

# TUBE & PIPE

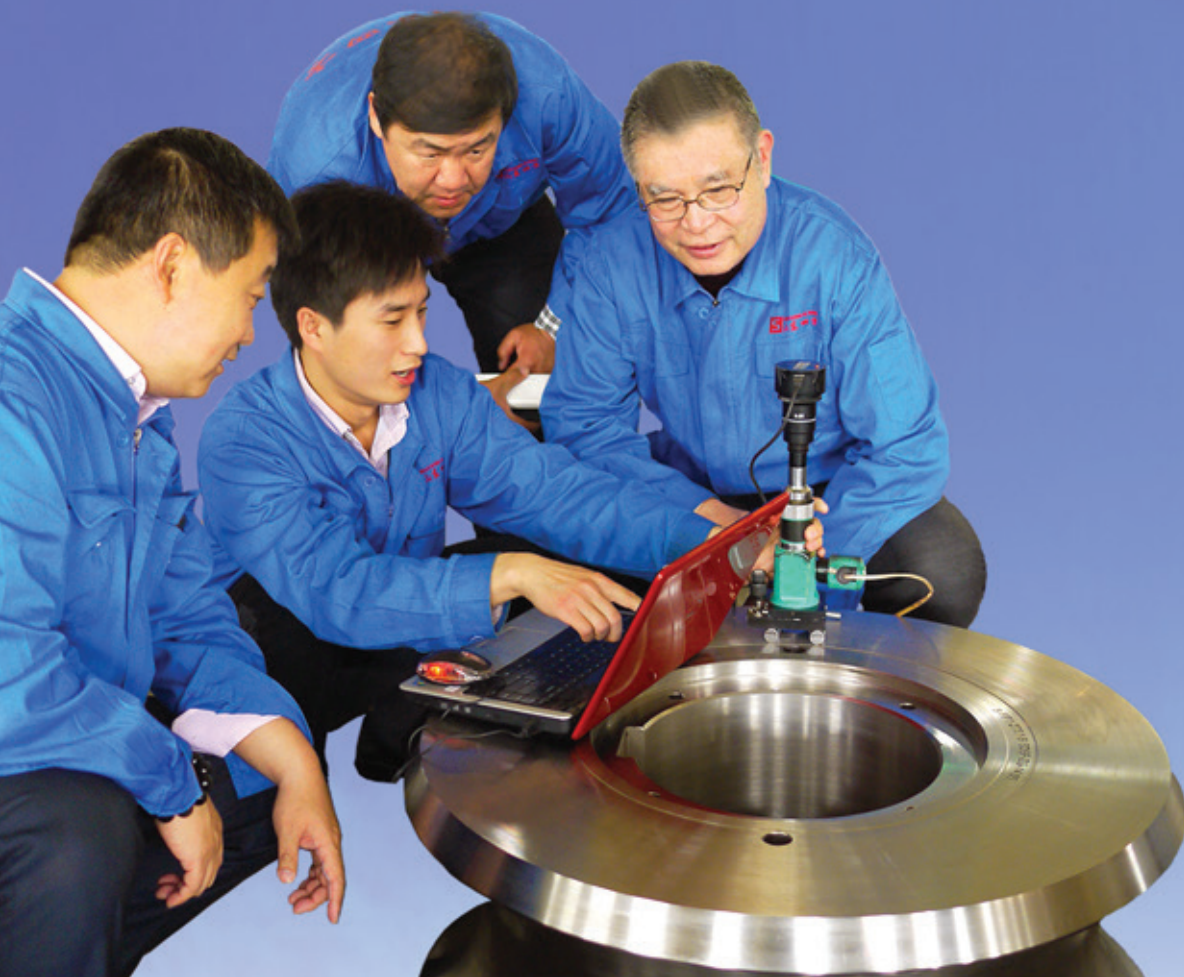
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# Technology

VOL 28 NO 1

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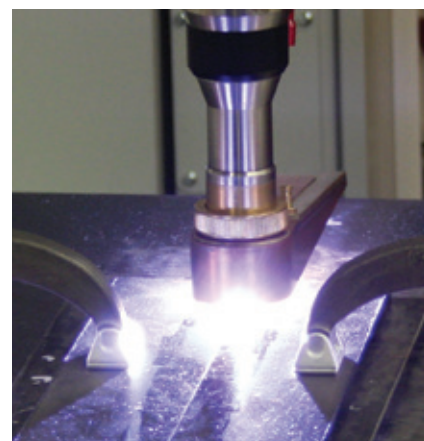
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Rory McBride –  
Editor

Welcome to the latest issue of Tube & Pipe Technology magazine. This month we have a feature on welding technology, equipment and consumables and a fascinating technical article on the manufacture of crimping dies in UOE welded pipe plants from Shandong SiFang Technical Development Co Ltd, as well as all the latest news and technology updates from the tube industry.

Also in this issue is a show feature on the BORU 2015 trade show, which will be held in Istanbul from 26 to 28 March. Several members of the magazine team will be in this magnificent and historic city so please do come to our stand and say hello.

In the March issue we will have features on tube extrusion and end forming; inspection, testing and quality control; and drilling, piercing and punching technology. The magazine will be distributed at two shows – TUBE Russia 2015 in Moscow and Made in Steel in Milan, Italy. The editorial deadline for submissions is 8 January 2015 and the advertising deadline is 21 January.

Finally, I would like to wish all of our readers a very happy and enjoyable festive period and a healthy and prosperous New Year. Enjoy the magazine.

Rory McBride – Editor

## On the cover . . .

Shandong Province Sifang Technical Development Co is a technical enterprise from Shandong Province in China that was initially established by a group of scientific and technical experts. It aims to establish a “technologically innovative strategic alliance of the Chinese steel pipe and cold roll-formed steel industry”.

It has passed through ISO9001:2000 quality system authentication and ISO4001:2004 environmental system authentication. The company also has a large research and development team that constantly looks at new metal materials with a focus on resistance to abrasion and materials that are resistant to heat and the many new types of production processes that can otherwise cause problems with materials.

New products which have been developed by the company to high international standards include high chromium alloy straightening rolls, high chromium alloy rolls for large ERW welding steel tubes and cold formed steel, alloy guide discs for seamless steel tube mills, alloy guide plates for seamless steel tube mills and heat resistance alloy castings for furnaces.



# 68



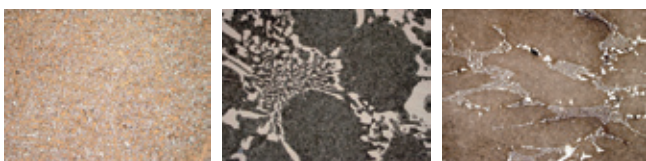
26-28 March 2015

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## ARTICLE:

### NEW MATERIAL DEVELOPMENT AND MANUFACTURE OF CRIMPING DIES IN UOE WELDED PIPE PLANT

By Li Xin-wen, Zhou Gui-de, Li Jian-xin and Su Qi-shuang from Baoshan Iron & Steel Co Ltd, Shanghai, China and Shandong SiFang Technical Development Co Ltd, Jinan, Shandong, China



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## Competence centres for the tube industry

LINSINGER places emphasis on in-house technology sourcing, and its established Competence Centers for sawing, milling and rail-milling provide significant contributions towards the company's market growth. This concentration of engineering know-how is a foundation for ambitious projects in all regions of the world.

Contrary to the general trend towards securing profitability by restructuring the workforce and relying on outsourcing, Linsinger has improved its productivity, quality and completion date reliability by focusing on the competence of its own in-house workforce.

Linsinger's purchase of Wagner Saws (formerly the world's largest sawing machine manufacturer) and the

resulting know-how was the starting point for development of the Sawing Competence Center. Consequently, the company's infrastructure was extended with new production facilities and the latest machine tooling. The target was to assemble and test all machines completely at Linsinger's site. Engineering, production services, quality assurance and logistics management are all available at the company's own manufacturing facility, and experienced Linsinger engineers are permanently on-call worldwide to work in partnership with global customers to ensure satisfaction and protect investments.

Both the Linsinger KSA tube layer saw and the RTM pipe cutting machine have been developed taking into account the

latest findings of vibration technology, and create burr-free cuts suitable for end-users without the need for additional de-burring. The vortex milling process of the RTM pipe cutting machine works with many tool inserts orbiting around the pipe. The number of cutters depends on the diameter and wall thickness, resulting in manageable short chips and practically burr-free cuts.

The machines are designed for heavy-duty three-shift operation, and are characterised by high material throughput. Linsinger supplies complete turnkey equipment concepts, with all necessary transport systems, and length measurement stops for head, foot and partial cuts, either single or in layers. Turnkey systems including integration and implementation in existing finishing lines are also provided.

The Multi-Cut saw is equipped with up to four axis-controlled sawing stations working independently. Sawing of the tube starts simultaneously at several positions, and segments are finally cut along its circumference. Small, disposable saw blades with a high number of coated cutting teeth are used for lower saw blade loading and increased tool life. The result is small chips and negligible burr.



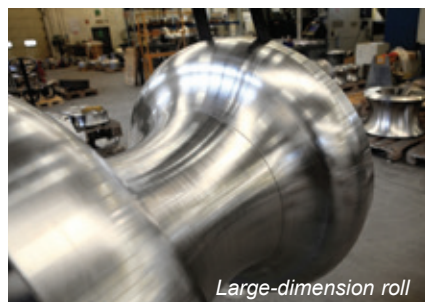
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## Another success for Eurolls

EUROLLS states that increasing numbers of customers in the tube industry are applying its design experience to improve the quality of their products or to solve quality problems, and that its reputation as a 'problem solving' partner represents added value on being a recognised, reliable tooling supplier for the industry.

A number of important orders, including project and design, were secured by Eurolls during 2014. The company has consolidated relationships

with customers around the world for their new installations or implementation



*Large-dimension roll*

of existing ones, for the supply of steel and tungsten carbide rolls, mainly based on Eurolls tooling design.

Eurolls SpA has been selected by SMS Meer GmbH and its customer, Huta Labedy in Poland, as their partner for the supply of tooling for their new 12¾" mill according to SMS Meer GmbH roll design.

**Eurolls SpA – Italy**  
Fax: +39 0432 796501  
Website: [www.eurolls.com](http://www.eurolls.com)



# New director at George A Mitchell

CRAIG H Kyle has joined the George A Mitchell Company in the newly created position of director of sales and engineering.

Mr Kyle has more than 12 years of experience in the pipe and tube industry, including estimating, sales, design, manufacture, installation and commissioning of pipe and tube handling and finishing equipment. Most recently he was chief engineer for Fairfield Machine Company, a designer and builder of pipe, tube and billet machinery.

Mr Kyle also has eight years of engineering and manufacturing experience in integrated steel mill equipment. He holds a bachelor's degree in mechanical engineering from the University of Toledo.

The George A Mitchell Company has been producing push pointing equipment for the tube and rod drawing industry since 1963, as well as developing special cold forming processes and equipment for the production of various tubular parts.

**George A Mitchell Company – USA**  
Fax: +1 330 758 7263  
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# Diary of Tube Events

## 2015



**10-13 January**

**Tube Arabia** (Dubai, UAE)  
International Exhibition  
[www.tekno-arabia.com](http://www.tekno-arabia.com)



**26-28 March**

**Boru** (Istanbul, Turkey)  
International Exhibition  
[www.borufair.com](http://www.borufair.com)



**20-22 May**

**Made In Steel** (Milan, Italy)  
International Exhibition  
[www.madeinsteel.it](http://www.madeinsteel.it)



**8-11 June**

**Tube Russia** (Moscow, Russia)  
International Exhibition  
[www.metallurgy-tube-russia.com](http://www.metallurgy-tube-russia.com)



**16-18 June**

**Guangzhou Tube & Pipe Industry Exhibition**  
(China) International Exhibition  
[www.chinaexhibition.com](http://www.chinaexhibition.com)



**15-17 September**

**Tube SE Asia** (Bangkok, Thailand)  
International Exhibition  
[www.tube-southeastasia.com](http://www.tube-southeastasia.com)



**5-10 October**

**EMO** (Milan, Italy)  
International Exhibition  
[www.emo-milano.com](http://www.emo-milano.com)



**6-8 October**

**Tubotech** (São Paulo, Brazil)  
International Exhibition  
[www.tubotech-online.com](http://www.tubotech-online.com)



**9-12 November**

**Fabtech** (Chicago, USA)  
International Exhibition  
[www.fabtechexpo.com](http://www.fabtechexpo.com)



**17-20 November**

**TOLexpo** (Paris, France)  
International Exhibition  
[www.tolexpo.com](http://www.tolexpo.com)

## Corporate ID and new web design underscore successful merging

ASMAG and Seuthe are introducing a common corporate identity that is designed to visually demonstrate the fusion of the companies' strengths and products. Both companies are available around the clock under the new design at their respective websites.

The companies' manufacturing ranges and their common strategic orientation as a one-stop equipment supplier for

tube mills have been providing extensive know-how and engineering ability since the Austrian Asmag Group acquired Seuthe, Germany, four years ago.

Asmag and Seuthe rarely sell off-the-shelf products, although they have more than 100,000 drawings in their archives. Most solutions are developed to the specification of, and in close cooperation with, the customer.

After the acquisition of Seuthe, investments were made that included a complete in-house production facility on new premises. Tube and section welding lines are now exclusively manufactured in Germany. Knowledge collected across more than 115 years was brought to the latest technology, by new staff and a new manager – Mauritz von Reden.

Reflecting the importance of the North American market, Asmag Group opened a subsidiary, Asmag USA, Inc, in Chicago at the beginning of 2014. Asmag's robust design of straighteners and Seuthe's sophisticated FCF cage forming tube mill technology have quickly found their place in the US market.

*Asmag and Seuthe's new corporate identity on show at FABTECH 2014 in Atlanta*



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Website: [www.seuthe.com](http://www.seuthe.com)

## Drill pipe market worth \$1.7bn by 2019

THE report 'Drill Pipe Market by Grade (API, Premium), Application (Onshore, Offshore) & Geography – Global Trends & Forecasts to 2019', published by MarketsandMarkets, defines and segments the global drill pipe market with an analysis and forecast of the revenue. The report features 100 market data tables with 28 figures spread through 200 pages.

The drill pipe market will grow from an estimated \$1.17bn in 2014 to \$1.7bn by 2019, with a CAGR of 7.9 per cent.

The US market is driven by the major oil and gas exploration activities in major onshore areas, the Gulf of Mexico and Alaska. The US has experienced a rapid increase in natural gas and oil production from shale and other resources. High drilling efficiency and

new well productivity, along with an increase in the rig count, have been the main drivers of the recent production growth in the US. The recent boom in shale gas could also promote a rapid expansion of the petrochemical sector.

The US recorded the highest market size at a value of \$490.2mn in 2013. It is expected to reach \$828.2mn by 2019, from an estimated value of \$560.3mn in 2014, at a CAGR of 8.1 per cent during the forecast period.

The drill pipe market is segmented into two categories in terms of grade: API grade and premium grade drill pipe. The API grade is based on specifications defined by the American Petroleum Institute (API) and follows the latest API specifications, 5D and 7. The drill pipe market for the API grade segment

recorded the largest market volume in 2013, at 171.74 thousand short tons. This segment is expected to grow from an estimated 179.09 thousand short tons in 2014 to 183.46 thousand short tons by 2019, at a CAGR of 0.5 per cent from 2014 to 2019.

MarketsandMarkets is a global market research and consulting company based in the USA. It publishes strategically analysed market research reports and serves as a business intelligence partner to Fortune 500 companies around the world. The company also provides multi-client reports, company profiles, databases and custom research services.

**MarketsandMarkets – USA**

Website: [www.marketsandmarkets.com](http://www.marketsandmarkets.com)

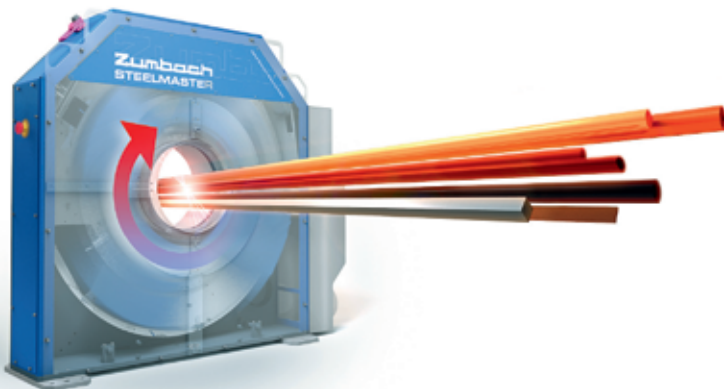
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## Foerster expands into new business sectors

INSTITUT Dr Foerster GmbH & Co KG has taken over NDT Systems GmbH, a leader in non-destructive testing of heavy plates by ultrasonics. The companies signed an agreement on the takeover as well as the continuation of all business operations.

Foerster has been active in the development, production and sale of equipment for testing bars, tubes and wires for more than 60 years.

*The management of NDT Systems and Foerster, after the signing of the agreement*



With NDT Systems, Foerster assumes a product range that fits into its existing organisation with regards to sales, project planning and service, technologically complementing the range of products. With ten international

sales and service subsidiaries, as well as representatives in over 60 countries, the Foerster Group offers customer support locally.

The combination of the two methods – NDT Systems' ultrasonics and Foerster's eddy current – for quality testing in railroad track production has been successfully applied in testing lines around the world. President Felix Förster is convinced that the two companies will be complementary, and give additional value to customers in different testing applications.

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Website: [www.foerstergroup.de](http://www.foerstergroup.de)

## Major press line order from China

SCHULER AG has received one of the largest orders in its 175-year history. FAW Volkswagen Automotive Co Ltd has ordered three press lines with ServoDirect technology and three tryout

presses for testing and setting up dies for its facilities in China. The order is worth over €150mn.

This is the first time that FAW Volkswagen has invested in equipment

with ServoDirect technology. Compared to conventional mechanical press lines, productivity is claimed to be around 20 per cent higher, while energy consumption is significantly lower.

"We are registering a growing interest in servo technology, also on the Chinese market," said Stefan Klebert, CEO of the Schuler Group. "The order underlines our leading role in forming technology." With electronically regulated motors, presses equipped with ServoDirect drive technology provide not only high output performance, but also increased flexibility and energy efficiency.

Schuler offers cutting edge presses, automation, dies, process know-how and services for the entire metal forming industry and lightweight vehicle construction. Clients include car manufacturers and their suppliers, as well as companies in the forging, household equipment, packaging, energy and electrical industries. Schuler also supplies systems solutions for the aerospace, railway and large pipes industries.

**Schuler AG** – Germany  
Fax: +49 71 61 66 233  
Website: [www.schulergroup.com](http://www.schulergroup.com)



*FAW Volkswagen has ordered three servo press lines and three tryout presses  
Photo credit: Schuler AG*

*Enhancing the value...*



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## Tube China 2014 comes to a successful end

TUBE China 2014, the world's second largest and Asia's largest exhibition covering the cable, wire and tube industries, witnessed the curtain fall on a successful four days of business.

wire & Tube China 2014 hit a new record with the total exhibition area of 90,000m<sup>2</sup>.

It attracted 1,431 exhibitors from 34 countries and regions exhibiting their most up-to-date mechanics, equipment, products and solutions, representing the cable, wire and tube manufacturing industries. As Asia's number one industrial exhibition, wire & Tube China 2014 continued to maintain its high level of internationalisation with national and regional delegates from Germany, Italy, Austria, France, North America, South Korea, Japan and the Taiwan region at wire China as well as three large pavilions from Germany, South Korea and the Taiwan region in Tube China.

According to statistics, 38,834 visitors were attracted to wire & Tube China 2014. 53 visitor delegations from Argentina, Thailand, Vietnam, India, Japan, South Korea, Hong Kong, Macau, Taiwan region and mainland China came to visit the show. Argentina organised a buyer group to visit wire &

Tube China for the very first time. During the four-day event, both exhibitors and visitors reported being satisfied with the exhibition.

"The continual economic growth of China with its immense infrastructure and energy projects has led to a boost in the already huge market demand for all kinds of wires, cable and pipes. In only ten years, wire China and Tube China have become Asia's number one networking platform for industry and buyers," said Werner M Dornscheidt, president and CEO of Messe Düsseldorf GmbH.

"As a dynamic platform of technology communication and information, as well as a trade collaborative platform to encourage the sharing of new technology, products and thoughts, wire China gathers in one place the global technology development trend in the industry and will definitely help with the transformation upgrade and innovative development of China's wire industry," said Wei Dong, director-general of Shanghai Electric Cable Research Institute, vice-president of China Electrical Equipment Industry Association (CEEIA) and chairman of Electrical Cable & Wire Branch of CEEIA.

"After ten years' efforts we have created a world known international tube and pipe communication platform, which we believe will bring new benefits for exhibitors and visitors both in China and abroad and create new value as the Chinese economy continues to grow," said Yang Zunqing, deputy secretary general of CISA, chairman of MC-CCPIT and director of MCIEC (International Exchange and Cooperation Center of Metallurgical Industry).

