more for the titanium than the austenitic stainless. Based upon the consultant's recommendations, Plymouth's installers have quoted an average of $200,000 for the titanium and $50,000 for the austenitic. The consultant is also concerned about the additional uplift if titanium is chosen. Therefore, $50,000 has been included in the budget for reinforcement of anchor points.

At this point, it is possible to start including estimates of operational and maintenance costs for the various candidate materials. Based upon the fuel costs calculated in table 1, there are expectations for savings of $3.1 million over 20 years for titanium, $1.55 million for N08367, and almost $3.0 million for S44660, compared with 18 BWG copper nickel. Plymouth's experience with the copper nickel tube shows the liability for occasional tube leaks, predominately from erosion corrosion from entrapped debris. It is estimated that this will occur once per year during the first 5 years and twice per year after 5 years.

Fortunately this condenser was designed as a divided flow design so that there is not a complete need to shut the plant down to fix the leak. It normally takes 2 days to locate the leaks and plug the tubes. During a derate of that time frame, $225,000 of income is typically lost. As the other tube candidates are not susceptible to erosion corrosion, no cost was assigned to them.

Table 2: *Value Comparison Summary - Estimated 20 year installation and operating costs of various tube candidates for 300 MW power plant condenser*

Alloy Option	90/10 18 BWG	Titanium 22 BWG	N08367 22 BWG	S44660 22 BWG
Estimated Tube Purchase Cost	$2,200,000	$2,900,000	$3,300,000	$2,000,000
Installation Charges	$250,000	$250,000	$250,000	$250,000
Staking Cost	$0	$200,000	$50,000	$0
Anchoring Improvement	$0	$50,000	$0	$0
Fuel savings – 20 years	$0	-$3,144,960	-$1,572,480	-$2,948,400
Derate to fix tube leaks – 1/ yr for 5 years, 2 / year after	$4,875,000	$0	$0	$0
Chemical treatment $100,000/yr	$2,000,000	$0	$0	$0
Turbine cleaning every 4 years	$1,000,000	$0	$0	$0
20 year total cost basis	$10,325,000	$255,040	$2,027,520	-$698,400
20 year savings	$0	$10,069,960	$8,297,480	$11,023,400
Approx. years for payback vs. Cu-Ni	$0	6.8	8.7	4.1
Optional: Lost MW from Copper on HP Turbine -Avg 5 MW/yr loss @ $55 / MW, 85% operation time	$40,953,000	$0	$0	$0

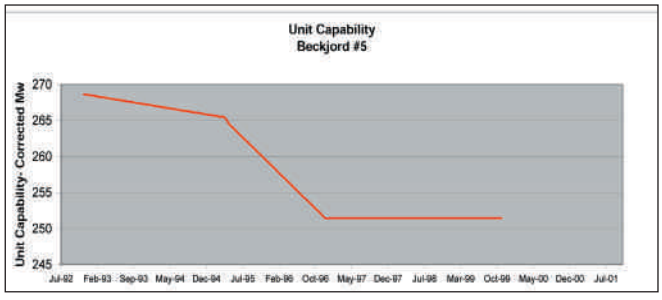


Figure 3: *Loss of MW capacity due to copper plating on the HP turbine blades for a 270 MW plant. Source Burck & Foster*[10]

The traditional cost for chemical treatment (pH adjustment, ferrous sulphate treatments, others) to protect the copper tubing has been costing about $100,000 per year. These will not be required, or will be minimal, with the other alternatives. On this plant design, it is not unusual to see a significant drop in plant output due to copper buildup on the HP turbine blades as shown in the example in Figure 3.[10]

Copper deposits build on high pressure turbine blades lowering the efficiency of the turbine, and restricting the overall plant output. Approximately every four to five years, the derate is significant enough to justify cleaning the turbine at a cost of approximately $250,000. As all of the copper based feedwater heaters have been replaced with other alloys, the only remaining source for copper is the condenser. If titanium or the high performance stainless options are selected, this cleaning cost disappears.

Summing up the installation, operation, and maintenance cost components that have been considered so far, and not including the base 90-10 related fuel cost, there are some very significant differences for the condenser tube candidates. The combination of derate to fix tube leaks, water chemistry control, and additional cleaning required due to copper transport, has added over $10,000,000 to the cost directly related to the use of copper nickel condenser tubing.

Although the installation and tubing costs of the titanium option and N08367 option are significantly higher, this is mitigated by a significant fuel saving (vs Cu-Ni) for titanium and to a lesser extent for N08367. The 20 year fuel savings pays for approximately 92 per cent of the titanium installation costs and about 44 per cent of the N08367 costs. With S44660 lower initial cost and excellent thermal conductivity resulting in good fuel savings, the installation and tube costs are paid for by fuel savings alone in 14 years.

One very significant performance penalty was not included in the 20 year analysis, but is identified in the last row of table 2. Copper deposits on the HP turbine blades can have an enormous financial impact. Derates of 20MW or greater is possible on a plant of this size after a four or five year period. Using the following assumptions:

- The turbine is cleaned every 4-5 years
- The average MW derate is 5MW
- The plant is in operation 85 per cent of the time
- The average selling price is $55 per MWHr (based upon the average selling rate at the Cinergy hub)

The total income lost over the 20 year period can be $40,953,000. This emphasises how important it is to keep the plant operating efficiently, particularly keeping the turbine free from copper deposits.

Summary

It is critical to the bottom line to keep exchangers, particularly feedwater heaters and condensers, operating efficiently. Not only are current operations and maintenance important, but materials selection for the performance of the exchanger and impact in the balance of the system need to be considered. Today, there are many more commercial material choices than 25 or 30 years ago. Factors to consider and manage are:

- Tube cleanliness
- Tube material and thickness
- Installation costs including modifications
- The selections impact on heat rate
- The impact of copper transport
- The cost of condenser tube repair including lost MW
- The cost of emergency shutdowns due to boiler tube repair including lost MW
- The cost of chemical treatments
- Lost MW due to undersized condenser
- The cost of lost MW due to lost efficiency

Proper planning, maintenance, and materials selection can turn a borderline operation into a big winner. We cannot afford to wait.

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