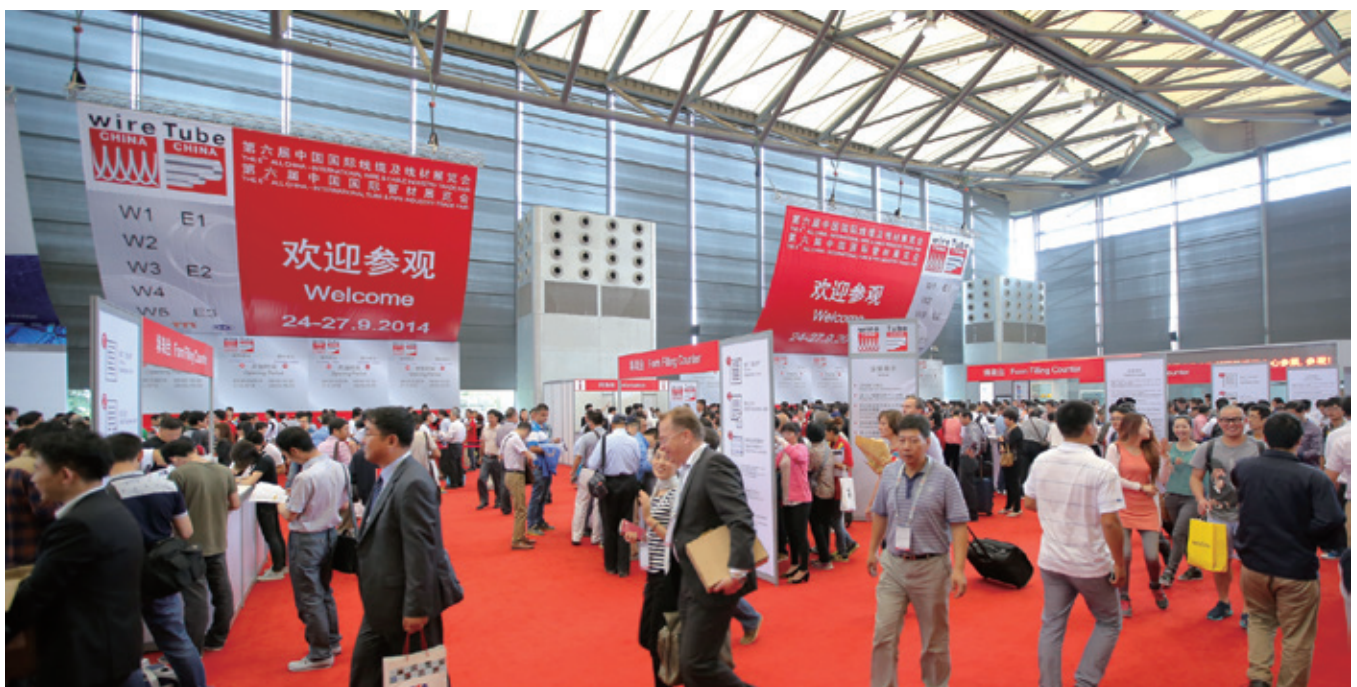
"With ten years' thoughtful operations, wire & Tube has grown to the biggest professional show in Asia and the second biggest in the world, all thanks to its renowned quality, service, scale and level. wire & Tube China have successfully built a strong connection between Chinese and foreign companies," said Axel Bartkus, general manager of Messe Düsseldorf (Shanghai) Co Ltd.

wire & Tube China 2016 will be held from 26 to 29 September 2016 at the Shanghai New International Expo Center. For all of the latest information about the exhibition visit [www.wirechina.net](http://www.wirechina.net) and [www.tubechina.net](http://www.tubechina.net)

### Tube China 2014

Website: [www.tubechina.net](http://www.tubechina.net)

*Tube China attracted 1,431 exhibitors*



# Asil Çelik orders first 3-roll reducing and sizing block in Turkey

ASIL Çelik, headquartered in the Turkish province of Bursa, has modernised its medium section mill with a major revamp.

The order was placed with an international consortium made up by Danieli, Italy, Fematek, Turkey and Friedrich Kocks, Germany.

Kocks is responsible for the supply of a heavy-duty reducing and sizing block (RSB). The RSB is equipped with four stand positions and is designed for operation of 3-roll stands with a nominal roll diameter of 370mm.

The 3-roll block will be implemented in the 400,000t/a medium section mill behind the roughing and intermediate mill consisting of 18 HV 2-high stands. After re-commissioning of the mill the RSB will finish roll the total straight bar production in the range from 19 to 100mm diameter round and from 18 to 80mm hexagon onto the cooling bed in top SBQ-quality with excellent tolerance and ovality as well as perfect surface finish.

The RSB allows rolling to be performed out of only one pass series in the roughing and intermediate mill and thus reduces the number of required feeders significantly.

Any finished dimension of the whole dimensional range can be produced in any desired sequence with a small number of roll sets and just a few stand changes in the RSB.

The rolling configuration program BAMICON calculates optimum adjusting values for rolls and guides, as well as the driving motors speeds and gear stages depending on the requested finished product.

The scope of the Kocks supply comprises the 3-roll reducing and sizing block with automatic quick stand changing system, the roll shop with quick roll change, the mill configuration program BAMICON, and CAPAS, the computer-aided system for accurate adjustment of rolls and guides of the 3-roll stands in the roll shop.

The supply package is completed by the training of customer personnel and the supervision of erection and commissioning.

This is the basis for a trouble-free, economic production of top quality

SBQ-bar. Implementing the first 3-roll reducing and sizing block in Turkey into its medium section mill will enable Asil Çelik to strengthen and expand its position as one of the largest domestic producers of quality steels. The delivery time of the 3-roll heavy-duty RSB is 12 months FOB.

**Friedrich Kocks GmbH & Co KG** – Germany

Email: [v.d.heiden@kocks.de](mailto:v.d.heiden@kocks.de)

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# Mecmesin buys FMS

MECMESIN, a British designer of force and torque testing equipment, has acquired Flexible Machining Systems Ltd (FMS), an established aerospace accredited, precision machining business.

FMS, incorporated in 1982, has a proven track record of providing precision engineered CNC components and subassemblies to customers in the automotive, aerospace, defence and oil and gas industries, where quality and precision are critical.

FMS's team of experienced engineers will join Mecmesin's machining division, which includes synergistic business units in the UK and Asia.

With FMS added to its portfolio of businesses, Mecmesin will enhance its offerings to include 5-axis CNC milling combined with AS 9100 accreditation, the globally recognised standard for quality within the aerospace sector.

FMS will continue to offer precision CNC machined components and mechanical assemblies to the aerospace, automotive, defence, medical and oil and gas industries to the exacting standards they require.

Mecmesin managing director John Page commented, "This complementary acquisition signifies an immediate step forward in both Mecmesin's capacity and capability to supply machined components to a diverse range of customers and industries. The exceptional pedigree of FMS for engineering excellence established



FMS's management team with the previous owner. From left, Andy Howe, business development manager; John Page, managing director; Andrew Streeter, ex-owner of FMS; and Rob Oakley, chairman

over many years combined with the sales and marketing expertise of the Mecmesin Group presents an exciting opportunity for all involved."

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Progress is Life

## EuroBLECH 2014 attracts international audience

EUROBLECH 2014, the 23<sup>rd</sup> international sheet metal working technology exhibition, took place 21-25 October 2014, in Hanover, Germany.

A total of 59,600 trade visitors attended the show to find out about the latest technology trends for sheet metal processing. A record number of 1,573 exhibitors from 38 countries put a wide range of innovative solutions, cutting edge technology and an large amount of live machine demonstrations on display, on a total net floor space of 86,500m<sup>2</sup>.

Exhibitor numbers were up by five per cent compared to the previous show, and the exhibition space increased by three per cent, though visitor numbers remained roughly the same. The results of a preliminary visitor survey showed a further shift towards highly qualified trade visitors.

"The prevailing mood at the show was positive throughout," commented Nicola Hamann, managing director of

the show's organiser, Mack Brooks Exhibitions. "There was lively trading activity in the eight exhibition halls and many exhibiting companies reported large numbers of international business contacts and buoyant sales figures. A first analysis of the exhibitor survey shows that participating companies were highly satisfied with the outcome of EuroBLECH 2014. A vast majority of exhibitors were able to fully or largely reach their target groups; they praised the quality of trade visitors and the internationality of the audience."

The exhibition survey also shows that companies assess the current business climate as more favourable than two years ago. Approaching new markets was the main aim for exhibitors at the 2014 exhibition. "We are delighted to be able to report that 52 per cent of our exhibitors came from outside Germany compared to 48 per cent last time; and we could also increase our traditionally

high percentage of international visitors. 38 per cent of this year's visitors came from outside Germany compared to 34 per cent at the previous show," said Ms Hamann.

More than two thirds of exhibiting companies intend to exhibit again at the next show, which will take place from 25 to 29 October 2016.

In 2015, Mack Brooks Exhibitions will hold sheet metal working exhibitions in selected target markets: BLECH Russia 2015 in St Petersburg (24-26 March), and BLECH India in Mumbai (22-25 April).

The first AsiaBLECH will be held in Suzhou, China (11-13 May 2016). AsiaBLECH will replace BLECH China, which has taken place since 2013.

**Mack Brooks Exhibitions Ltd – UK**  
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# Start-up of heavy gauge, large strip accumulators

KENT Corporation has commissioned two large horizontal accumulators. The customers, said to be respective leaders in their industries of OCTG and structural

steel, chose Kent based on its experience in entry equipment/accumulators and its technical features. The customers were looking for more storage to

enable them to meet end weld times. The new accumulators will reduce downtime, scrap and maintenance. The specifications of the machines, which were 100 per cent made in the USA, are up to 1,219mm (48") wide x 16.25mm (0.64") thick.

Kent Corporation has been providing coil handling, end welding, accumulators, high speed cold saws and tube mill consumables to the tube mill, roll forming and stamping industry for more than 40 years. It has delivered more than 6,000 pieces of equipment, with applications that vary from 0.2 to 19mm (0.008" to 0.75") thick, and strip widths from 12.7 to over 2,032mm (0.5" to 80").


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## Stainless steel tube factory

INTERNATIONAL Industries Limited (IIL), a producer of GI pipes, API pipes, cold rolled tubes, polyethylene and PPR C pipes, is planning to commission a stainless steel tube factory in Karachi, Pakistan, from January 2015, and a large diameter tube mill by mid-2015. The company has also incorporated a wholly owned subsidiary in Australia: IIL Australia Pty Ltd.

IIL Stainless Steel Tubes will initially cater to the needs of ornamental and auto sectors for various applications by manufacturing austenitic and ferritic series in conformance with the ASTM A-554 international standard.

In addition, the company is setting up a 12" diameter API and structural pipe mill. This mill is expected to cater to the growing demand of gas companies

and the construction sector in the region.

IIL, which has 50 years of pipe manufacturing experience, will also participate in BORU 2015, in Turkey.

**International Industries Ltd – Pakistan**

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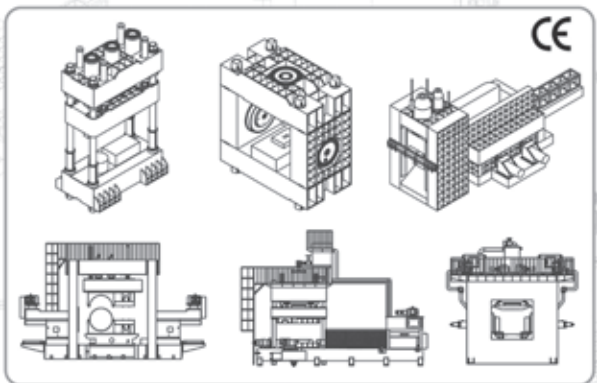
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## Made in Steel 2015

MADE in Steel takes place from 20 to 22 May at Fieramilano, Milan, Italy. It will be the 6<sup>th</sup> edition of the conference and exhibition dedicated to the international steel supply chain.

Made in Steel has evolved over the years into a major event in the sector in Southern Europe.

The universal EXPO 2015 will take place at the same time, beginning on 1 May. The EXPO is to be built right next to the centre where Made in Steel will be held. The two events will be connected

by a specially made walkway/gallery called "Passerella Expo – Fiera". This will allow the visitors of Made in Steel to have the best of both worlds.

The sixth edition of this event will be organised by Siderweb – the main online Italian news source for information, training and consulting for the steel market. Made in Steel will feature numerous Italian and international steel leaders who have already booked their stands, and will offer a broad programme of conferences.

On 20 May the results of research that began in June 2014 will be announced. Its title is 'Industria & Acciaio 2030'. It focuses on innovation and process of steel production, distribution and delivery in the future as well as the environmental impact of the European and Italian steel industry.

In addition to this, the 2015 edition will involve an agreement between Made in Steel and Eurometal. This sponsorship has also been agreed upon by the four branches that make up the European continental unit: Dismet – the association of European steel distributors, tubes and metal; Eassc – coordinator of the European service centres; Nat Fed – which brings all the national iron and steel distributors together; and STSG – which represents the European traders. It is an agreement that has arisen out of the strong amount of steel trade among Italian and European countries. It is hoped that this strong bond will have a positive outcome in the near future.

On the second day of the event, Made in Steel will host "International Steel Trade Day" which will be organised by STSG. A conference will be held inside the three-day event. The goal is to give visitors and exhibitors the opportunity to meet operators/suppliers in the iron and steel trading/selling sectors, within the European framework.

**Made in Steel – Italy**  
Website: [www.madeinsteel.it](http://www.madeinsteel.it)



## Thermatool appoints new agent in Turkey

INDUCTOTHERM Heating & Welding Ltd, manufacturer of Thermatool induction welding systems for the tube and pipe sector and comprehensive ranges of induction heating systems from Radyne, Banyard and Newelco, has appointed Patech Metal as sales agent for Thermatool products in Turkey.

Patech Metal already serves the Turkish tube and pipe production market by utilising its own dedicated team, providing consultative methods for developing and obtaining the best production results from existing tube and

pipe mill set-ups, operation, production and maintenance.

Wayne Hine, director of sales, commented, "The appointment of Patech Metal represents another step in Thermatool's continued development within the Turkish tube and pipe market. Strategically we are setting a business relationship that will continue for many years.

"We recognise that with the number of Thermatool units installed, the most in any single country, requires excellent local technical service and spares support. As one of Thermatool's

largest markets, investment has already been made locally with the set up and operation of Turkish service technicians at its facility in Inductotherm Turkey, Gebze, and this investment is set to continue."

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# ASTM Paul Finn Memorial Award

JOHN Kurdziel, PE, chief engineer for Advanced Drainage Systems (ADS), has been presented with the American Society of Testing & Materials (ASTM) Paul Finn Memorial Award, for technical excellence in plastic pipe. He received the honour in recognition of his development of ASTM testing and manufacturing standards for corrugated polyethylene and polypropylene pipe.

“John has made a strong impact in moving the industry forward,” stated Joe Chlapaty, chairman and chief executive officer of ADS. “His work with ASTM and many other organisations has been exceptional. His years of participation have led to many new standards that make it easy to specify long-life products and instil confidence in their use. John was the principle author for many ASTM storm sewer, sanitary sewer and recycled standards.”

Among other industry honours, Mr Kurdziel has previously won the ASTM Spangler Award for technical excellence in concrete pipe, and the ASTM Award of Merit, the highest society award



John Kurdziel (right) receives the Paul Finn Memorial Award from Tom Walsh, chairman of ASTM F17

given by ASTM. He has also been appointed chairman for ASTM F17.65, Land Drainage Subcommittee. This subcommittee controls all the standards for agricultural drainage products, septic leach field pipe and chambers, including the StormTech product line, pavement underdrains, mine leachate and collection systems, and all polyethylene resins used for storm drainage products.

ASTM Committee F17 on Plastic

Piping Systems was formed in 1973 and now has around 520 members participating on 18 technical subcommittees, which are responsible for 180 approved standards. These standards are referenced in many plumbing and building codes, and ensure quality and performance for the plastic pipe industry.

Founded in 1966, ADS produces corrugated plastic pipe, and is known for its storm water and sanitary sewer management pipe and products. The company has 58 domestic and international manufacturing plants and 28 distribution centres. ADS products include N-12® corrugated HDPE pipe, SaniTite® HP pipe and fittings, and other storm water system components such as StormTech® storm water chambers, InsertaTee® fittings, and various geotextiles.

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## Laser specialist reports further growth in the US market

THE production of natural gas through fracking has helped the laser specialist LAP to achieve its position in the US market for high-precision pipe measurement. Purchasers include pipe manufacturers that are suppliers to the fracking companies. The laser systems allow them to ensure the required consistently high pipe quality. A further important market segment is the revitalised American construction industry, which is showing increasing willingness to invest. The US aircraft industry also has full order books and relies on laser projection for optimisation.

LAP USA has supplied more than 50 RDMS systems for the measurement of pipe profiles in the USA and Canada so far. "We have thus achieved a leading market position in this sector in North America," said Karsten Hofmann, president of the LAP subsidiary in the

USA. "In order to meet the increasing demand for the Straightness Check system for measuring the straightness of pipes as well, we have already added four employees to our sales team."

LAP systems optimise quality in pipe production. The laser systems of LAP are particularly used by manufacturers who produce pipes for fracking companies. "The RDMS system measures the geometry of the pipes in two to six axes. Straightness Check checks the straightness with laser scan micrometers according to specified parameters," explained Mr Hofmann. With both systems, software provides visualisations that allow workers to check tolerances on monitors almost in real time and to document finished products for quality assurance. Mr Hofmann added: "This concerns compressive strength, among other things. After all, the fracking companies pump a mixture of water, sand and chemicals into deep layers of rock at high pressure to produce the freed natural gas. For this enormous stress on the pipes, the quality has to be absolutely perfect."

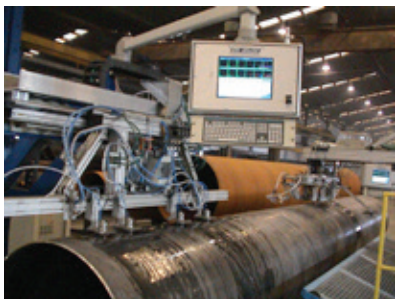
American manufacturers of building materials are also increasingly relying on LAP systems. "In the past years, the

manufacturers were in survival mode because the construction industry was totally devastated," Mr Hofmann remembers. "The crisis seems to have been overcome since the beginning of the year; the manufacturers are looking optimistically to the future and are even investing in a more efficient production."

LAP has developed the Composite Pro laser projection system specifically for the manual production of CFK components. "In contrast with the previously used templates, the work with laser lines is cleaner, faster and easier to control," said Mr Hofmann.

In the near future, LAP expects an increased demand on the part of aircraft manufacturers, who constantly endeavour to increase their production efficiency. Mr Hofmann said: "Due to their full order books, Boeing has set itself the ambitious goal of finishing one machine of the Dreamliner type every three days and is currently experimenting with various production methods."

**LAP GmbH Laser Applikationen – Germany/USA**  
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## Tubtaly 2015

FOLLOWING the positive results of the first event, which took place in 2013, Tubtaly has set ambitious new targets to further establish the importance of the sector.

Tubtaly, which will show the best of tubes, rods, pipes and profiles, and technologies for their production and processing, will be held in Piacenza, Italy, from 20 to 22 May 2015. Unlike the previous event, Tubtaly will not be held simultaneously with EXPOLaser, and this will allow the organisers, Piacenza Expo and PubliTec, to put the entire exhibition area at exhibitors' disposal.

The slogan chosen for the promotional event, "Piping all forms of energy, we nourish life," emphasises the fundamental role of pipes and pipelines, and everything that turns around them.

Travelling underground or hundreds of metres below sea level, they transport the resources that are part of everyday life, such as water, gas or oil.

The decision to bring the event forward from November to May will allow Tubtaly visitors to take advantage of another exhibition: EXPO 2015. With close proximity to Milan, Tubtaly will benefit from the strong international appeal of EXPO, and this will help to increase the number of visitors to the exhibition in Piacenza.

The exhibition is supported by Federacciai, Istituto Italiano del Rame, and Fondazione Promozione Acciaio.

**Piacenza Expo SpA – Italy**  
Email: [info@piacenzaexpo.it](mailto:info@piacenzaexpo.it)  
Website: [www.tubtaly.it](http://www.tubtaly.it)



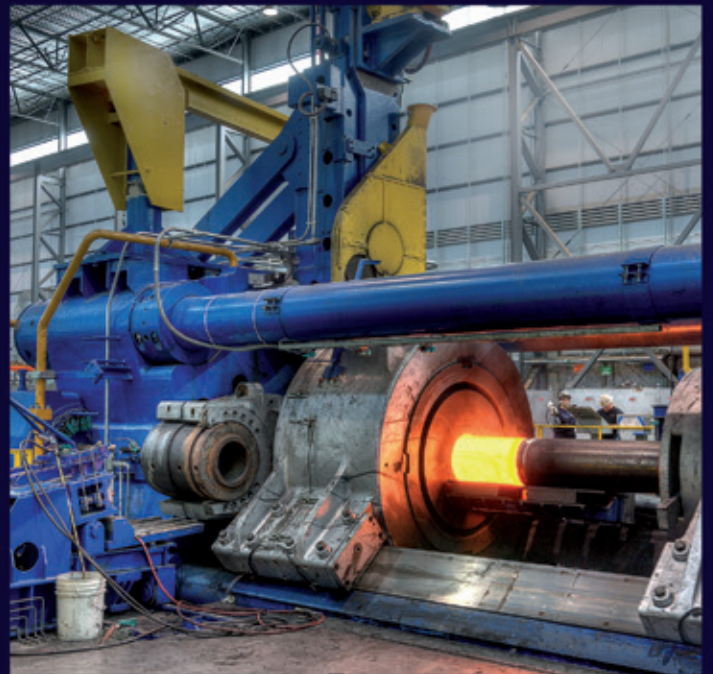
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passion for piping

## Investment in second Singapore manufacturing facility

PREMIER Hytemp, a provider of metal-based solutions to the oil and gas industry, is increasing its engineering capability in Singapore with the development of a second manufacturing facility.

The US\$20mn investment will create a 67,000ft<sup>2</sup> precision engineering facility that will serve the downhole tools, wellhead and subsea tree markets. This will complement the established Premier Hytemp manufacturing operation in Singapore, which primarily serves only the wellhead and subsea tree markets.

The company has acquired land for the development adjacent to its existing 78,000ft<sup>2</sup> facility in the industrial area

of Jurong in western Singapore. The strategic location offers easy access to Singapore and throughout Asia, with port facilities for export shipments.

Campbell MacPherson, chief executive officer of Premier Hytemp, said, "This \$20mn investment in our second Singapore facility will significantly increase our capacity to serve clients in the downhole tools market and complements our existing service offering for wellhead and subsea tree components out of Singapore.

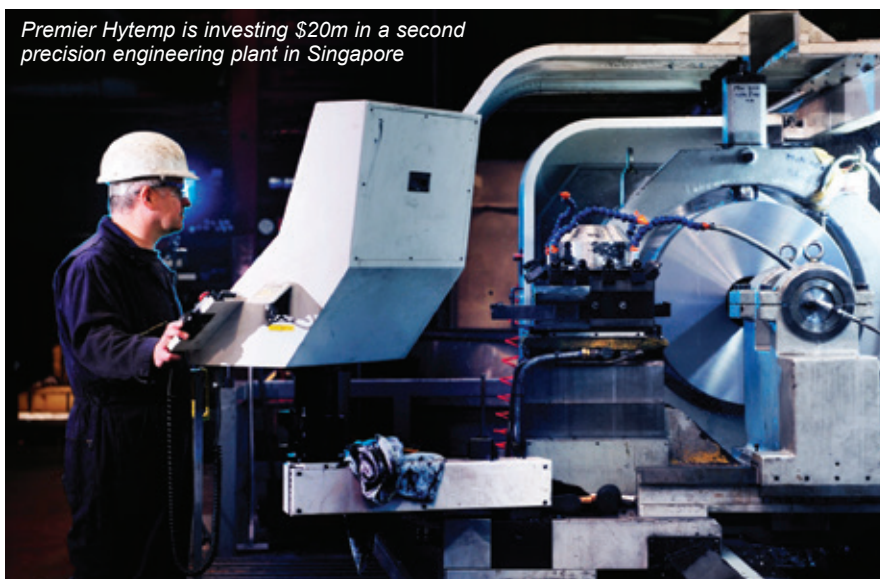
"The expanded scope of the new facility and our ability to manage products from raw material through to fully tested, final machined and assembled

consignments – supported by extensive in-house technical expertise developed over 30 years – means that we are strongly positioned to deepen our relationships with established customers and attract new business. Our control of all aspects of the product manufacturing process also provides our clients with additional assurance in terms of quality control and on-time delivery."

Premier Hytemp provides engineered solutions for low alloy, stainless steel and nickel alloy products in the global oil and gas industry. It manufactures operationally critical components for the industry's major original equipment manufacturers and service companies for applications in wellheads and production equipment, well construction, valves and actuators, and downhole tools.

The company is responsive to client needs, and can service contracts ranging from one-off commissions with short turnaround times, through to providing turnkey solutions and full supply chain management. Its suite of services include sawing and proof machining, heat treatment, testing, final machining, cladding and assembly, and is fully supported by an in-house technical team with expertise in metallurgy, forging, heat treatment, welding and project engineering.

**Premier Hytemp – UK**  
Website: [www.premierhytemp.com](http://www.premierhytemp.com)



*Premier Hytemp is investing \$20m in a second precision engineering plant in Singapore*

## Leadership changes at Tenova

TENOVA, a supplier of advanced technologies, products and engineering services for the metals and mining industries, has announced the departure of Alberto Iperti, who has served as the company's chief executive officer since 2012. Mr Iperti will remain a Tenova board member and will assist during a transition phase.

Under Gianfelice Rocca's governance as executive chairman, Tenova will be managed by a team of four managing directors leading the company's business areas around the respective

industry competencies within the Tenova portfolio: Walter Kueng – Tenova Mining & Minerals; Mauro Medici – Tenova Pomini & I2S; Roberto Pancaldi – Tenova Thermprocesses; and Andrea Rocca – Tenova Steel Making & Strip Processing.

"I thank Alberto Iperti very much for his personal commitment and valuable contribution over the past two years," said Mr Rocca. "Reviewing the strategy, he quickly and successfully reshaped the organisation towards a focused and profitable growth and thus created

a sustainable platform for our new leadership structure."

Tenova is a worldwide supplier of technologies, products and engineering services for the metals and mining industries, providing integrated solutions for complete process areas. Tenova's network companies operate in 26 countries on five continents.

**Tenova – Italy**  
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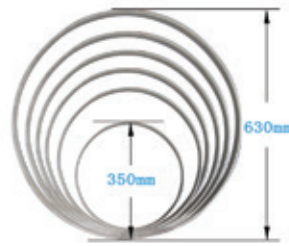


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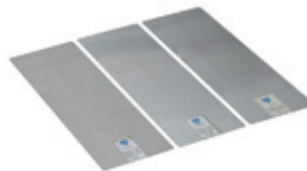


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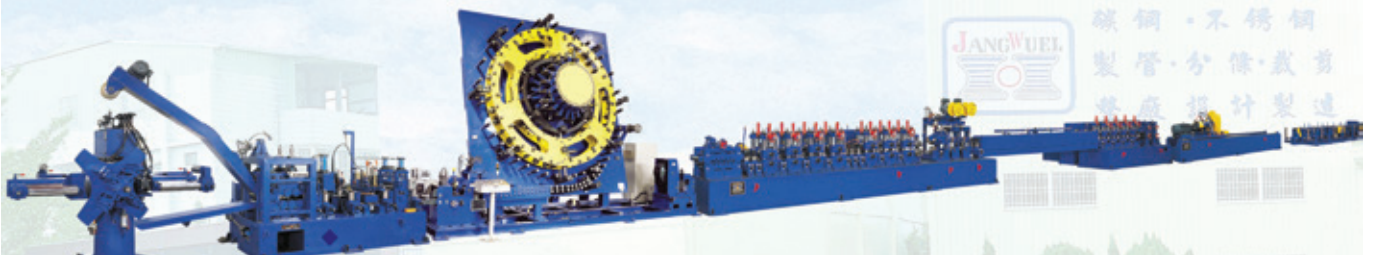
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- ◆ End Facing & Cutting Machine



## Self-calibration of measuring units increases accuracy

ACCURATE calibration of measurement technology means establishing the measurement deviations on the measuring unit first, according to Zumbach Electronic AG. During the calibration process no technical intervention occurs with the measuring instrument, as opposed to cases of adjustment where a measuring instrument is set or adapted to keep the measurement errors as small as possible, or ensuring that the number of measurement errors do not exceed the error limits. The official calibration of a measuring unit is carried out according to the rules and regulations of the examining authority and the unit is marked with the respective stamp. The examining authority establishes whether the respective measuring unit fulfils the respective prerequisites.

The validity of a calibration period follows practical requirements such as manufacturer's information, requirements of quality standards or company internal and customer specific regulations, rather than an official calibration with a fixed time period validity for use.

In order to be able to compare results of measurement, it must be possible to feedback information via a chain of comparison measurements to a national or international master. For this purpose, the display of the measuring unit in use, or the material representation, must be compared with the master's in one or more stages. On each of these stages a calibration is carried out with a master, which has been previously calibrated by a higher-level master. According to the ranking of the master – of consumption or factory standards via reference masters up to national standards – there is a calibration hierarchy of points to be

carried out. This extends from the in-house calibrating laboratory through accredited calibrating laboratories up to the national metrological institute.

Different standards, regulations and guidelines are valid for the expert carrying out of calibrations. A unit must fulfil basic requirements before a unit can be calibrated. One must also be aware of the physical conditions required in order to carry out a calibration and observe them. Rules for the calibration of instruments are essential when a company decides to adhere to a specific norm or guideline or if it produces a product whose production is subjected to legal regulations.

Standards and regulations such as the ISO 9000 series are becoming more important for quality assurance in all industrial nations. Then it may be explicitly required to calibrate all test equipment that directly or indirectly influences the quality of the product. This includes, for example, test equipment that is used as reference during the production process.

Zumbach Electronic AG adheres to different standards and guidelines of quality assurance. The regulations of the FDA (American Food and Drug Administration), for example, are important worldwide in respect of international trading relations. The CFR (Code of Federal Regulation) demands that "devices, apparatus, measuring instruments and recording devices be calibrated at suitable



*The Zumbach ODAC 18XY*

intervals in agreement with an in writing created program which contains specific guidelines, schedules, limits and accuracy and precautions for remedial actions if accuracy and/or limits are not fulfilled". European legislation has similar requirements. The company's measuring units are calibrated using reference standards which were certified by the federal office for metrology ([www.metas.ch](http://www.metas.ch)) or by accredited laboratories. Each unit is supplied with a detailed calibration protocol.

A regular check for measuring errors along with the corresponding protocol can be carried out according to customer requirements. The regularity of these calibrations is dependent on the customer specific requirements (internal regulations). Zumbach recommends a check of accuracy every 12 to 24 months.

**Zumbach Electronic AG** – Switzerland  
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## Steel passivation process challenges

QUAKER Chemical Corporation featured its Primecoat™ passivation product line at the 106<sup>th</sup> Galvanizers Association Meeting and Exposition in Jackson, Mississippi, USA.

In the steel making process, the passivation step treats the surface to protect it from the environmental factors

that cause corrosion. Depending on the chosen chemistry and regulatory considerations, this process can be approached in several different ways. The Primecoat portfolio offers a product range consisting of hexavalent chromium (Cr6+), trivalent chrome (Cr3+) and chrome-free technology

options to meet process needs. The key benefits of the Primecoat line of products include a transparent appearance and corrosion protection.

**Quaker Chemical Corp** – USA  
Email: [info@quakerchem.com](mailto:info@quakerchem.com)  
Website: [www.quakerchem.com](http://www.quakerchem.com)



# Tube bending machines

OP has introduced the new C50EL and C22EL bending machines which are dedicated to processing hydraulic tubes. Both machines are suitable for bending tubes up to 180° in both stainless steel (AISI 316 TI) and carbon steel (ST 37.4) with the distinctive characteristic of having a different ability: the C50EL model allows machining up to a 50mm maximum external diameter while the C22EL version allows bending up to a 22mm diameter.

The adjustment of the desired angle is an intuitive operation thanks to the graduated protractor that is simple to read and set; the change of tools is particularly quick and it does not require the help of any tool. Besides the use buttons, the machine control panel is completed by the LED alarms for setting adjustment and system malfunctions. Pedal and special voltage are available upon request.

**OP – Italy**  
Website: [www.op-srl.it](http://www.op-srl.it)



*The OP bending machine in operation*

# Precision all-electric tube hone

SUNNEN'S new HTR all-electric job-shop tube hone combines servo precision and cycle-automation features with constant spindle power and 0.1mm (0.004") stroke repeatability to efficiently hone blind bores or correct tight spots in a bore without operator intervention.

Designed and equipped to hone the wide variety of parts encountered in a job shop, the machine handles bore IDs up to 900mm (35.41"). Its modular design can be configured for stroke lengths from 2.5 to 14m (8 to 46.2ft).

For job-shop versatility and productivity, the HTR's 12kW (16 HP) spindle motor, combined with a four-step gearbox, produces a constant power band through the entire speed range of 10-470 rpm for fast metal removal. The standard servo rotary tool feed can also function as a push-feed system with an optional drive shaft that converts rotary to linear motion, allowing the machine to handle the full range of Sunnen heavy-duty and two-stage tools.

Tool overload monitoring ensures optimal stock removal rates, while protecting the tool and workpiece. Precision stroke position and repeatability are ensured with a servo rack-and-pinion stroking system. The spindle carriage is driven at speeds of 0.1 to 48m/min (4" to 157ft/min) on hardened and ground ways with a 10.2kW (13.6 HP) servomotor, giving the machine power to handle super-abrasives for fast material removal.

The HTR's design eliminates hydraulics to reduce maintenance, noise, leakage and heat, as well as system hysteresis due to heating of hydraulic oil. The machine's 305mm (12") Windows touchscreen PC control manages all machine functions, including stroke speed/position, tool feed, spindle speed, stone wear compensation and cutting pressure. Standard control features include size lock, automatic bore geometry correction, recommended set-ups, tool

overload protection, spark out, spindle jog and short stroke. The control can store up to 900 different part programs and be configured for 13 languages.

The HTR's optional easy-to-setup fixturing is available in two ranges, for 40 to 600mm parts (1.6" to 31.8"), or 50 to 810mm parts (2" to 31.8"); part weight capacities are 6,000kg (13,230lb) and 8,000kg (17,640lb), respectively. The fixtures ride on a linear bearing system to allow easy positioning.

Multiple coolant system configurations are available to tailor for process requirements. Other options include in-process gauging, tapered-bore capability, part rotation device, moving steady rests for 2m and 4m models, two-stage honing, air conditioned electrical cabinet and CE-compliant safety system.

**Sunnen Products Company – USA**  
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Website: [www.sunnen.com](http://www.sunnen.com)



*Sunnen's HTR tube hone*

## Installation of brazing machine

THERMO King, a specialist in transport temperature control systems for trucks and trailers, has installed an automatic brazing machine from EFD Induction. The machine is employed to braze vibration absorbers, components used in the suction lines of air conditioning and refrigeration systems.

Commenting on why EFD Induction was chosen over alternative offerings, Michael Corcoran, project manager of Thermo King Ireland, said, "We examined various proposals before opting for the EFD Induction solution. There were several reasons behind the choice of supplier for this critical piece of equipment. First, their solution made technical and economic sense. Second, the company has deep expertise in the brazing field – especially in custom-engineered solutions such as this machine. And third, the fact that EFD Induction is present throughout Europe

means we have considerable after-sales support on our doorstep."

The Thermo King machine features a 'separable' coil design. "This use of separable coils was decisive in winning the Thermo King order," said Bjørn Røsvik of EFD Induction. "Indeed, it was essential for the whole automation process, making it possible to go from manual brazing to a fully automated, continuous production flow."

The Thermo King brazing machine is powered by an EFD Induction Sinac 18/25 generator. The Sinac model is a 'Twin' version with two independent power outputs, each with a split transformer function, making it possible to install separable coils. The full system delivered to Thermo King includes an automatic handling solution, a power source and a chiller unit.

EFD Induction has manufacturing plants, workshops and service centres



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**EFD Induction AS – Norway**  
Email: [sales@no.efdgroup.net](mailto:sales@no.efdgroup.net)  
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## Clamshell pipe cold cutter

DWT has enlarged the product range of its pipe cold cutter up to 72". The clamshell pipe cold cutter has been developed for high metal removal rate, a large adjustment range and an easy setup in-situ. The portable clamshell pipe cold cutter machine for pipe cutting and bevelling avoids heat-affected zone (HAZ) in the pipe cutting process.

Designed for heavy wall pipes in heavy-duty applications, the high working speed and quick set up provide fast operation on-site. The

DLW-HD clamshell cutter is able to operate safely and precisely in most critical applications. A rigid frame construction in combination with high quality steel pinion gear and bearings provide a rugged combination for challenging work.

Features include cold cutters with split-frame technology for endless tubes; compact dimensions for use in confined work spaces with limited access; quick and safe clamping and adjustment for pipeline welding; and

rigid pipe cold cutter for pipeline welding. The application range of the DLW-HD is for cold cutting of pipe from 48" to 72" OD, and for wall thickness up to 100mm. The split-frame cutters can be mounted on assembled stretches of pipe. Special applications such as remote control are available for limited access in pipeline welding.

**DWT GmbH – Germany**  
Email: [info@dwt-gmbh.de](mailto:info@dwt-gmbh.de)  
Website: [www.dwt-gmbh.de](http://www.dwt-gmbh.de)

## Detecting defects in copper tube

A FREQUENT problem for copper tube producers is the presence of foreign metallic inclusions, which can lead to failures, particularly in fluid transmission applications. Magnetic Analysis Corp's eddy current Multimac® tester with an additional magnetic inclusion detector (MID) absolute channel provides a convenient, reliable solution that can detect inclusions as small as 3mg.

In many cases, the inclusion can come from the material itself, which may contain residual impurities from

continuous casting. In other cases, such as finned tube, the inclusions develop during the manufacturing process, where small particles of metal such as tungsten can break off from fabricating tools and become imbedded in the OD or even through the wall.

The MID option uses principles of flux leakage technology. A magnetic dual-coil test sensor consisting of one primary winding, associated with a secondary arranged in differential mode, and one single absolute winding for detecting metallic inclusions, is used.

A stable DC magnetic field is created and, in its presence, a magnetic particle on or within the non-ferrous product passing through the test coil will have the effect of distorting this magnetic field. The distortion induces a signal that is detected by the Multimac electronics, analysed and displayed on the monitor.

**Magnetic Analysis Corp – USA**  
Fax: +1 914 703 3790  
Email: [info@mac-ndt.com](mailto:info@mac-ndt.com)  
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Tube Bending Machines full electric with 9 axes managed by CN and U.I.I. graphic programming, easily re-configurable for right and left bending senses with capacity up to 80 mm Fe.

### 955LE



## Up & Down Full Electric

Tube Bending Machines full electric with 10 axes managed by CN and U.I.I. graphic programming. Integrated loading/unloading, incomparable with right and left bending sense in automatic cycle and capacity up to 42 mm Fe.

### 1042E



## Heavy

Tube Bending Machines full electric with 13 axes managed by CN and U.I.I. graphic programming, available for right or left bending sense with capacity up to 150 mm Fe. The extreme rigidity of these machines allows the realization of bends with a compare CLR/Ø also less than 0.8.

### 150HE

### 114HE

### 980HE



## Quality control for coated pipes

SELMERS BV, a supplier of multi-layer pipe coating plants, has completed the renewal of its Peeling Resistance Tester (PRT), used in testing the adhesion strength of a three-layer PE/PP coating system.

The PRT is considered a logical



device inside Selmers' quality control equipment programme. Over the years, the improved adhesion strength and performance of pipe coating materials has required a complete re-assessment of the PRT. The results are that it is now a more user-friendly peeling device, capable of handling higher peel strength forces than before (eg handling forces up to 2,500 Newton, up from 1,500 Newton in previous years).

At the same time Selmers has managed to reduce the weight of the peeling device by almost 40 per cent, making it easier to handle on the pipe by the quality engineer executing the test.

The peeling device is placed on the pipe for peeling the three-layer coating from the pipe. When peeling a strip of width 20-50mm off the coated pipe, it

may remain within the 120-130mm cutback pipe end. The peeling angle is maintained at a controlled 90° while having a 10m/min velocity. The control unit consists of a logical to use touch panel, which is used for collecting and presenting data. From the control unit, data can be transferred to a secondary device via LAN or USB connection.

The PRT has a 220-240 VAC, 50-60Hz mains connection, but an optional rechargeable battery pack is available. Other options include wireless-LAN for easier data collection (using a laptop, for example), and a printing device that prints test results directly.

**Selmers BV** – Netherlands  
Fax: +31 251 220 777  
Email: sales@selmers.com  
Website: www.selmers.com

## Milestone in diameter measurement

IN addition to Sikora's classic diameter gauges of the LASER Series 2000, Sikora offers the high-end devices of the LASER Series 6000. These diameter-measuring devices are specifically designed for sophisticated customer requirements that exceed the classic demands for quality control in the hose and tube industry.

2,500 measurements per second, all with extremely high single value precision, allow for an optimum line control and provide reliable statistical data. The gauge heads measure the diameter of hoses and tubes with precision and repeatability. Sikora offers three gauge head models for product diameters from 0.2 to 78mm. The LASER Series 6000 measures precisely transparent products as well.

The devices include an integrated LCD display with control panel. This provides the operator with diameter values at a glance, directly at the measuring device. At the control panel the diameter nominal value can be entered and the control module activated. Via line speed or extruder rpm the module controls the diameter automatically to the specified value.

The high measuring rate of the diameter devices also allows the detection of lumps and neckdowns. With the two-in-one system, investment costs



are reduced. In addition, there is more space in the line, as only one gauge head has to be installed.

Directly integrated in the gauge heads is a universal interface module for all connections such as RS 485, RS 232, Profibus-DP or, alternatively, industrial field buses such as CANopen, Ethernet/IP, DeviceNet and Profinet IO. As the interface module as well as all connectors are completely integrated in the gauge

head, they are protected against dirt, water or mechanical influences during production.

The opening of the gauges is twice as big as the measuring range, to ensure an easy and safe passage of the production. A special feature of these devices is the swivel type gauge head. It allows for the gauge head to be easily moved upwards, out of the extrusion line. The measuring heads are open at the bottom to prevent dirt and water from falling into the measuring area. The feeding of the connection cables to the interface module is protected, directly in the gauge head stand.

The LASER Series 6000 has common interfaces as well as an optional Wi-Fi interface, which allows direct connection to a smartphone or laptop. The Wi-Fi interface is used for diagnosis and quality control. Measuring values, trend and statistical data, and also video signals are transferred.

Sikora offers a free app for displaying measuring values, trends, statistics or video signals on smartphones. The operator easily logs in via the Wi-Fi interface, and production data is directly displayed on the smartphone.

**Sikora AG** – Germany  
Email: sales@sikora.net  
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## Continuous casting technology

UPCAST OY is a supplier of Upcast®-SGTube production lines for upward casting of thin-walled Cu-DHP tubes ready for further processing into various high quality tube products.

The continuous casting technology offers a shortcut in copper tube production process, requiring one-step compared with the traditional multi-step tube production. It is an extension of the Upcast system used for casting Cu and Cu-alloy rod, and shares the same inherent benefits of the standard system, with specific construction of the casting machine, coilers and casting machine tooling.

The Upcast-SG cast tube has a fine grain structure, allowing for its straight breakdown drawing followed by inductive in-line annealing. To ensure complete softening a total area reduction of at least 50 per cent is required before intermediate annealing.

Upcast rod and Upcast-SGTube lines are both of modular design, offering solutions for small and medium capacities. With a double-furnace configuration (separate melting and casting furnaces) it is possible to reach 12,000 tpa.

Sizes of tube with outer diameters from 38 to 60mm have been cast, with wall thicknesses of 2mm/3mm respectively. Different tube sizes can be cast simultaneously when the casting



Double-furnace configuration

machine is equipped with more than one servo-drive system. The smaller the final tube size, the smaller the cast tube size. With respect to coil weight Upcast-SGTube is flexible, with an upper limit of around 1.5 tons. The final weight limit is more likely to be determined by the downstream process equipment.

The main use of Upcast-SGTube is in the casting of phosphor deoxidised (DHP) copper tube for the production of sanitary, industrial and ACR tubing. However, the process is not limited to DHP copper, and is also suitable for other copper grades/copper alloys. Oxygen-free copper and copper nickel

alloys have all been successfully cast.

Having the Upcast-SGTube process as the first step of tube production line is claimed to be cost effective due to smaller energy consumption, as well as providing a small environmental footprint. It is also possible to use clean and dry scrap in the process with the double-furnace configuration. Further savings can be gained through the smaller space requirement of the line.

**Upcast OY – Finland**  
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Website: [www.upcast.com](http://www.upcast.com)

## Lathe designed with safety in mind

TRI TOOL has announced the new RBL-G2, the next generation in clamshell lathes. Designed to be faster, better and safer, the RBL-G2 is built for safety, performance and speed.

Safety is a core value at Tri Tool, and a primary goal of Tri Tool's engineers when tackling both design and redesign projects. "We wanted to eliminate as many pinch points on the new RBL-G2 as possible," stated Justin Tripp, PE, manager of engineering.

"Our engineering team developed an innovative and patent-pending tool block design that allows for the tripper mechanism to remain in a fixed and low-profile location adjacent to the tapered drive housings. The result is significantly fewer pinch points throughout the entire usable range of the machine."

In addition to addressing safety, Tri Tool examined every aspect of the clamshell lathe design and improved performance, speed and ease of use while maintaining the power and durability customers have come to expect.

The newly redesigned RBL-G2 will now sever and bevel up to three times faster with new high speed, in-line and right angle motor options in a single drive housing which adds flexibility and reduces machining time without compromising power.

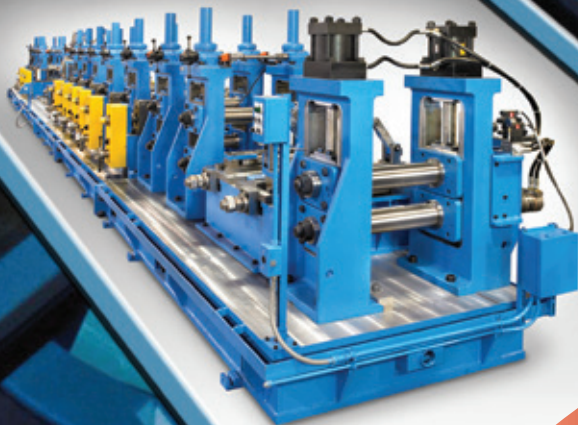
"We've also simplified the tool bit setup which should save the operator time and reduce the amount of training needed to operate the machine," stated Ash Ferozpurwalla, PE, lead engineer.

The new, economical high speed carbide sever kit allows for sequential sever and bevel operations with minimal setup and without having to reposition the clamshell lathe.

Tri Tool Incorporated is a privately held, global company in the manufacture of portable precision equipment specifically designed for pipe bevelling, flange facing, in-line cutting, multi-process welding, high performance pipeline machinery, and a wide range of internal line-up clamps. In addition, Tri Tool offers on-site machining and code welding services, special engineering and custom machine design and equipment rental.

**Tri Tool – USA**  
Website: [www.tritool.com](http://www.tritool.com)

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## Reducing the programming and teach-time of welding processes

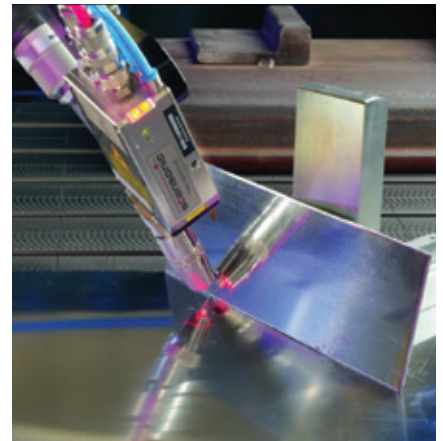
PROBLEMS can arise when switching a production-line: during the switch production stands still and sometimes it takes even more time to reconfigure and recalibrate than to actually switch the tools. Even after the adjustments are made the user still has to make sure that the change of products fits the quality criteria, which costs time and money.

The solution to this problem is online seam-tracking sensors. This kind of optical sensor can automatically detect and compensate variations in the geometry of parts and therefore significantly reduce switching costs. If any common robot is used for welding processes, than a stand-alone sensor like the TH6D from Scansonic MI GmbH can easily be integrated into production. It stores unlimited different welding jobs and in combination with its online detection, switching from one product to another is simple.

The sensor uses triangulation for a no-contact scan of the shape of the seam at the joint. It then transmits the

current seam position to the control unit of the robot. Based on the submitted values, the robot can compensate tolerances in Y (lateral displacement along path) and Z (vertical offset along path), without changing the existing programming. The sensor has a very sturdy construction. The optical filter to prevent extraneous light helps to ensure that operations proceed properly when working less than 15mm to the process. Reliable seam tracking is supported by a powerful signal analysis feature, which is especially useful on reflective surfaces. The TH6D uses a state of the art CMOS active pixel sensor to get the most accurate measurements possible.

If a welding robot is not used for production it is still possible to lower switching costs with the Scansonic MI GmbH Auto-Guide system. It is an easy-to-use plug and play system consisting of the TH6D sensor in combination with two linear axes. The system is supplied ready to use and all components can



The mounted TH6D

communicate with each other directly after the mounting and without any additional programming required. The Auto-Guide system offers process safety and reliability of a robot welding and simplicity in the operating process.

**Scansonic MI GmbH** – Germany  
Website: [www.scansonic.de](http://www.scansonic.de)

## Tungsten carbide-tipped saw blades

NEW-Form Tools has added tungsten carbide tipped (TCT) circular saw blades to its metal cutting product line. Each blade is manufactured to reduce downtime and increase operational speed, and the TCT circular saw blades are specifically designed to address the specifications of the tube and pipe industry.

The advanced blades can be used for all kinds of metal cutting, producing

a burr-free cut through steel materials. The carbide-tipped saw blades are coated to last longer and it is claimed that, in some cases, they can last four to ten times longer than the average HSS circular saw blade.

“Users will quickly see increased sawing performance in their operation,” said Tyler Jantzi, sales director for New-Form Tools. “With advanced coatings, our blades allow for the cleanest,

dependable cuts with less change-outs, for overall higher productivity.”

The TCT circular saw blades also work on a variety of sawing applications, and can be re-sharpened by New-Form Tools.

**New-Form Tools** – Canada  
Fax: +1 519 272 1992  
Email: [tjantzi@newformtools.com](mailto:tjantzi@newformtools.com)  
Website: [www.newformtools.com](http://www.newformtools.com)

## Stainless steel pipe production

SURAJ Ltd is a manufacturer and exporter of stainless steel seamless pipes, tubes and U-tubes in various sizes, specifications and grades. The company has a strong presence in the global market, and serves more than 70 countries around the world.

The size range is 6 to 323.9mm OD, with 0.8 to 25mm thickness. Pipes are

available up to 12m in length; tubes up to 30m. Materials include all austenitic, ferritic, Duplex and Super Duplex stainless steels, and manufacturing is carried out according to ASTM, ASME, EN, NFA and JIS standards.

Suraj also holds certificates for quality in accordance with AD2000 Merkblatt W0 and Pressure Equipment

Directives 97/23/EC from TUV Nord, and supplies products under all national and international third party inspection authorities.

**Suraj Ltd** – India  
Fax: +91 79 2754 0722  
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## Mills for automotive tube industry

RAFTER Equipment Corporation manufactures tube mills, pipe mills, roll forming machines, cut-off machines, and other related mill machinery. For the automotive tube industry, in particular, the company has produced several mills.

A common automotive tubing application is the production of exhaust tubing. This includes lighter wall 409 stainless steel using both high-frequency induction (HFI) and laser welding techniques. Another application is fuel line tubing, which is generally formed and welded at a larger 13mm diameter and subsequently cold-stretch reduced to a final size as small as 4.76mm OD. Automotive drive shaft tubing is another application.

A growing market segment is the production of direct-welded profile sections for use in auto body structures. This application generally involves the addition of pre-punched holes so that secondary operations can be eliminated. Both HFI and laser are used to weld these profiles.

Rafter still manufactures its equipment solely within the USA, which allows the



Rafter's RT-3000 drive shaft tube mill

company to control the manufacturing process to ensure shorter and on-time deliveries. The company states that in many cases it can ship orders before the promised delivery date.

Originally started in 1917 as a roll forming machine builder, the company was purchased, relocated, and transformed into a tube mill manufacturer in 1988. Rafter Equipment

has since provided nearly 100 tube mills and more than 400 mill accessory upgrades. Its focus is to provide robust equipment that is simple to operate and maintain.

### Rafter Equipment Corp – USA

Fax: +1 440 572 3703

Email: [sales@rafterequipment.com](mailto:sales@rafterequipment.com)

Website: [www.rafterequipment.com](http://www.rafterequipment.com)

## Calibration and maintenance of orbital welding equipment

FOR a number of years, numerous sectors have been facing a demand for constant improvement in the quality and safety of the products being sold. In the agro-food, chemical and pharmaceutical industries, the handling of products is subject to draconian restrictions and an imposing rulebook.

Anything affecting quality is of crucial importance and the manufactured product may be affected by various factors of internal – cross contamination, microbial growth – or external origin. Numerous directives and standards govern the qualification of installations. They also give many recommendations on how to ensure hygienically acceptable welds. Other than exposing welding procedures for joining pipes, fittings and valves at the cutting edge of technology, orbital TIG welding (GTAW) is the technique that offers the best quality in the execution of welds for the fabrication of thin wall stainless steel tubing.

In the oil industry, it is the continuous evolution in extraction techniques, productivity gains and environmental safety that compel the firms in the industry to improve their production and lengthen the useful life of their equipment.

Environmental safety also affects

other industries such as nuclear power.

Numerous recommendations also highlight the importance of the quality of joint preparation to ensure perfect workpiece alignment, the importance of electrode grinding, etc. Inspection means are presented and advice given to counter the most commonly occurring defects.

These recommendations are founded on the idea that the items of welding equipment used become reference elements, the baseline for implementing these rules.

Polysoude, specialist in orbital welding using the TIG process, proposes equipment designed to fulfil these quality requirements. The TIG process is the only technique capable of producing the clean, smooth seams demanded by the standards. Its main characteristics are: a root flush with the inside wall of the tube; insignificant heat input; minimal oxidation which, where it does occur, can be easily be stripped; ensuring that quality can be maintained consistently and is documented outside of the welding process; and preservation of mechanical and metallurgical characteristics of the materials used.

In order to prevent oxidation, a smooth metallic inside wall is a prerequisite for the natural passivation process which offers lasting surface protection. Additionally, the resulting metallurgical properties exceed the criteria of the strictest standard.

The principle of the TIG welding process is based on creating an electric arc. This arc is generated between the refractory tungsten electrode and the workpiece. The electrode concentrates the heat of the arc while the



*Measuring and checking a printed circuit board during a maintenance operation on a Polysoude power source*

workpiece metal melts, thus forming the weld pool. Even if the conditions for generating and maintaining the electric arc are totally controlled by the power source, experience has shown that drifting may occur in practice. Such drifting is linked to the conditions of use of the equipment. For instance, the operating time (compliance with duty factors) can cause the temperature of certain electrical or mechanical components to rise which, in some cases, can alter their characteristics. Component wear and tear is another factor that influences equipment setting parameters. It is important to remember that the environment – including dust, temperature, humidity, corrosive vapours, draughts, etc – influences equipment performance.

Latest-generation power sources are designed to help operators quickly get to grips with the equipment and make it easier to develop welding programs. This can only be achieved through a computerised Human-Machine Interface.

While it is true that proper preparation of the tubes and parts to be assembled and compliance with tolerances are very important notions for ensuring quality and safety, two other recommendations



cannot be ignored: calibration and preventive maintenance of the welding equipment.

In line with the company's "zero defect" objectives, Polysoude power sources are all tested prior to shipment and a calibration certificate is provided on delivery of the equipment.

Always keeping its ear to the ground, Polysoude has for many years been offering its customers the possibility of having their power sources calibrated at regular intervals according to a precise protocol with Cofrac-accredited instruments in order to preserve the most reliable settings and parameters.

If any parameters are seen to have drifted during calibration, the Polysoude technician is also capable of correcting the defect and restoring the equipment to the same quality level as when it left the factory.

Any defects that may be caused by electrical or mechanical drifting on the welding equipment are therefore eliminated, maximising the performance of the production tool.

After calibration, a label is affixed to the power source stating the date of calibration, the certificate number and

the recommended date for the next check.

Users can therefore organise the recalibration of their equipment well in advance and thus optimise their productivity. Under certain conditions, Polysoude also offers specific training to enable users to calibrate their own equipment independently.

For years, attempts have been made to ingrain compliance with a number of important principles required to obtain quality welds in the operator's routine. But what about equipment?

Nowadays, no one thinks twice about taking their vehicle into their garage for a regular service but, unfortunately, this does not apply to work tools.

Here too, Polysoude takes care of its customers by offering preventive maintenance operations. The purpose of these operations is to keep equipment in ideal working condition while ensuring personal safety in accordance with the requirements of directive 2006/42/EC, the "Machinery Directive". It must be remembered that electrical energy is present throughout the welding process.

If the quality and health security of the installations are important, then the

safety of the persons who build them is certainly no less so.

A full service must be scheduled regularly to pre-empt all risks and possible equipment failure. It must cover the entire installation including the weld head, power source, cooling unit, wire feeder and other devices. Polysoude maintenance technicians are highly qualified and trained to propose a quality service within the shortest time frames, enabling preventive maintenance to be slipped comfortably into a production schedule.

Through its servicing activity, Polysoude also proposes a list of parts to be kept in stock and offers advice on the components to be changed periodically. Polysoude maintenance technicians are also in a position to pass on best practices in term of daily maintenance operations. In addition, they offer training which forms a valuable complement to the maintenance instructions provided in the operating manuals for the products and helps extend the service life of the equipment.

**Polysoude – France**  
Website: [www.polysoude.com](http://www.polysoude.com)

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## Coolant platform for the tube and pipe industry

QUAKER Chemical Corporation, a dedicated chemical speciality supplier to the tube and pipe industry, exhibited its innovative modularly designed mineral oil-free metalworking fluids from the QUAKERCOOL® 700 series at FABTECH 2014.

This new platform addresses the demand for a single product technology to be utilised for multiple operations and substrates. Designed with “front-to-back” compatibility in mind, the product series integrates well with upstream chemistries and downstream protective coatings.

The high performance coolant series portfolio includes QUAKERCOOL® SUPER HYDRO 720, QUAKERCOOL® 730 TP, and QUAKERCOOL® 750 TP which target the hydrotesting, roll forming process and thread cutting operations. Depending on the process needs, each product demonstrates its flexibility to be used for one or all the targeted applications. Benefits include lubrication, short-term corrosion protection, clean rinsing, and a wide water quality tolerance. These synthetic oil-free microemulsions effectively resist microbiological growth and contain no chlorinated compounds, formaldehyde release agents, boron, monoethanolamine, or secondary amines.

The QUAKERCOOL® 700 series expands the “front-to-back” portfolio of processing fluids and coatings offered for seamless and welded tube and pipe manufacturing processes. On the front end, Quaker provides fire-resistant hydraulic fluids, speciality greases, hot forming and rolling lubricants, and metalworking fluids for roll forming, cutting, and hydrotesting. At the back end, Quaker provides a wide range of temporary corrosion preventives and transport coatings, including high solids solvent-based coatings, fast-drying, low-VOC, water-based coatings and UV coatings. Combined with Quaker's process expertise, the comprehensive “front-to-back” solutions can bring opportunities to lower the total cost of ownership during manufacturing of tubular products.

**Quaker Chemical Corporation – USA**

Website: [www.quakerchem.com](http://www.quakerchem.com)

## Welded tube

SAPA Welded Tubes, part of Sapa's precision tubing business area, operates in the field of aluminium welded tube solutions for a wide spectrum of HVAC&R, automotive and other industrial products. The company states that, as an experienced developer and manufacturer of aluminium welded tubes, it aims to meet and surpass customers' expectations.

**Sapa Precision Tubing Lichtervelde NV – Belgium**

Website: [www.sapagroup.com](http://www.sapagroup.com)

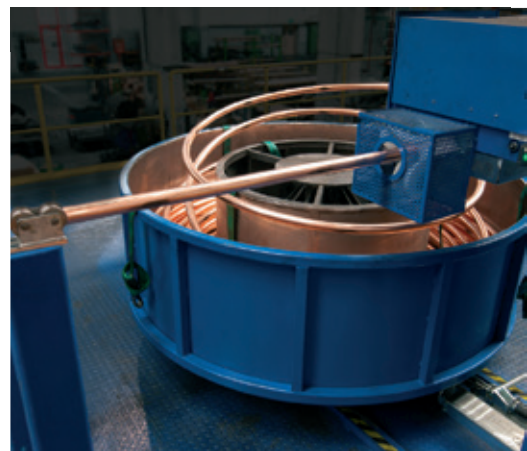


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## Heavy-duty pipe bevelling machines

TAG Pipe Equipment Specialists has announced the global release of its new line of ID locking pipe bevelling (end prep) machines. The Prep series is TAG's latest innovation in bevelling technology, and has been developed from over 30 years' experience in the industry.

TAG Pipe states that, as a company that prides itself in maintaining its market position, it is constantly evaluating its products, modifying and improving based on customer feedback, experience and requirements.

The flagship machine in the new range is the Prep 24. Covering a range of 7 to 24" pipe, it has been designed to suit the arduous conditions and materials faced by pipe fabricators. With a removable centre shaft for rapid and simple set up in the pipe, the revised, lightweight, yet heavy duty six-point locking system, together with new motors (3,200W electric or 3.5Hp pneumatic) and an uprated gearing system enable the Prep 24 machine to bevel pipe of almost any wall thickness, and any material.

*TAG Pipe's Prep 24 pipe bevelling machine*



For high volume repetitive work where consistent, high quality machine finish bevels are required, the TAG Prep series of bevelling machines are a solution for any job site or workshop application.

TAG Pipe's range of equipment also includes portable pipe bevelling machines; portable pipe cutting and

bevelling machines; pipe alignment clamps; pipe stands and pipe handling equipment; pipe purging equipment; and plate bevelling machines.

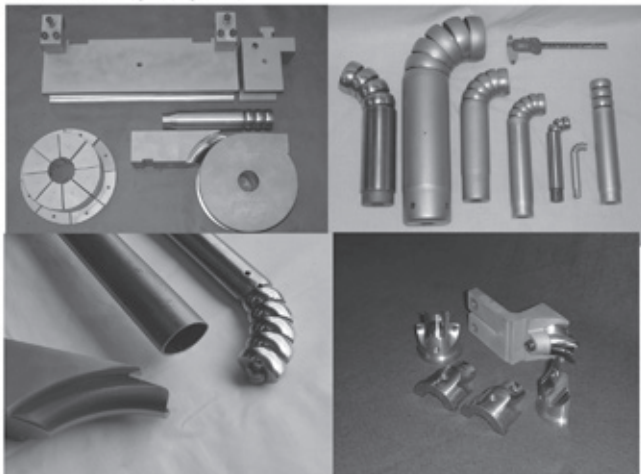
**TAG Pipe Equipment Specialists Ltd**  
– UK  
Website: [www.tag-pipe.com](http://www.tag-pipe.com)

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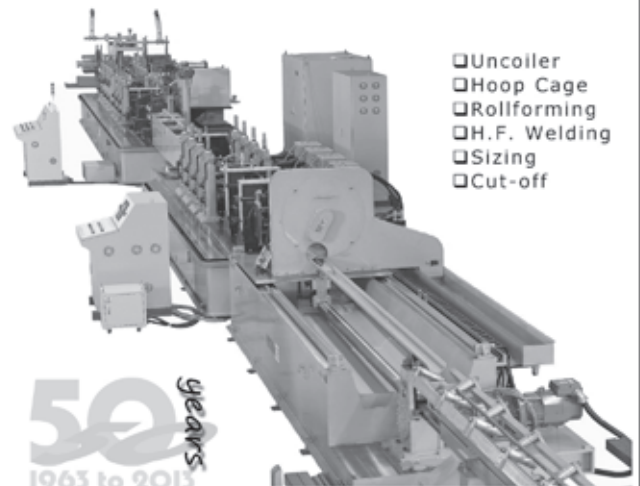


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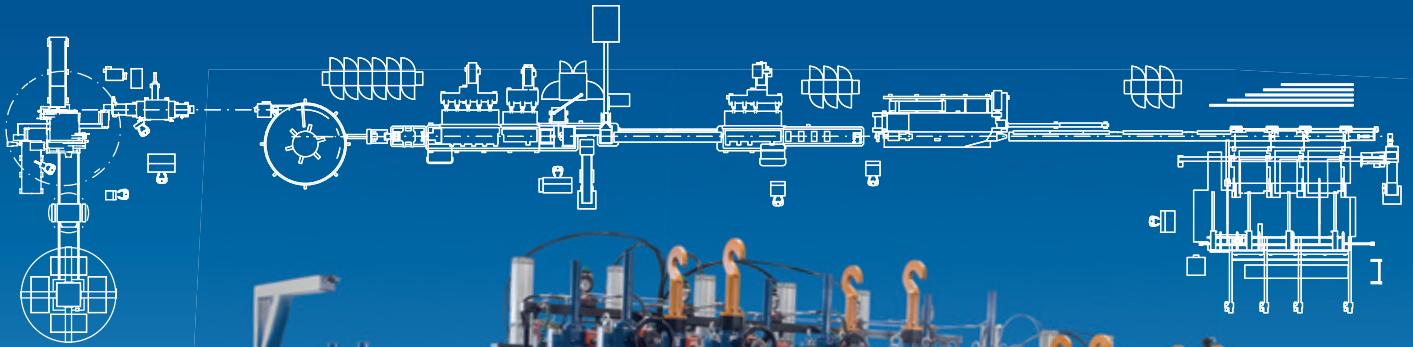
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## Tube end-forming equipment

MANCHESTER Tool & Die has introduced a Servo Roll Former for tube OD capacity of  $\frac{3}{4}$ ". The Servo Roll Former can be tooled for either rolling or cutting operations, and features servo-driven ball screw roll forming unit and quick and easy machine setup.

The roll former offers the same industrial package as the company's model 24008-HS grooving machine.

Manchester Tool & Die supplies tube end-forming, grooving and crimping machines and tooling to a variety of industries, with machines ranging from

$\frac{3}{16}$ " to 3" OD capacities. Standard and custom-built machines and parts can be manufactured to meet customer applications. The company's manufacturing facility is available for customers' production machining needs, such as CNC and manual turning, CNC and manual boring, CNC milling, grinding and wire EDM. Steel fabricating services are also available.

**Manchester Tool & Die, Inc – USA**

Website:

[www.manchestertoolanddie.com](http://www.manchestertoolanddie.com)



*The servo roll forming machine*

## Electric bevelling – end preps where air is unavailable

ESCO Tool has introduced a new portable end prep tool that is suitable for metal fabricating shops and other applications where compressed air is not available.

The Esco Millhog® Mini electric pipe bevelling tool features an 1,800W, 110/230 VAC, 40-60Hz motor and a self-centring draw rod mechanism that rigidly mounts into a tube or pipe ID. Developed for end prep applications where compressed air is not available, it uses the same wedge-lock blade locking



system as the air-powered model and pulls a thick chip without oils.

Suitable for boiler tubes and pipes from 31.8mm ID to 168.3mm OD, the bevelling tool has two-speed operation: low speed (18 rpm) for stainless steel, P-91 and exotic alloys; and high speed (60 rpm) for mild and carbon steels. It can perform any angle of prep, including compound bevels and J-preps.

**Esco Tool – USA**

Website: [www.escotool.com](http://www.escotool.com)

## The next Generation of Carbide Tipped Tube Mill Saws have arrived.

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## Producing and testing stainless steel tube to meet rising demands

MAGNETIC Analysis Corp (MAC) Echomac® ultrasonic inspection systems are being used by a number of tube manufacturers who supply steel tube for heat exchanger applications. A recent installation at Ratnamani Metals & Tubes Ltd, a steel tube producer in

India, is testing welded stainless steel heat exchanger tube to meet industry standards.

The system incorporates an Echomac ultrasonic instrument with an ultrasonic rotary containing eight transducers – two for detecting longitudinal defects, two for

transverse, three for wall thickness and OD/ID measurement, and one for water temperature compensation to enable dimensional measurement. This is the second system of this type that MAC has supplied to the company. Both are operating very satisfactorily, according to the company.

MAC has also supplied several ultrasonic test systems to Schoeller Werk in Germany, to inspect heat exchanger tubing made of stainless steel and titanium alloys. In addition to detecting defects, the company uses these test systems to provide quick feedback to the operators on any changes taking place in the welding process. One system incorporates seven ultrasonic channels, while the other includes 14 channels. MAC also supplied a complete inlet table and outlet conveyor.

Eddy current test systems are also generally required to inspect any tubing that is to be used for fluid transmission. When using eddy current technology, care must be taken when testing 300 series welded tube. Generally, the 300 series is close to being non-magnetic, while the 400 series is much closer to being magnetic. However, where 300 series tube is being welded, the weld can become 'delta ferritic', which creates permeability noise that will interfere with an eddy current test. This problem can be solved by 'saturating' the tube by means of a direct current coil, which MAC can supply. When this is done, the permeability becomes relatively uniform and the noise is minimised. It is also possible to avoid the permeability noise by testing the product after it has been annealed.

**Magnetic Analysis Corp – USA**  
 Email: [info@mac-ndt.com](mailto:info@mac-ndt.com)  
 Website: [www.mac-ndt.com](http://www.mac-ndt.com)



*Echomac ultrasonic inspection system*



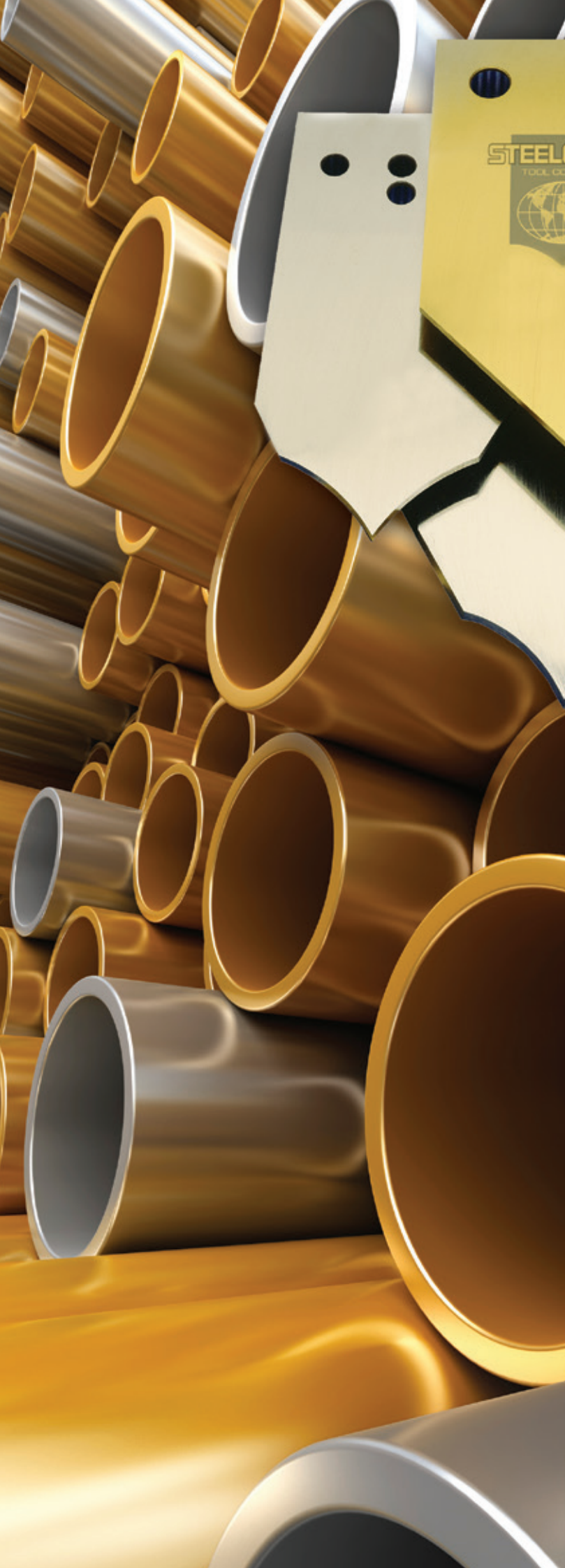
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## DataLogger goes wireless

MCELROY has brought wireless capability to the DataLogger® 5 to give pipe fusion operators the ability to upload data to the DataLogger Vault, where it can be reviewed and analysed in real-time from anywhere in the world.

Fusion data can now be uploaded instantly from the field via Wi-Fi or cellular, and reviewed and analysed the same day.

Fusion operators no longer have to physically connect the DataLogger to a PC to extract the information, a process that some operators may delay for days

or even weeks after the fusion joints are made, which is usually too late to easily address any potential concerns.

“Data logging is being required on more and more job sites to verify pipeline integrity,” said McElroy CEO Chip McElroy. “We are happy to offer tools that allow fusion operators to do this as easily and efficiently as possible.”

The wireless feature takes advantage of in-field connectivity to provide benefits such as expedited workflow, real-time oversight on the job and real-time joint analysis. McElroy launched

the latest-generation DataLogger 5 and the DataLogger Vault software application to provide users with the most up-to-date quality assurance tools. The DataLogger records and documents the key parameters of the pipe fusion process. In addition to full support for Wi-Fi and cellular networks, its features include GPS stamping, barcode scanning and a 5MP camera.

**McElroy Manufacturing, Inc – USA**

Email: [fusion@mcelroy.com](mailto:fusion@mcelroy.com)

Website: [www.mcelroy.com](http://www.mcelroy.com)

## Marking and NDT products

MARKTEC, established in 1955, specialises in marking products and non-destructive testing products. Customers include companies in the steel, automobile and plant industries.

Features of the company's marking equipment and consumables include

high-speed automatic marking, up to 4.6m/sec; high-quality distinct dot-matrix marking which lasts semi-permanently, even in an outdoor condition by using special paint; Drop-On-Demand does not need excess paint or thinner for proper adjustment; special paint is

environment-friendly with low toxicity; and no need of thinner reduces vapour diffusion.

**Marktec Corp – Japan**

Email: [cho@marktec.co.jp](mailto:cho@marktec.co.jp)

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## Plasma annealing for automotive and heat exchanger tubing

TUBES for the automotive industry and heat exchanger tubing are made of various materials and sizes. Copper, galvanised steel, stainless steel, nickel alloys, aluminium, or composite material are all used in automotive and heat exchanger applications. The sizes also vary with ODs over 1" and over. For such a varied product range one has to adopt a variety of different annealing and surface cleaning techniques.

Most of the above product range can be heat treated and degreased also with plasma. Plasma annealing has been gaining increasing interest among tube manufacturers in the automotive and heat exchanger sector. Plasma annealing can be used for production of tubes made from the mentioned materials and sizes.

The advantage of using plasma as opposed to a conventional furnace is high rate of power input, which translates to high process speeds. Plasma annealing can be performed in-line with tube welding or drawing substituting multiple lines of a traditional tube furnace. It can also be used for a brazing step in double-wall tube production. Braking system and fuel delivery tubing in a car are typical applications where plasma can be used effectively.

Plasma annealing or surface treatment is conducted in a protective atmosphere, which results in superior surface quality of the finished tubes. Ion sputtering on the material surface results in fine dry surface cleaning and surface oxide removal, which have proved beneficial to applications with demanding surface requirements. A range of inert gases or

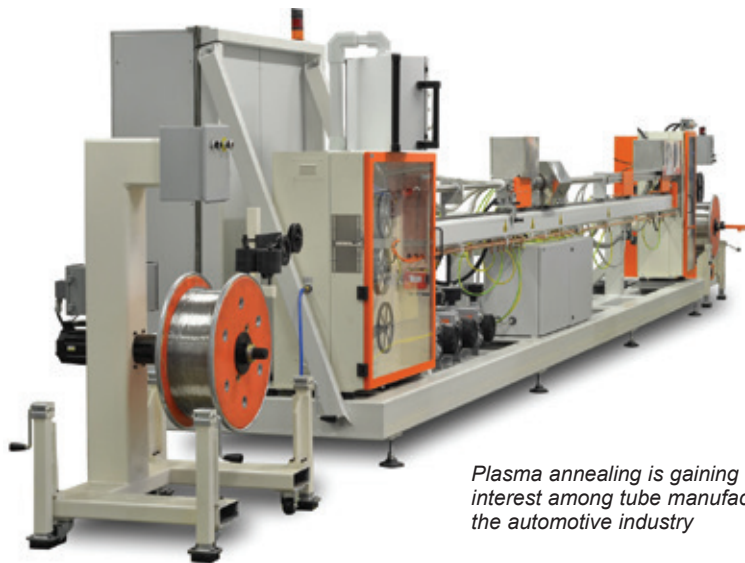
their mixtures can be used for purging of plasma machine. Hydrogen, nitrogen and forming gas are the most commonly used gases while helium and argon are used in specific applications. The choice of gas is important as it impacts the surface finish of the processed material. Many applications with demanding surface quality can be found in heat exchanger, aviation, automotive and medical sectors.

Plasma treatment can be used also for surface activation. Plasma annealed tube surface remains active and susceptible to coating, whilst still in protective atmosphere. Plasma annealer or plasma cleaner can therefore run immediately in-front of a coating or plating line in order to avoid the use of chemicals for surface preparation. Plasma annealer features

compact design, high energy conversion efficiency and low gas consumption, and gives the operator the ability to target mechanical properties with a great degree of accuracy. Rapid heating and reduced time of recrystallisation results in fine grain size with uniform crystal structure. This in turn improves material formability, and its susceptibility to bending and further drawing.

Plasma annealer can cold start production in few minutes and can be stopped immediately. This avoids the lengthy heating-up and cooling-down times and associated energy costs that are symptomatic of a conventional furnace.

**Plasmait GmbH – Austria**  
Email: [info@plasmait.com](mailto:info@plasmait.com)  
Website: [www.plasmait.com](http://www.plasmait.com)



*Plasma annealing is gaining increasing interest among tube manufacturers in the automotive industry*



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# SMF enjoys faster throughput with TruLaser Tube 7000

WHEN Leicester-based sheet metal fabrication shop SMF UK had the opportunity to replace its existing Tubematic tube laser cutting and profiling machine, the company had no hesitation in returning to Trumpf. Reliability, capability and support steered the company towards a new TruLaser Tube 7000, one of the first in the UK. According to SMF, the upgrade has brought many benefits, including three to four times faster loading and set-up.

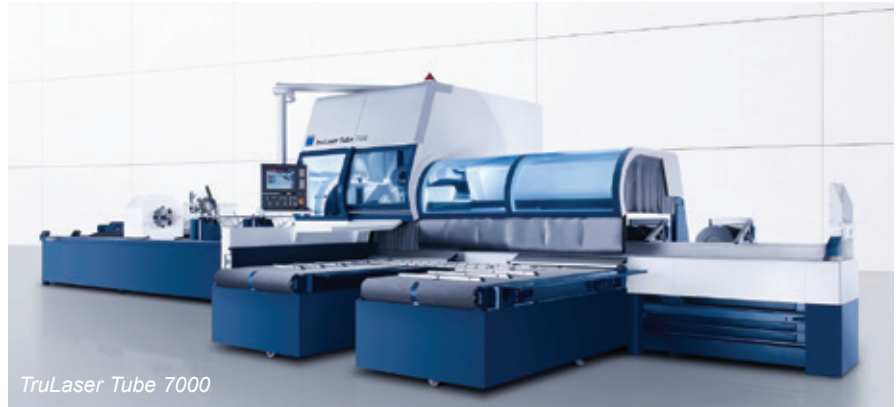
SMF is a ten man subcontract fabrication shop with a good spread of work that includes everything from electrical control cabinets and machine guards, through to architectural metalwork and parts for spacecraft. Formed in 1990 by current managing director Steve Morrison and his brother, the company had been running a Trumpf Tubematic successfully for many years.

"The machine was still very capable, however, the advent of the RGF (Regional Growth Fund) and 100 per cent capital expenditure allowances made the jump to the latest technology more achievable," explains Mr Morrison. "And we're very glad we did, it is a wonderful machine."

Whereas operators previously struggled loading 7.5m lengths of tube using the Tubematic, the TruLaser Tube 7000 can accommodate 9m lengths with ease. Add the machine's five-axis head and its ability to accommodate tube up to 250mm diameter rather than 150mm previously, and it is easy to see the positive impact made by the TruLaser Tube at this progressive manufacturing business.

Mr Morrison said: "We're mainly using the machine to produce point-of-sale products for the retail sector, from both round and square tube, largely from mild steel with 1.2 to 3mm wall thickness. However, we also process a reasonable amount of 6mm stainless steel for the architecture market. The machine cuts all of our work superbly, and gives very good yield."

Installed in January 2014, the machine – which is able to cut tube with wall thickness up to 8mm – was selected after SMF carried out a benchmarking exercise involving a



TruLaser Tube 7000

number of potential suppliers.

"We looked at all of the alternatives, but concluded that there wasn't a machine on the market that came anywhere near the Trumpf tube machine for capability," said Mr Morrison. "The machine is much quicker for programming and loading than anything else we saw. Furthermore, we can have three or four jobs done on the TruLaser Tube 7000 in the time it took to load one job on our old Tubemaster. Also, whereas adjustments to the rollers and bridge supports were done manually on the Tubemaster, they are all now completed automatically."

Stepped rollers on the TruLaser Tube 7000 that provide both support and lateral guidance for the tubes adjust automatically to the diameter of the workpiece, while the self-centring clamping jaws also adapt automatically to the tube's geometry. Furthermore, the FocusLine regulation mechanism keeps the laser's focal position constant, adjusting it automatically to suit the type of material being processed and its thickness. The machine's software activates the laser parameters as necessary, depending on which tube is being processed.

Three people at SMF are trained to use the TruLaser Tube 7000, which according to Mr Morrison has been extremely reliable since it was installed.

"When SMF started in 1990, the company had only a circular saw, a radial drill and a welding machine. Now, aside from its TruLaser Tube 7000, the company has a Trumpf TruLaser 5030 fibre laser profiling centre, a Trumpf TCL 3050 laser cutter with 6kW resonator, and a Trumpf TruMatic TC200R

punching machine. Also offered are waterjet cutting, forming, welding and powder coating.

**Trumpf – UK**

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## New 4,000-bar direct-drive pump

WITH a 4,000 bar operating pressure yet low energy consumption, the new Woma EcoJet 70M 4000/4 is a cost-saving, ultra-high pressure, direct-drive pump for waterjet cutting system operators. Its compact dimensions mean that the unit with its plunger pump is easily installed in new or existing systems. The EcoJet 70M 4000/4's plunger pump uses very little oil and runs very quietly, with a

noise rating of just 80 dBA. The direct drive uses up to 30 per cent less energy. These are significant improvements on the performance of pressure intensifier units. The EcoJet is suitable for abrasive and pure water cutting and can also be retrofitted into waterjet cutting systems for metal, stone and plastics.

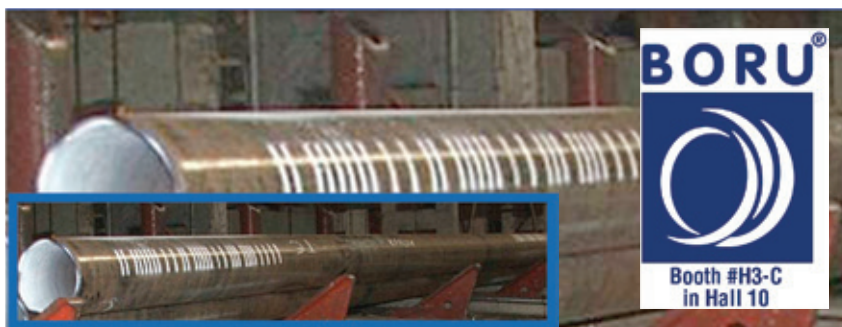
Waterjet cutting uses a very fine jet with an optimal combination of pressure,

water quantity and nozzle. The jet can cut at a very high speed, producing an edge-free cross-section and few shavings. Multilayer material can also be cut without problems and is not crushed in the process. Furthermore, the EcoJet is barely heated with the use of water, so the process is also suitable for use with heat-sensitive materials that would melt or change in shape if they were sawn.



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The new Woma EcoJet 70M 4000/4

## Bending tools

BEND Tooling Inc has supplied companies around the world with tube-bending tooling since 1986. It produces die sets, mandrels, and wipers for rotary-draw tube-bending machines for most makes and models. The company states that the precision machining of its tooling eliminates hand-working, improves quality and shortens lead times.

The company also develops modern inserted mandrels and wipers. Its inserted designs are claimed to be favoured by production tube-bending operations in the automotive, sports vehicle, HVAC and hydroforming industries, and are widely used by speciality tube-bending companies because of their consistency in specification, which facilitates frequent changes in setup.

Bend Tooling Inc – USA

Website: [www.bendtooling.com](http://www.bendtooling.com)





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[fivesoto@fivesgroup.com](mailto:fivesoto@fivesgroup.com)



## Increase in pipe-cutting reliability with new split-frame technology

ENERGY sector portable machine tool specialist Mirage Machines, an Acteon company, has achieved a step-change in the operational efficiency and reliability of cutting technologies for pipeline and plant fabrication manufacturers and contractors in the international energy sector.

Rising fabrication and maintenance project activity, including works on wellhead, riser and caisson assemblies, has significantly increased demand from construction yards, operators and dutyholders for new pipecutting technologies across the Americas, EMEA and Asia-Pacific.

UK-based manufacturer and supplier Mirage Machines has evolved split-frame machine technology with the development of its MSF (Mirage Split-Frame) machine, which is claimed to improve the efficiency of pipecutting operations on infrastructure composed of heat-resistant, stainless and Super-Duplex metals.

Mirage has developed innovative new self-squaring capability for the fully-portable MSF, reducing the risk of installation error during operations and significantly shortening the setup process, maximising the operational run-time of its equipment.

Richard Silk, managing director of Mirage Machines, says the MSF technology has applications in every energy-producing region, and is already being shipped worldwide to meet rising demand generated by capex and opex projects in new and existing oil and gas infrastructure.

"The pipecutting marketplace is a significant slice of the portable machine tool supply chain, yet until now the technology has not moved forward. The

*The MSF technology from Mirage Machines*



majority of machines in use have been based on an operational design which hasn't evolved in 30 years," he said.

"We designed the MSF to bring about the step change the industry needs – reducing the weight of the machine while improving its technical capability, giving operators and service companies a more reliable, durable pipecutting tool which delivers excellent accuracy, without interruption, at any scale.

"Due to the level of global demand, we have already increased our manufacturing capability at our headquarters in the UK to deliver work-ready MSF machines

across the regions, and have focused on being able to supply from stock in the US and Australian markets to ensure that Mirage customers can respond quickly to the industry's needs."

Mirage Machines designs and manufactures technologies for applications including drilling and tapping, flange facing, hot tapping and line stopping, line boring, milling and gantry milling, orbital milling, and pipe and casing cutting.

**Mirage Machines – UK**  
Website: [www.miragemachines.com](http://www.miragemachines.com)

## Cutting tools and sawblades

CALEYRON Industries has specialised in the manufacture of cutting tools since it was established in 1933.

The company produces solid carbide and HSS circular sawblades and circular knives, as well as TCT sawblades, from 20 to 600mm in diameter.

The new generation of circular sawblades provides a solution to the cutting of all available steels and non-ferrous metals.

Surface coatings are recommended for better performance and longer tool life, especially when cutting conditions are demanded.

These blades allow higher cutting speed and feed rates as well high output.

**Caleyron Industries SAS – France**  
Fax: +33 477 352 464  
Email: [caleyron.ind@caleyron.fr](mailto:caleyron.ind@caleyron.fr)  
Website: [www.caleyron.com](http://www.caleyron.com)

## New flaw detector ranges

SONATEST Ltd has launched the latest range of the SITESCAN and MASTERSCAN series of flaw detectors. Retaining the best features of the established series, the new range has evolved in response to the requirements of users and their applications, combining simplicity of use with improved capability and field-proven reliability.

The user now has the freedom and flexibility to customise their instrument to fulfil their preferences and meet their application demands. All units are field upgradeable. New and standard software options can be customised to meet the needs of the project, as can the hardware of the instrument – either the traditional table-top style case or the more recent hand-held portable case with rotary wheel menu driver.

The flaw detectors offer new features to boost the productivity of the inspector. Customisable and intuitive menus create a smooth workflow for the operator and, together with improved 4GB of data storage, simplified PC interfacing and new UT-lity reporting software, the post-inspection report writing and



SITESCAN 500S

result processing is enhanced. The new range consists of four models: the SITESCAN 500S and D-50 offer entry level broadband UT performance, and the MASTERSCAN 700S and D-70 provide high specifications, including eight filter settings from 100kHz to 22MHz, with 100-450V square wave transmitter and 20m range.

DAC functionality, available on all models, now enables up to three custom DAC curves on-screen, meeting all known worldwide standards. Adjustable DAC curves increase the available dynamic range, and using the same reference indications DAC curves can

now be converted to TCG and back again with ease. The unique Split DAC option gives up to three zones of additional gain to permit single-pass scanning of lossy materials and thicker sections.

Angle measurement mode is a new standard feature that simplifies beam plotting. Using the built-in peak detection mode, the beam profile for any transducer can be confirmed in moments. The introduction of a corrosion software option improves reliability over spot-thickness measurements and includes a B-scan display function that shows a cross-section of the material being tested based on its wall thickness.

A-scan data can be stored with the thickness readings and transferred to a PC using the new UT-lity Pro data management software. UT-lity Pro also provides the user with the ability to create and manage inspection plans, location notes, historical data and other asset management information.

**Sonatest Ltd – UK**  
Email: [sales@sonatest.com](mailto:sales@sonatest.com)  
Website: [www.sonatest.com](http://www.sonatest.com)

## New circular saw blade from Japan

HSS saw blades are widely utilised in the ERW pipe industry but recently there have been cases where TCT saw blades are used because materials such as high tensile pipes and thick wall pipes are required more by industries.

Regarding cutting condition, blade rim velocity is set between 250 and 400m/min, which is a very high speed compared with normal steel sawing. For

conventional sawblades, the sawing condition is quite severe because the weld scarf (bead) remains in the pipes and saw blades are damaged as they catch the weld scarf. Kanefusa's Tube Max Scarf has been designed to avoid this problem.

The three main features of Tube Max Scarf are tough tooth shape against weld scarf; new design of embedded

tooth; and new gullet shape. Even if the weld scarf is caught, highly damage-resistant teeth prevent the tooth and shoulder from being broken. According to in-house data the breakage rate has reduced compared with conventional saw blades.

**Kanefusa Corporation – Japan**  
Website: [www.kanefusa.net](http://www.kanefusa.net)

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## Adaptable high-performance circular sawing line

FEATURES of the new HCS 180 multi-fluid circular saw from Behringer Eisele include a new machine base and optimised chip disposal. For the division of high alloyed heat-resistant steels greater than 1,200N/mm<sup>2</sup>, the HCS 180 MF provides a hybrid of tried and tested saw technology with a high degree of variability and adaptability.

In line with the specific machining assignment and saw cutting requirements, a range of special possibilities are offered, from workpiece cooling using emulsion and the use of a microspray system, to active saw blade cooling for dry cutting applications.

The circular sawing line is configured for workpiece diameters of up to 180mm. The standard speed range of 20 to 250 rpm provides scope for almost any type of sawing assignment.

The machine concept has been optimised to permit extended functionality for wet and dry cutting. A new chip conveyor with integrated coolant reservoir and coolant pump, for instance, ensures the rapid disposal of produced chips and coolant. For cleaning it can be easily pulled out of the machine.

The machine has also been made more rigid, in order to improve vibration dampening. The new saw blade guide, with blade vibration absorber (BVA) and



Behringer Eisele's HCS 180 MF

active chip cleaning concept, provides a bonus in terms of saw blade lifetime coupled with an improved cutting surface for precise, rapid cuts, whether working wet or dry.

As a fully automatic circular saw, the HCS 180 MF focuses on maximum yield, but without neglecting production-specific, flexible integration into

downstream production processes. Different infeed and discharge systems, and link-up to magazines and storage systems, ensure independence from set night and day shift working.

**Behringer GmbH** – Germany  
Email: [info@behringer.net](mailto:info@behringer.net)  
Website: [www.behringer.net](http://www.behringer.net)

An advertisement for DWT GmbH. The background shows several large metal pipes with beveled ends. In the foreground, there is a close-up of a hand-held beveling tool. The text is overlaid on the image.

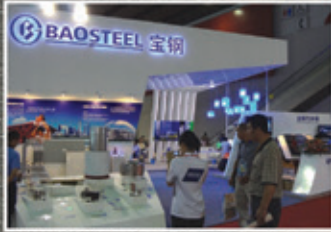
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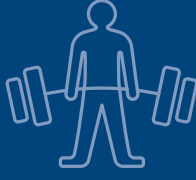
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## New draw cell built by Bültmann

A NEW machine has been designed and built for the drawing of copper tubes up to 140mm in diameter. The double 600kN draw bench works at a drawing speed of up to 60m per minute and the drawing length amounts to a maximum of 11m.

The installation is equipped with tube charging and separation equipment, draw bench with chain drive, prebench as electrically lifting table, die stand, drawing carriage with internal and external gripper systems, tube brake, discharging and re-charging devices for drawn tubes and a cradle for finished material.

The special features and highlights of the installation are high efficiency and production flexibility; automatic inserting of mandrels with centring device; automatic dimensional adjustment; hydraulic controls of mandrel rod and closing gripper; internal lubrication of tubes; drawing carriage with quick changing system for working with external or internal gripper system; product quality and efficiency; manipulation of tubes without drop height, thus careful and low-noise handling; all supporting elements for the tubes are covered with plastic material; mainly electric drives are used for controlling the machine's movements; and efficient and low-maintenance AC motors for drawing drive and all auxiliary drive.

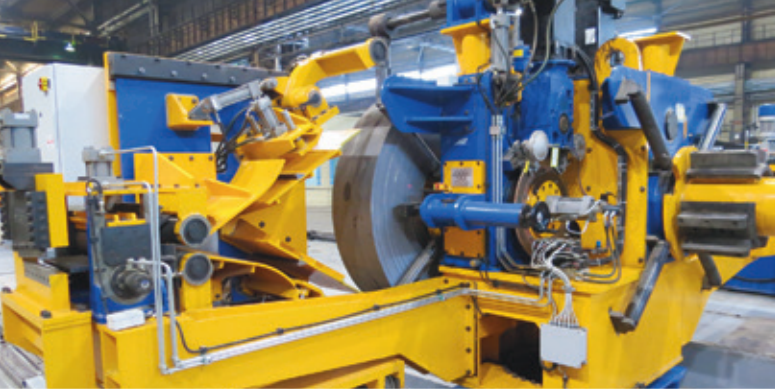
Two different diameter reductions may be simultaneously drawn on this special drawing equipment. Due to the re-charging system, one of the drawn tubes can immediately be returned to the pusher track for a second drawing cycle. The drawing machine is characterised by a compact and clear design, ensuring small movements and good accessibility.

**Bültmann** – Germany

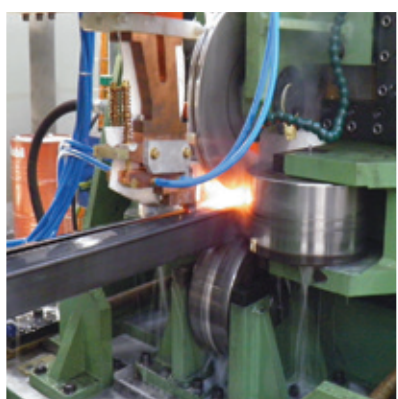
Website: [www.bueltmann.com](http://www.bueltmann.com)



The machine can draw copper tubes up to 140mm in diameter



# **TUBE MILLS**



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## Xiris releases new generation weld camera

XIRIS Automation has released the new Xiris XVC-1000 weld camera. The system includes a 140+dB high dynamic range capability with power over Ethernet. Complete with a full suite of welding-specific imaging software tools,

and a host of unique features, this small camera provides image quality of a variety of welding and laser processes.

The XVC-1000 comes packaged with functionality designed to maximise image quality and reliability, including

image triggering, general purpose I/O, imaging window capability and a weld arc photodetector. Weighing 135g without optics, the system is easily integrated and highly effective. With this system Xiris has also released the Xiris WeldStudio Viewer that allows for customisation of automation systems and easy integration.

Xiris Automation Inc specialises in developing optical equipment used for process and quality control across a number of speciality industries. With an extensive product line, Xiris provides some of the world's most dynamic manufacturers the ability to detect, recognise and interpret quality defects in their manufactured goods.

**Xiris – Canada**  
Email: [sales@xiris.com](mailto:sales@xiris.com)  
Website: [www.xiris.com](http://www.xiris.com)

## New purge products

SUMNER Manufacturing has introduced two new purging products: Nylon Expansion Plugs and the Purge Buddy. Both products are suitable for purging oxygen from weld chambers, and can also be used to seal pipe as pipe plugs or drain stoppers.

Nylon Expansion Plugs are available in a range of sizes from 17 to 100mm (¾" to 4"). A 150mm (6") Aluminum Expansion Plug is also available. The plugs can be ordered individually, in sets of two, or as a kit complete with storage case (the kit does not include the 6" Aluminum Expansion Plug). Each Expansion Plug has a hollow shaft making them suitable for purging. The Purge Buddy is similar to inflatable purge dam products, but has a single inflatable bladder instead of two inflatable bladders connected by a stainless steel hose.

**Sumner Manufacturing Co, Inc – USA**  
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# Detection systems for copper and copper alloys

CONTROLE Mesure Systèmes (CMS) designs, develops and manufactures quality and productivity solutions for all industrial applications, for ferrous and non-ferrous metals. Its NDT range of products in eddy current and ultrasonic testing methods include high-performance instruments and systems, probes and transducers, accessories, and complete turnkey machines with associated mechanics. Applications for copper and copper alloys tubes include detection of swimmer position inside the tube during the manufacturing process; eddy current defect detection on double wall tubes; and junction detection on copper alloys on double wall tubes with six eddy current Zet@ Micro instruments, managing 12 lines simultaneously.

CMS also provides other NDT systems for tubes in steel, stainless steel, carbon steel, titanium and zirconium. All systems meet quality standards such as API, ASTM and DIN, and can be used on-line and off-line.

**Contrôle Mesure Systèmes – France**  
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*Junction detection in 12 lines simultaneously, with six eddy current instruments*

# Fast cutting of stainless steel tube

KINKELDER'S newly developed carbide-tipped saw blade is aimed at setting a new standard for fast cutting of austenitic stainless steel tube.

High-performance cutting of 300-series stainless steel tubes with a wall thickness of 3-6mm is the primary area of application for this type of saw blade. Based on a constant, conservative cutting speed of 80m/min and constant tooth load of 0.06mm/tooth, the new Kinkelder Connexioncut 4 (CX 4) saw blade range cuts 60 x 4mm tube in under four seconds.

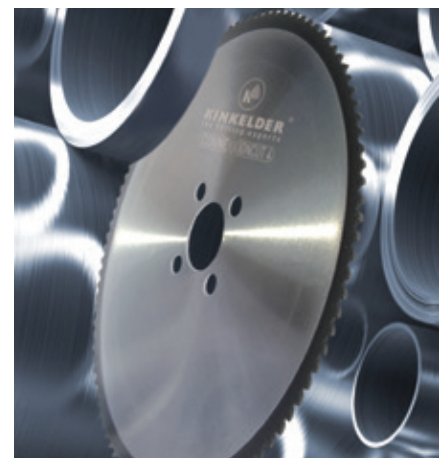
With these parameters, a steady blade life of 3 to 4m<sup>2</sup> is reached. "That's at least twice as fast and twice the blade life as what's normally being achieved with HSS saw blades," said Dave Hiddink, application engineer at Kinkelder BV. "The cutting surface is virtually burr free,

which is similar to what can be achieved with HSS saw blades."

With CNC machines, which allow applying of variable cutting speed and variable feed rate, even shorter cutting times are possible. "We applied cutting speeds of 120m/min and a tooth load of 0.1mm/tooth and achieved well over 2m<sup>2</sup> cutting surface on tube 60 x 4mm (3,000 cuts) without compromising the cutting surface."

Commenting on his own experience, Mr Hiddink said, "While cutting 3,000 tubes 60 x 4mm normally takes two shifts when using a HSS saw blade, the CX 4 saw blade does the job in one shift. This effectively means the cutting tool has easily paid for itself."

Connexioncut 4 saw blades are available in diameters from 225 to 630mm for both stationary and flying cut-off applications.

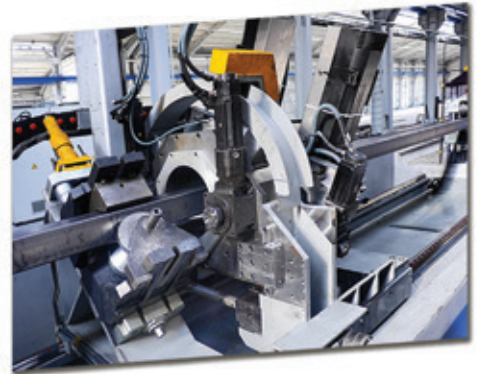


*Connexioncut 4 carbide-tipped blade*

**Kinkelder BV – Netherlands**  
Email: [info@kinkelder.nl](mailto:info@kinkelder.nl)  
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## BSA expands rental fleet

BSA TUBE Runner, a UK-based manufacturer and supplier of specialist tube and pipe working tools, has added a hydraulic stub puller to its extensive range of rental equipment.

The CP-1000-S, one of the lightest and fastest stub pullers on the market, has been specifically engineered by BSA for use with its Javelin pneumatic

driven, hydraulic power pack. This fully pneumatic system provides a compact and reliable solution for both on-site and workshop use.

When re-tubing heat exchangers, chillers or condensers this equipment will efficiently remove the tube stubs from the tube sheet, while offering claimed productivity and safety benefits

over traditional methods of collapsing the stubs or knocking them out using a chipping hammer and drift.

The unit has been designed to remove both ferrous and non-ferrous tubing, and has the capacity to pull 5/8" to 1 1/2" OD tubes from tube sheets up to 2" thick, at a rate of up to eight stubs per minute. The system uses an expanding 'collet' arrangement that automatically grips the tube stub and pulls it in one movement, removing the need for the pulling mandrel and impact wrench normally associated with hydraulic tube pulling machinery.

BSA Tube Runner has over 30 years of expertise in the manufacture and supply of machinery and equipment for the manufacture, reconditioning and refurbishment of heat exchangers. Following changes in the marketplace during recent years, the company continues to invest in its rental operations – an area that has grown steadily over that time.

In addition to the stub puller, the company's rental fleet includes pipe bevelling machines, 'continuous' tube pullers of various sizes, pneumatic tube expander drives and other associated equipment.

**BSA Tube Runner Ltd – UK**

Email: [tuberunner@bsa-regal.co.uk](mailto:tuberunner@bsa-regal.co.uk)

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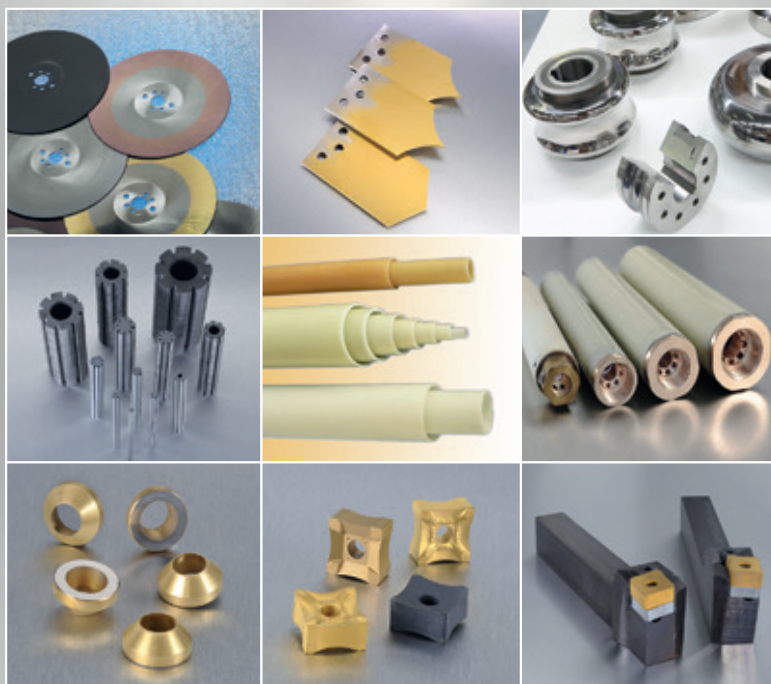
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## Small bore coils

A NEW heat exchanger manufacturing process from Power Fin Technologies makes prototyping and small to medium batch production of small bore coils easy and affordable.

The Infinity machine can produce a coil of any two similar or differing materials using round or elliptical tubes. The process swages multiple fins into position on tubes as small as 3mm diameter. This mechanical bond requires no heat, expansion or lubrication. The work occurs on the outside of the tube, causing no deformation of the base tube – imperative when tubes have an enhanced inner surface.

In HVAC applications, price, compactness, light weight, thermal efficiency, high pressure, reduced coolant or refrigerant, strength, recyclability and corrosion resistance are all features of aluminium small bore coils that can create benefits for manufacturers and end users.

Power Fin Technologies commented that two all-aluminium coils created great interest when displayed on the booth of aluminium tube manufacturer Sapa, at the Chillventa 2014 exhibition in Nuremberg, Germany. One was made using a 5mm round tube, while the other was made using elliptical tube with enhanced internals. Both were made on the same Power Fin Infinity machine.

The company's ability to fin elliptical tubes reduces air-side pressure drop, while the smaller internal capacity relative to the equivalent circumference of round tubes improves heat transfer. Small bore stainless steel heat exchangers, suitable for use in fuel cell or heat pump applications, can also be made on the same Infinity machine, as can coils using, but not limited to, copper or titanium.

A complete fin line system from Power Fin Technologies includes a de-coiler, press, tooling, guillotine and Infinity machine. The Infinity machine is also available separately.

**Power Fin Technologies – UK**

Fax: +44 1675 467 675

Email: [info@powerfin.co.uk](mailto:info@powerfin.co.uk)

Website: [www.powerfin.co.uk](http://www.powerfin.co.uk)

## Welding lathes

MAVRIX Welding Automation Inc has launched horizontal and vertical welding lathes featuring PLC-based controls. The straightforward terminology of the PLC reduces the learning curve, so operators are quickly ready to weld. With adaptive spindle speed compensation, operators do not need to adjust wire-feed speed or spindle speed to accommodate any change in diameter, and dual-axis step allows for any combination of surface angle. The Mavrix multi-process horizontal lathe is capable of sub arc, open arc and gas-shielded welding processes using a single torch. An on-board second torch is ready for quick changeover for ID bore welding down to 4" ID. Target customers include those who remanufacture slab caster rolls, shell rolls, zinc pot rolls and mandrel bars, as well as other roll options.

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BORU Tube Istanbul is an important date in the calendar for anyone involved in the tube, pipe and machinery industry

with a particular emphasis on trading with the areas of Turkey, the Balkans, Northern Africa, Middle Eastern countries, the Turkic Republics, Russia and Ukraine. The show location in Istanbul, Turkey, offers an ideal central destination for visitors from the many neighbouring countries to conduct trade with Turkey, Western Europe and the Middle East.



## Steel

### **A visionary pedestrian drawbridge lends interest – and then some – to a venerable London waterway**

“For the ubiquity of the mechanism used to operate it, it’s got an ingenious amount of bang for the buck. With a few pieces of expertly crafted steel, some counterweights, and a hydraulic jack, these designers built a bridge unlike any other in the world.”

The assertion, by Kelsey Campbell-Dollaghan of gizmodo.com, is incontrovertible. The structure in question – the Merchant Square Bridge over Paddington Canal in central London – is unique by any reckoning. (“This Hydraulic Bridge Opens and Closes Like a 30-Ton Steel Fan,” 2 October)

The 65-foot-long bridge is divided lengthwise into five distinct steel beams. Each beam is cantilevered out over the canal with a massive counterweight hidden in the ground at one side and controlled by an underwater hydraulic jack. When the bridge is down, the beams lock together to create a 10-foot-wide path across the canal, complete to handrails. When the bridge is raised, the five beams compose a twisted steel form described by its London-based creators, Knight Architects and AKT II, as “a kinetic sculpture.” A respondent to the gizmodo.com article offered another vision: “Edward Scissor-bridge.”

### **ArcelorMittal sees rising demand in US and European steel markets as offsetting a plunge in iron ore prices**

Given the impact on ArcelorMittal’s mining operations of iron ore prices at five-year lows, analysts had expressed concern that the world’s largest steelmaker would temper its outlook for 2015. But in early November the company – which makes about 6 per cent of global steel and is also one of the world’s largest iron ore producers – published a remarkably upbeat forecast.

ArcelorMittal, a benchmark for manufacturing worldwide, did cut its estimate for 2014 global steel consumption growth to 2.25-2.75 per cent from 3.0-3.5 per cent, citing mainly the slowdown in China. But it also made a sharp upward revision of its overall market estimate for US steel consumption, while that for Europe was left little changed. Together the two regions account for about two-thirds steel of shipments by the Luxembourg-based steel group.

“What we say, which is important, is that we are constructive on the US economy and the European economy next year,” the company’s CFO Aditya Mittal told Reuters in Brussels on 7 November, adding that he also sees a steel rebound just ahead in Brazil, which fell into recession in the first half of 2014.

Philip Blenkinsop, who is responsible for Reuters news out of Belgium and Luxembourg, noted Mr Mittal’s assertion that years of plant closures and job cuts had served the steelmaker well in Europe. In the context of an improved steel market overall, the cost and volume improvements would help counter the effects of the price decline in iron ore. (“ArcelorMittal Says Strength in Key Steel Markets Offsets Mine Pain”)

But it is the US, with its increased profit from higher steel shipments and average prices even as fixed costs have risen – buoyed by a broad-based recovery and the building of inventories – which provides ArcelorMittal with the most encouragement. The group, which is double the size of its rivals Nippon Steel and Sumitomo Metal Corp combined, said US steel consumption would be 8.25-8.75 per cent higher this year.

➤ American steelmakers would appear to justify that confidence. Industry leaders Nucor and US Steel Corp have reported strong demand from the auto, appliance, and oil and gas industries, as well as lower energy costs. The domestic construction sector, which uses about half of the world’s steel, has also improved from 2013.

As for its own prospects, ArcelorMittal said that strong demand in key developed markets meant it would maintain its forecast for steel shipments 3 per cent higher this year than in 2014. Iron ore shipments, it said, would be up 15 per cent after the ramp-up of capacity at its mines in eastern Canada.

### **China and Latin America: a sharp rise in imports of Chinese steel turns a spotlight on a complex evolving relationship**

“Latin America is important to China as a source of minerals that the Chinese can convert into products like steel. Latin America is not a major export market for China although that could begin to change in the long term.”

Margaret Myers, director of the China-Latin American programme at the Inter-American Dialogue, a Washington-based think tank, had been asked about the recent increase in China’s steel exports to Latin America. This was, she told Paul Welitzkin of *China Daily USA*, a reflection of a Chinese steel industry in transition and not of pressing immediate concern. (“Steel Exports Unlikely to Strain Sino-Latin American Bond,” 25 October)

Ms Myers’s view is at variance with that of the Latin American Steel Association (Alacero), which in September urged the governments of the region to develop public policies to address steel imports from China.

The trade group – based in Santiago, Chile – reported that these jumped 60 per cent year-over-year over the first seven months of 2014. It said Chile, Brazil and Central America were the main destinations for the Chinese steel, but that imports to Mexico were also rising rapidly.



In 2013, Mexico imposed tariffs on seamless steel tubes from China after a Mexican steel company complained about unfair pricing practices.

Some of the steel exported from China to Latin America in the first half of 2014 could have gone into Chinese projects in the region, suggested Ms Myers. And some, she said, might be tied to increased infrastructure demand from the 2014 World Cup soccer tournament hosted by Brazil and the 2016 Summer Olympics, also scheduled for Brazil.

When she spoke with *China Daily USA*, China was poised to announce an infrastructure fund targeting Latin America and especially Mexico at December's Asia-Pacific Economic Cooperation (APEC) meeting in Beijing. It was expected to work closely with the Mexican state-owned oil company Pemex to help build out the industry.

Ms Myers was also, she said, "hearing talk" that China and the Community of Latin American and Caribbean States (CELAC) were set to announce an initiative that would consolidate several existing lines of credit related to infrastructure development in the region.

➤ Ms Myers told Mr Welitzkin, a New York-based correspondent for the North American version of *China Daily USA*, China's English-language newspaper, "More infrastructure development [in Latin America] will likely mean an increase in demand for products from China."

## Of related interest . . .

➤ China has boosted exports to some Asian countries of steel with the minimal boron content necessary to earn a speciality or alloy steel classification and a generous tax exemption. As reported by Reuters (29 October), Chinese mills can get an export rebate that is five times greater than the cost of adding 0.0008 per cent boron to a metric ton of steel, sparking objections from Indian steelmakers, among others.

In the first half of 2014, boron alloy steel exports from China reached 11.58 million metric tons, according to a government report cited by Reuters. While denying that China is subsidising its steel industry, Li Xinchuang, vice-secretary general of the China Iron and Steel Association (CISA), acknowledged the risk of problems associated with the boron alloy exports.

"There are countries around the world that are very unhappy," Mr Li told a conference in Tianjin in mid-October, as China's overall steel exports were hitting record highs. "But the customers are very happy."

## Automotive

➤ As of 17 October, Kenneth Feinberg, who is directing the assessment of 184 death claims received by the General Motors Ignition Compensation Fund, had approved settlements for surviving families in 29 fatal accidents involving defective ignition switches. Another 27 people had received compensation payments for serious injuries, of 1,333 claims received.

The claims derive from switches installed in GM cars, most from the model years 2003-07. In an instance of death as a result of the defect, if Mr Feinberg deems the claim eligible the victim's family receives a minimum of \$1mn. But the amounts are not capped.

While General Motors hired Mr Feinberg, no company officials are involved in the claims process. GM has estimated that in the end its compensation costs will total between \$400mn and \$600mn.

➤ Having added capacity for building 60,000 more cars per year in Tuscaloosa, Alabama, USA, Daimler can begin making the Mercedes-Benz ML Coupe – a new crossover the German automaker plans to add to its lineup this year. The assembly plant, which commenced production in 1997, will soon be able to turn out more than 300,000 vehicles annually.

Mercedes is the first German producer in the luxury car segment to produce a sedan in the US. Since 1993 the company has invested more than \$4bn in Alabama, including \$2.4bn for the current expansion in Tuscaloosa.

*Detroit Free Press* business writer Brent Snavelly noted that a United Auto Workers organising campaign "continues to simmer in the background" at Tuscaloosa.

Alabama governor Robert Bentley has said that the establishment of a local UAW chapter would impair the state's pro-business environment.

For its part, Mercedes-Benz remains neutral on the issue of union representation at the automaker's only car or SUV plant worldwide that is not unionised.

➤ The next-generation Jeep Wrangler may have an aluminium body and be assembled somewhere other than Toledo, Ohio, USA, where its roots go back more than 70 years to the first Willys MB made for the US Army. Fiat Chrysler Automobiles CEO Sergio Marchionne also hinted at the Paris Motor Show in October that the Wrangler could be built on a unibody structure, rather than body-on-frame.

The US government is requiring automakers to reach a fleet average of 56.5 miles per gallon of fuel by 2025. The next Wrangler, due in 2017, would benefit from an aluminium body as Chrysler works to improve the fuel economy of all its vehicles.

"We need to downsize the engines and then increase the capabilities by putting turbos in," Mr Marchionne said in Paris.

"This requires a complete rethink of the architecture, and before we start committing capital to particular places we need to make sure that we don't spend an inordinate amount of money trying to get it done."

Jeep is the oldest off-road vehicle ever made. As noted by Brent Snavelly in the *Detroit Free Press* (2 October), removal of the Wrangler from Toledo would be a major blow to the city where Jeep, then owned by Willys-Overland, got its start.

The first Jeeps were produced in 1941 for the military. The first civilian models were made in 1945.

## In brief . . .

### A European Union resident visa that comes with the house?

With its offer of a realty-based visa for property buyers from outside the European Union, Portugal evidently holds a strong attraction for Chinese investors.

As noted by *Bloomberg News*, they are the major participants in Portugal's "Golden Residence Permit" programme, which entitles the buyer of property worth at least \$624,000 to live in Portugal and travel freely throughout the EU bloc.

As China allows freer movement of funds into and out of the country, its citizens have been taking advantage of the greater ease of money transfer to pursue opportunities overseas. Even so, the allure of Portugal is remarkable.

According to the Portuguese Real Estate Professionals and Brokers Association, Chinese buyers accounted for almost one in five foreign property purchases in Portugal during the first nine months of 2014.

On the basis of money invested they already represented the biggest group of foreign buyers, Luis Lima, head of the association, told *Bloomberg's* Henrique Almeida in Lisbon (3 November).

## Oil and gas

### Their savings on jet fuel from recent oil price drops are not being passed along by US airlines to the fare-paying customer

According to FareCompare.com, several major US airlines raised fares on many domestic flights in the autumn. As reported by USA Today (21 October), United, American, US Airways and Delta confirmed to the comparison-shoppers site that they matched an industry-wide fare increase of \$2 one way, \$4 round trip. Even low-cost carrier Southwest said it had raised one-way fares by \$2 on some domestic routes.

When airlines boost fares they customarily blame higher fuel costs. But this most recent fare hike came at a time of steadily dropping oil prices – to \$81.94 a barrel on 20 October.

According to Rick Seaney of FareCompare.com, the fare increase was only the fifth successful such hike to that point in 2014, out of 20 fare-boost attempts by the airlines since January – three of these occurring in October.

In 2013 there were a dozen attempts to raise fares. Only three were successful.



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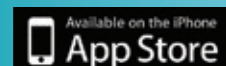
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Among the factors working against fare hikes, Mr Seaney said, are a reluctance on the part of airlines to charge more on a route than Southwest. And filling empty middle seats will always require discounting, especially on low-demand days.

But the October fare hike was sticking, despite concerns that fliers would be deterred by the Ebola outbreak that had reached the US after killing thousands of people in West Africa. Charisse Jones of *USA Today* reported that the airlines, backed up by some traveller surveys, were saying that demand had not diminished.

➤ The US airline industry's first successful system-wide domestic fare increase since April offered an example of how a bane to some people is a boon for others.

In an investor's note quoted in *USA Today*, Jamie Baker of JPMorgan wrote, "Evidence of domestic fare traction can hopefully allay investor concerns that lower fuel prices will simply be handed over to passengers in the form of lower fares."

## Of related interest . . .

➤ If US travellers by air are not benefiting from the decline in fuel prices, others are.

When, on 14 October, the Paris-based International Energy Agency published a report lowering its estimate for growth in gasoline demand for last year and this, Americans were spending some \$230 million a day less on the automotive fuel than they were on 4 July. The savings – based on price and consumption calculations by AAA, the biggest US motoring group – is easily explained. The Organization of Petroleum Exporting Countries was reporting its highest production in over a year and US oil output was at the highest level since 1985.

The falling price of gasoline in the US was following a drop in the broader oil market. Brent Crude, the global benchmark, closed at \$86.16 a barrel 17 October on the London-based ICE Futures Europe exchange after slipping the day before to \$82.60, the lowest level since November 2010. US benchmark West Texas Intermediate settled at \$82.75 on the New York Mercantile Exchange, after trading below \$80 on 16 October for the first time since 2012. The lower cost of filling the tank represents the most tangible benefit yet that US consumers had seen from a record boom in domestic oil production, a surge contributing to the global crude glut and helping reduce international prices.

## Two presumptions about 'fracking', both open to challenge: its environmental threat and its virtually limitless potential

Coverage of hydraulic fracturing, both in the general press and in scientific journals, tends to centre on two aspects of the controversial method of producing natural gas from shale: its danger to the environment and its promise of financial reward.

Recent reports suggest that, in both cases, conventional views of "fracking" are questionable.

As distinguished from a gusher oil well, the term "well" here denotes a drilled access to the exploitable rock. Shale gas producers commonly bore a deep vertical well that is then extended horizontally in several directions into the rock, like spokes from a hub. In fracking, water and chemicals are injected at high pressures into these spokes, creating fissures and releasing the trapped natural gas.

The principal environmental concern is that fracking could cause the gas to migrate into drinking water aquifers. But a study of tainted water in areas of the US with extensive deposits of gas-bearing shale exploited over years by means of fracking shows that such contamination is more likely due to leaky wells than to the extraction process itself.

As reported by science writer Henry Fountain in the *New York Times*, the study, published 15 September in the Proceedings of the National Academy of Sciences, looked at seven sites in Pennsylvania and one in Texas where water wells had been contaminated by methane and other hydrocarbon gases. The researchers found no evidence that fractured shale led to water contamination. Instead, they faulted the cement used to seal the outsides of the vertical wells, or the steel tubing used to line them, for allowing gas to leak up into the wells and into aquifers. ("Well Leaks, Not Fracking, Are Linked to Fouled Water," 15 September)

"In all cases, it basically showed well integrity was the problem," said Thomas H Darrah, a researcher at Ohio State University and the study's lead author. Rather than deriving from the shale itself, the leaking gas was mainly traced to shallower gas-rich pockets through which the vertical wells were drilled on their way to the shale formations. The good news, Dr Darrah said, is that "improvements in well integrity can probably eliminate most of the environmental problems with gas leaks."

➤ Richard J Davies, a professor at Newcastle University in Britain and a petroleum geologist not involved in the study, told the *Times's* Mr Fountain that it confirmed what he and others had shown earlier: that the fissures created by fracking were generally not long enough to affect aquifers.

"It is good to know which parts of the fracking process are the ones we need to worry about," Dr Davies said.

## The assumptions of 'the shale revolution' rest on recovery rate estimates that may be too optimistic by far

"By calculating the production numbers on a well-by-well basis for shale gas and tight oil fields throughout the US, Post Carbon concludes that the future of fracking is not nearly as bright as industry cheerleaders suggest." The work cited by Steve Horn, of the Montreal-based Centre for Research on Globalization (CRG), touches on the second major perception of hydraulic fracturing: its association with handsome profits.

The calculations are by the Post Carbon Institute (Santa Rosa, California). PCI is a think tank focused on sustainability issues. In the report "Drilling Deeper: A Reality Check on US Government Forecasts for a Lasting Tight Oil and Shale Gas Boom," PCI fellow J David Hughes analysed the production statistics for seven tight oil basins and seven gas basins which, respectively, account for 88 per cent and 89 per cent of current US shale gas production.

Mr Hughes is a geoscientist who for over three decades analysed energy resources for the Geological Survey of Canada. His findings differ markedly from the roseate projections published by the US Energy Information Agency (EIA), a statistical sub-unit of the US Department of Energy (DOE). Among the key points of his report, as summarised by Mr Horn:

- Three-year average well-decline rates for the seven shale oil basins measured range from an astounding 60 per cent to 91 per cent; ie, over a given three years the amount of oil coming out of the wells decreases by that percentage, yielding 43 per cent to 64 per cent of the estimated ultimate recovery achieved during the first three years.
- In terms of well productivity, four of the seven shale gas basins are already in terminal decline.
- The three-year average well-decline rates for the seven shale gas basins measured ranges from 74 per cent to 82 per cent.

- The average annual decline rates in the seven shale gas basins examined equals between 23 per cent and 49 per cent. Translation by Mr Horn: Between one-quarter and one-half of all production in each basin must be replaced annually just to keep "the drilling treadmill" running at the same pace and keep getting the same amount of gas out of the earth. ("The Uncertain Future of Shale Gas: Report Casts Doubt on US Hydraulic Fracking Production Numbers," 31 October)

Mr Hughes said in a press release accompanying publication of his report, "By asking the right questions you soon realise that, if the future of US oil and natural gas production depends on resources in the country's deep shale deposits, we are in for a big disappointment in the longer term."

For his part, Mr Horn of CRG noted that the shale boom has created a revolution of sorts for corporate interests across the supply chain: from the world of plastics to manufacturing to the pipeline business to liquefied natural gas (LNG) export terminals and far beyond – creating something akin to a "complex."

This implies confidence in a nearly infinite future for shale oil and gas. To the executive director of the Post Carbon Institute, Asher Miller, this is a false premise that has generated false promises.

**Dorothy Fabian, Features Editor (USA)**



## SHANGHAI YUEYUECHAO STEEL TUBE

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# Welding technology, equipment and consumables



When the hydraulic and fuel lines on a single jetliner can total 700 assemblies, the golden ideal of welding and of tubemaking is identical: a faster weld at no sacrifice in quality. Even orbital welding – fully automated, versatile, offering perfect arc control – is continually fine-tuned to deliver its benefits at ever-higher speeds.

Tubemakers have mastered welding setups for rotation, dwell, and penetration parameters, different for each size of tubing. They know how to regulate a power supply for welding current, primary and background amperes, weld bead overlap, and for delay of rotation at the start of the weld and current

downslope at the end. They share with welders a zeal amounting to passion for a clean cutoff operation with smooth surfaces and no contamination or burring.

For as long as welding is the method by which tube and pipe are joined, the advances that lie ahead for the two already highly developed technologies will be made in tandem. In the meantime, this partnership of equals acknowledges a common obligation: to provide perfect leak-tight joints having uniform circumferential weld strength to the automotive, defence, aerospace, biomedical and machine tool industries of the world.

## Tube and pipe maker orders giant induction welder

EFD Induction, a supplier of solid-state welders, has reported a significant delivery of a 1,800kW/300kHz welder to a major tube and pipe manufacturer.

"It's great news," said Peter Runeborg, head of sales at EFD Induction operations in Norway.

"The order is from an extremely large and well-known name in the global tube manufacturing industry. We are proud that they selected EFD Induction as a partner to supply a large induction welder."

The news is even more significant in light of the nature of the welder. Mr Runeborg explains: "In terms of physical size, the welder we built is the largest ever constructed by EFD Induction. We've previously built several welders of similar power output. But as for dimensions, this is the clear winner. The welder is an 1,800kW welder for large pipes, heavy-wall products."

EFD Induction has, to date, installed thousands of heating solutions for a wide range of industrial applications,

bringing the benefits of induction technology to many of the world's leading manufacturing and service companies.

EFD Induction has manufacturing plants, workshops and service centres in the Americas, Europe and Asia. Corporate headquarters are in Skien, Norway.

**EFD Induction** – Norway  
Email: [knl@efdgroup.net](mailto:knl@efdgroup.net)  
Website: [www.efd-induction.com](http://www.efd-induction.com)

## Increased productivity with the PERFECT® arc welding process

PERFECT® arc is a digital welding process newly developed by PWS GmbH. It can be used for spiral pipes as well as for longitudinally seam welded UO and JCO® pipes. It is suitable for both arc and submerged arc welding. The benefits: compared to conventional welding procedures, PERFECT® arc is 50 per cent faster with tack-welding and 20 per cent faster with submerged arc welding. This can mean a twofold or even threefold increase in the productivity of a spiral pipe plant, depending on its design. It also offers considerable energy savings. By controlling the power supply precisely using the digital current source, energy costs can be reduced by more than 30 per cent compared to conventional welding techniques.

Some of the applications for spirally and longitudinally welded pipes include gas and oil pipelines, shipbuilding and wind turbines – particularly offshore installations. To meet the ever growing demands of these sectors, especially in terms of high pressures or improved resistance to corrosion, manufacturers are increasingly turning to pipes made from higher-strength steel grades. At the same time this also means increasing requirements with regard to the weld seams and greater cost pressure on pipe manufacturers. PERFECT® arc now provides a solution that guarantees

high-quality weld seams, including seams on higher-strength materials, whilst delivering consistently high cost efficiency.

In terms of the energy used, PERFECT® arc offers an operating efficiency level of around 90 per cent. For plant owners this means energy costs are reduced by more than 30 per cent. At the heart of PERFECT® arc is a purely digital current source, offering both ultra-precise control of the power supply and a superfast control intervention frequency within microseconds. Processes are controlled and managed with pinpoint precision using Perfect® Control. This control system integrates welding control, wire feed rate control and the evaluation computer within one unit, thereby providing a closed-loop control circuit. Problems with synchronisation, such as those previously experienced with multiwire submerged arc welding for example, are thereby avoided.

In addition, PERFECT® arc allows the power supply to be precisely controlled during ignition, welding and stopping. As a result, there is less spatter when tack-welding, the seams are flush with the pipe surface during submerged arc welding, and cost savings can be made as less material is used.

PERFECT® arc from PWS is an innovative leap forward in the



*Tack welding process during pipe forming*

production of spirally welded and longitudinally seam welded UO and JCO® pipes. The innovative, fully digital process offers energy savings potential, perfect weld seam quality and therefore improved pipe quality too. The process is said to be winning over customers with its significant material savings, considerably higher output and greater flexibility when it comes to fast welding process change-overs.

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## Welding electrodes and machines

GEDIK Welding is owned by Gedik Holding and was established in 1963. It manufactures 90,000 tons per year of covered welding electrodes, gas metal arc, submerged arc, flux cored type welding wires, rectifiers, gas metal arc, submerged arc welding machines, inverter-type welding machines and welding generators. The company manufactures and sells equipment both domestically and overseas in the field of welding automations. Gedik Welding is one of the leading companies in Turkey in the field of welding.

The company manufactures a wide range of products, which include welding consumables that have the trademark Geka and welding machines that have the trademark GeKaMac. These are its international and registered trademarks produced at the company's plants that are set up in an 75,000m<sup>2</sup> area in Istanbul, Turkey.

Gedik Welding invests heavily in training, spare parts and after-sales services both inside and outside the country along with its welding materials and manufacturing activities. Gedik Welding has the ability to manufacture special products using alternative solutions along the lines of customers' requests and delivering these products rapidly.

R&D efforts are conducted by its expert teams in modern and fully equipped laboratories, which has led to a number of innovations.

Gedik Welding generates robotic solutions for automation in welding and other processes while keeping close track of international technological developments. Automation is seen as the top factor for helping to reduce costs in welding and Gedik can generate special robotic solution scenarios for its customers using modern simulation programs.

The company keeps close track of all developments in the field of welding and supports Turkish industry and industries of other countries with its trademarks developed by its own R&D technology and expert personnel.

Gedik Welding has also been attending welding-related scientific and technological conferences and fairs both in Turkey and around the world.



Gedik Holding established the Gedik Education Foundation in 1994 with the aim of contributing to its country's education system and improving Turkey's welding technology. Gedik Holding provides the opportunity for the foundation to use the educational institutions, research and material examination laboratories and the educational workshops as well as the financial aids provided.

Gedik Education Foundation provides educational opportunities through the IIW (International Institute of Welding) and the diplomas it grants are not accepted just in Turkey, but across the whole world. Welding engineers educated in GEV gain intense industrial experiences besides being equipped with theoretical knowledge. This way, they acquire the ability of solving problems in the engineering field.

GEV's activities in the field of non-destructive inspection are carried out by Turkish Non-destructive Inspection Training, Certification and Industrial Service Center (TTM), which is a subsidiary of GEV. It offers modern laboratories that meet international standards, education classes, superior devices, equipment and technical and academic personnel who are leading specialists in their fields.

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## High-performance, flexible arc

INFOCUS by Kjellberg is a new high-performance technology for TIG welding and brazing which creates new possibilities for automated production processes and expands the range of applications considerably.

The InFocus torch as technology carrier generates an extremely concentrated, stable and powerful arc which leads to a multiplied welding speed, improved process reliability and an excellent seam. Thus, InFocus offers the potential to increase the efficiency of existing applications considerably, especially as an alternative to conventional TIG welding, plasma or laser welding. Furthermore, InFocus

extends the range of thicknesses which are typically covered by TIG welding regarding foils and thin sheets as well as thick sheets.

The wide range of industrial applications clearly shows the flexibility of the InFocus technology: welding of high-alloyed sheets with a thickness between 0.5 mm and 1mm; longitudinal welding of profiles with a speed of up to 15 m/min; keyhole welding of CrNi steels with a thickness of up to 10mm; keyhole welding of mild steel with a thickness of up to 8mm; welding of non-ferrous metals without pre-heating; and brazing of galvanised sheets with a speed of up to 4m/min with minimum impact on the

zinc layer in the surrounding areas and on the opposite side.

Kjellberg Finsterwalde offers InFocus systems in the following power classes: InFocus 500, InFocus 750 and InFocus 1000. InFocus 1000 operates with welding currents of up to 1,000A – suitable for quick, continuous longitudinal welding. For welding tasks with limited accessibility Kjellberg offers the InFocus 500 with a particularly small torch. The InFocus 500 torch looks more like a pen than a high-performance torch.

**Kjellberg – Germany**  
Website: [www.kjellberg.de](http://www.kjellberg.de)



# Automatic butt fusion for pipes

RITMO's Easy Life automatic butt fusion system offers advantages for the welding of HDPE, PP and other thermoplastic pipes.

The system, designed and developed entirely by Ritmo, is now in its fourth edition. The concept is based on a hydraulic gear case provided with hardware in which the electronic system ensures continuous repeat of the welding cycles and automatic control of the preset parameters. The operator needs only to validate the welding phases. This method of operation provides ease of use and the certainty of a correct weld.

The gear case features an intuitive control panel and graphic display that allows quick setting of the required parameters. The Easy Life system can store up to 4,000 welding cycles and summarise them into a PDF file. This report can then be downloaded via a USB port.

The data logging system also shows the date and time. The welding system



Easy Life welding system

is available on a wide range of Ritmo welding machines, and covers a working range from 40 to 630mm OD.

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## Virtual and practical welding studio opens at Goole College

UK-BASED one-stop welding products supplier Weldability-Sif has opened a virtual and practical welding studio at Goole College as part of an ongoing strategy from the Weldability-Sif Foundation charity to pro-actively encourage the development of new

welder training facilities across the UK. Goole College is one of 16 colleges that have already agreed to provide training facilities funded by the Foundation charity, which will be co-funding welder training facilities at colleges over the next five years.

Adrian Hawkins, Weldability-Sif Foundation director and trustee, commented, "The Weldability-Sif Foundation was established and registered as a charity to specifically encourage the development of new welder training facilities across the UK. Welding plays an important role in manufacturing and is used in a multitude of different industries including food processing, quarrying, shipping, as well as energy and UK infrastructure industries. Welding plays an active part in keeping it all together and foundation-level welder skills training at Goole College is another step towards a full apprenticeship programme designed to meet demand and overcome the current skills shortage in the UK welding industry."

Lynne Richardson, principal at Goole College, said, "This new facility allows us to provide a technology leading, fully joined-up training programme that will address the skills shortage that exists within the area. By providing modern, interactive training solutions we provide an engaging learning environment that captures the students' imagination and significantly improves their experience. These new welder training centres will provide trainee welders with the opportunity to progress from the foundation level through to a passport to practice welding internationally, leading in turn towards higher welding industry qualifications including to the Welding Institute, International Welding Diploma level."

Weldability-SIF supplies MIG, TIG, MMA, spot and oxy/fuel welding and plasma cutting machines, torches, accessories, consumables and personal protective equipment to the UK distributor market, as well as exporting to a number of countries around the world. The company's Letchworth Garden City facility enables distributors to single-source over 2,000 different products, and allows the company to maintain its stock of high-volume consumables, including the distribution of over 6,000 tons of mild steel MIG welding wire per year.

**Weldability-SIF – UK**

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## Upgraded portable welding

KEMPPI has upgraded the Minarc Evo equipment range. Minarc Evo 180 delivers more welding power than its predecessor, the Minarc Evo 150, but retains its qualities, serving 'welders on the move'.

The new Minarc Evo 180 has the necessary power for MMA maintenance welding, even where 4mm electrodes are required. The portable 5.8kg machine delivers 170 amps maximum output current for MMA welding at 30 per cent duty cycle, and 180 amps for DC TIG welding at 35 per cent duty cycle. When fitted with a 10-amp power supply plug

(market dependent) the Minarc Evo 180 still delivers 140 amps MMA welding power at 28 per cent duty cycle.

Minarc Evo 180 includes power factor correction (PFC) technology, giving energy efficiency and maximum welding power in any 1-phase, 230V, 16A or 10A industrial power network. It can also be used with generator power supply, even with extra-long extension cables more than 100m long. These qualities and its light weight make it easy to use in many welding jobs, in a wide variety of places.

A large LED meter display is included, with a remote current control option,

and Lift TIG ignition as standard. Precise arc ignition, large voltage reserves and automatic arc dynamics control make it suitable for welding with all electrode types.

The Minarc Evo range offers a choice of MMA, MIG/MAG, and DC TIG welding equipment that is easy to use and light to carry. The units include Kempfi's 2+ warranty cover.

**Kempfi (UK) Ltd – UK**

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## Laser welding opens new avenues for process optimisation

THE Machines, Switzerland, has several decades of experience in the manufacture of extrusion lines for drip irrigation pipe and tube systems, as well as expertise in the field of transverse and longitudinal laser welding of flat sheet and tubular formed metals and multi-layer metal polymer combinations.

Supply issues and unavailability of helium, an essential forming gas in the TIG welding process, is causing concern and giving problems to a number of industries engaged in metal welding of sheet and tube, and multi-layer pipe manufacturers. With the expectation that the supply situation will be further aggravated in years to come, THE Machines has continued to drive forward in the field of protection-gas-free laser welding.

The traditional processing of metal tape in the thickness range of 0.05 to 1.2mm in metal forming and stamping plants is still discontinuous. This means that a coil change mandates not only a machine stop, but also a time-consuming setup procedure each time when re-threading the new tape. This interruption of production could be reduced by combining the end of the tape with the incoming strip of the new coil in such a way that the weld and seam meet the rigorous requirements of the subsequent process steps, eg line tensions, repeated bending, forming and heat treatment, securely and at full production speed. The actual seam

can subsequently be left in the final product, or may need to be cut out. This optimisation potential has remained untapped, since no suitable welding method for joining the ends of thin metal strips has been available to meet these requirements.

THE Machines offers solutions for cross-welding with the SLT range of machines. The series covers a bandwidth as standard from 80 to 750mm, with higher bandwidths available on request. Laser welding is particularly suitable for processing thin sheets where other methods would fail. The welding is conducted in fully automated process steps. Depending on the materials and thicknesses, pre-programmed welding parameters ensure high, repeatable quality. The tensile strength and elongation at the seam are generally  $\geq 85$  per cent of the base material.

The LSL range of longitudinal laser welding equipment is available in the machine types 12, 40, 65 and 110 for composite tube diameters up to 12mm, 40mm, 65mm and 110mm, and 12mm for precision formed and welded tubular metal structures containing optical fibres such as those used in OPGW, OPPC, FIST and other fibre optic applications. An integrated optical seam tracking system allows high process speeds, and each LSL is suitable for the welding of stainless steel or other alloys. The quality of the entire seam integrity and



*The SLT range*

full weld depth and volume is checked using latest multi-channel remote field eddy current testing. The system uses non-destructive testing and in-line inspection of the weld seams with high sensitivity to detect small and hidden defects.

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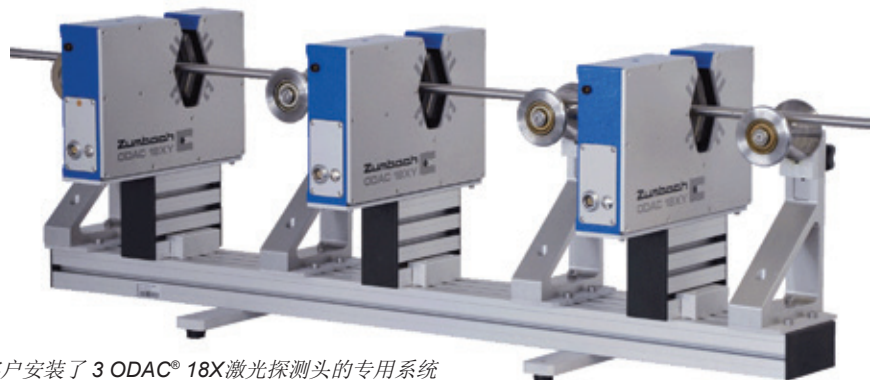
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## 中小型产能解决方案

与UPCAST®棒材生产线一样，UPCAST®-SGTube生产线也是模块化设计。单炉和双炉配置都可以。双炉配置——单独的熔炼炉和铸造炉——能够实现12,000 tpa的产出，而单炉配置实现9,000 tpa产出。如果废料——清洁、干燥——是输入材料的主要部分，则首选双炉配置。

能铸造外径38到60毫米、壁厚2毫米/3毫米的管道。当配备一个以上的伺服系统时，铸造机能同时铸造不同尺寸的管道。成品管道尺寸越小，铸造管道尺寸就越小。对于卷材重量，UPCAST®-SGTube是非常灵活的，上限约为1.5吨。最终的重量限制更有可能由下游工艺设备决定。

UPCAST®-SGTube主要用于铸造用于卫生、工业以及ACR管道的磷脱氧（DHP）铜管。加工工艺不限于只生产DHP铜管，还适用于其他铜/铜合金。已成功铸造了无氧铜以及铜镍合金。

拥有UPCAST®-SGTube工艺作为管道生产线的第一步意味着能明确地节省生命周期成本。UPCAST®-SGTube工艺铸造的管道几乎接近最终产品尺寸，因此该工艺仅用一步就可以达到逆向要的结果，而现有的轧管机需要几个短但昂贵的步骤。此外，生产线空间需求较小也带来了大大的节省，只需要传统设备所占面积很小的一部分，这些设备可被UPCAST®-SGTube生产线取代。

UPCAST OY公司和ASMAG GmbH公司已联手为客户提供更完整的解决方



案——为各种用途如卫生和部分ACR管道，生产半成品C&D铜管的工艺。通过综合利用各自的专业技术和知识，这两个合作伙伴能为铜管生产商提供节约成本的生产。这种紧凑型工艺与传统铜管生产工艺相比所需的更小，能耗更低。

UPCAST®-Hybrid技术是基于使用同一台设备同时铸造棒材和管材产品。这可通过改装UPCAST®-SGTube铸造机和卷曲机的特定产品部件使其更容易转换来实现。

这种产品组合的灵活性使这种混合系统成为那些拥有不同产品系列以及对同时生产棒材和管材有一定能力要求的公司真正具有成本效益的解决方案——不需要两条不同的生产线，以及在最坏的

情况下整年没有一条能充分利用。使用UPCAST®-Hybrid生产线，可以优化两种产品之间的满负荷生产能力或有时只是一种产品。

UPCAST® 研发工作我们的专家在公司自己的试验工厂进行。公司决定继续保持行业内发展的领先水平，并不断寻求改进、新产品以及应用，满足客户和市场不断变化的需求。

UPCAST®连铸线一周每天都能够可靠地、满负荷运行。如果没有在线和就地的快速、可靠、连续的UPCAST®客户服务以及耗材、备件和技术的支持，是不可能实现的。

UPCAST OY – 芬兰  
网址: [www.upcast.com](http://www.upcast.com)

## 工具更换加快

弯管机制造商SchwarzeRobitec公司以“保持简单”的工程座右铭开发了用于弯管机的新型快速夹紧系统Quick Tool Unlock。该系统无需工具就可以快速更

来自SchwarzeRobitec的Quick Tool Unlock™ System系统简化了工具更换



换弯曲胎模，从而大大减少设置时间。

快速夹紧系统由带夹紧手柄以及回转装置的分隔拉杆组成。在常用的系统中，在弯曲胎模顶端连接到旋转横臂的连续拉杆需要松开进行工具更换，而使用Quick Tool Unlock系统可以简化这一过程。这里只需要操纵夹紧手柄，因此与旋转横臂的连接断开。

随后打开旋转装置，弯曲胎模在顶部露出。与自动夹紧工具交互作用，可以好不费力地拆除弯曲胎模。不再需要像之前那样松开弯曲胎模。这种省工技术是绝对一目了然的而且快速。Quick Tool Unlock系统的另一个好处是所有从静止部件到传动部件的连接都上通过滚动轴承进行的，这样增加了机器的耐用性。

Schwarze-Robitec GmbH – 德国  
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网址: [www.schwarze-robitec.com](http://www.schwarze-robitec.com)

## 定制焊接工艺

REHM公司供应TIG焊接设备，而且刚刚推出INVERTIG.PRO系列，实现了新的TIG焊接尺寸，占空比和用户指南。现在REHM公司利用新的MEGA.PULS FOCUS为MIG/MAG树立了榜样：这种脉冲弧焊工艺FOCUS.PULS使生产率增加30%，能源节省30%，而且焊接烟尘减少30%。

INVERTIG.PRO系列覆盖了专业人士期望形成的TIG技术的全部。精确的焊接过程控制使每个位置的电弧都很稳定。

从240到450安的所有功率等级具有无限的灵活性以及最好的引弧特性，需要时可以配备独特的数字菜单指南。MIG/MAG装置MEGA.PULS FOCUS的技术数据使用户信服，最重要的是，在实际中，整个系列是为厚壁/薄壁低碳钢、不锈钢和铝/铜合金定制的。

REHM – 英国  
网址: [www.rehm.co.uk](http://www.rehm.co.uk)

## 带锯条焊接授权经销商

TRU-CUT Saw 公司已成为 Simonds International公司带锯条焊接授权经销商。

公司现在提供一整套定长焊接的 Simonds带锯条，还可提供各种PVD涂层：用于一般切割的TiN；用于不锈钢的切割的TiCN；用于合金钢的AlTiN以及用于钛和异金属切割的VitaNano™。

Tru-Cut具有内部PVD涂层功能，可以在硬质合金和双金属带锯上施加涂层。重点关注的领域将是把涂层过程和Simonds SineWave®技术结合起来。SineWave带锯可以进行非常快速的拉切。这种“摇摆”行动与传统带锯相比加快了切割速度，延长了锯片寿命，同时减少了机器应力。

据说这种技术在很多情况下切割刀具寿命是传统锯片的两倍，而且几乎适用

于任何带锯床。再加上Tru-Cut的PVD涂层，使该带锯能为整个切割应用范围提供好的性能并且节约成本。Tru-Cut将提供Simonds锯片，其锯带为1"到31/8"宽的定长焊接锯带。

Tru-Cut Saw公司总裁David Otter表示：“我们是以金属圆锯片和PVD涂层服务而出名。现在，作为Simonds的授权经销商，我们仍能为客户提供和圆锯片有相同的高水平生产和节约成本的PVD涂层带锯。”

Tru-Cut Saw公司为各种切割应用生产锯片，包括从简单的手动切割机到高产能飞切机。这些锯片设计用于各种金属和非金属材料的切割，尺寸范围从200毫米到3米多。

公司还销售用于切割管状材料、实心材料、角钢和其他型材的Tru-Cut 16"

(400毫米) Dry Cut Metal Saw干式金属切割锯。

公司的ICO Surface Coatings Division表面涂层部门专为各种型号的新、旧锯片，工具和磨损部件提供PVD涂层和重刷涂层服务。配有两个涂层室和旋转装置的Tru-Cut和ICO能同时提供标准的和特殊的表面处理。标准涂层有CrN、TiN、TiCN、AlTiN-ML、AlTiN-XL、AlTiCrN、TiAlCN Phoenix™ 以及VitaNano™。特殊的和特定工具的涂层根据客户需求定制。涂层室能涂刷外径1,250毫米x 700毫米的部件。

Tru-Cut Saw, Inc – 美国

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## 管道涂料新型抗剥离性测试仪

多层管涂料工厂SELMERS BV公司最近完成了抗剥离性测试仪更新。

抗剥离性测试仪 (PRT) 用于检测三层PE / PP涂料系统的附着强度。PRT被认为是Selmers的质量控制设备计划内部的一个逻辑设备。

多年来管道涂料附着强度和性能的增加需要全部重新评估PRT测试仪。结果显示该测试仪是更好的用户友好型剥离装置，能处理比之前更大的剥离力。

能处理的力度从前一年的1500牛顿上升到2,500牛顿。同时，Selmers公司设

法将剥离装置重量减少越40%。这样质量工程师能够更方便地拿着剥离装置在管道上进行检测。

PRT是带控制单元的剥离装置，被装在一个坚固的航空箱里。剥离装置安装在管道上能够剥离3层涂层。

当从涂层管道上剥离一个20至50毫米宽的涂层条时，可能在管端留下120至130毫米的减少量。

剥离角度保持控制在90°，速度为10米/分钟。控制单元包括使用触控面板的逻辑程序，用于收集和显示数据。

数据可以从控制单元通过局域网或

USB接口传输给客户的辅助设备。虽然PRT有220至240伏交流电、50至60赫兹的主接线，但该系统还可以选用充电电池。

抗剥离性能测试仪——2500牛顿——可选配无线局域网，使数据收集更简单，比如在笔记本电脑上就可以收集。还可以选购打印机，直接打印测试结果。

Selmers BV – 荷兰

电子邮件: [sales@selmers.com](mailto:sales@selmers.com)

网址: [www.selmers.com](http://www.selmers.com)

## 来自欧洲的改造设备， 安装的成套项目

公司在37个国家有业务，而且在中东销售了几套轧管机，现在的目标是提供全套机器用于生产管道、加工板材和管

道，还有棒材、钢筋以及钢梁，像该区域其他公司一样生产各种广泛的产品。

此外，Euromaquina正在中亚地区努

力，在非洲也非常成功，帮助促进新兴企业。Euromaquina能够提供全面改造的机器，这些机器经过机械翻新、液压和气动改造，全新的电气系统，可在客户工厂就地交钥匙安装，并为最佳生产提供咨询。Euromaquina还能升级为升级的生产线提供改造的关键部件，比如用于现有轧管机的冷飞锯。

在迪拜展会上，Euromaquina将提供：一套电阻焊设备(OTO Mills设备)；完整的不锈钢服务中心(CTL、纵剪、激光和射流)；20Tn用全改造三重拉床；一套全自动管道热浸镀锌设备；一套装饰管全自动电解设备。

Euromaquina – 西班牙

网址: [www.euromaquina.com](http://www.euromaquina.com)



OTO Mills 设备将在1月份的阿拉伯国际管材展上供应

## 合格的弯曲技术

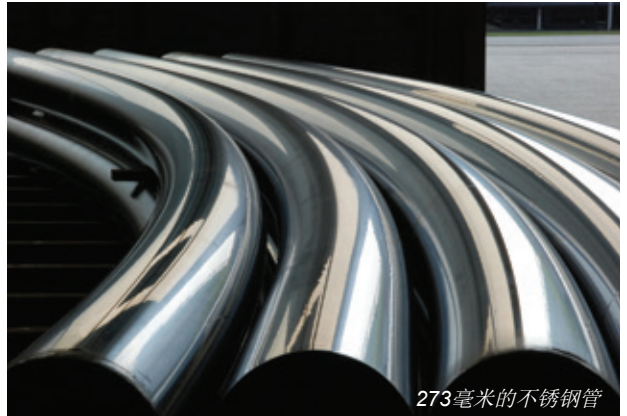
Kersten Europe公司和Kelly Steel Engineering公司共同创办的合资公司Kersten Middle East专攻钢、不锈钢和铝制型材和管道弯曲。公司的机器园配备一系列先进的欧洲弯曲机，可弯曲小的和大的管道(60.3到508毫米)、500毫米内的方形和矩形型材以及100到1000毫米的钢梁。

凭借一系列的项目和全球客户，Kersten公司搬到了阿联酋，以扩展在中东的业务。在Ras Al Khaimah工厂的生产始于2013年，之后，Kersten公司在海湾合作委员会地区的一些项目完成了先进的弯曲工作，包括梅舒纳公园(阿布达比酋长国)、卡塔尔伊斯兰教研究院(卡塔尔)、朱迈拉清真寺(迪拜)、麦地那机场和利雅得国际机场(都在沙特阿拉伯)。Kersten Middle East 总经理Mike Minten表示：“弯曲技术和经验在

中东是非常有价值的。我们必须按照欧洲严格的质量标准和规范生产高质量产品。”

对于公司对Kersten Middle East的计划，Minten先生表示：“我们也能够为工业领域弯曲管道和型材，如石油和天然气、储罐、压力容器、基础设施和绿化工程。”

Kersten在该地区最关键的是公司对市场服务差异化的想法，Minten先生坚持要确保集团的技能被行业所看到并当作高度精确的功能。“中东地区其他的建筑公司主要处理制作加工，很少有公司拥有弯曲机。我们53年来累积的专业技术知识、经验、工具以及设备只有



273毫米的不锈钢管

Kersten Middle East公司才能为市场提供的。”

**Kersten Middle East FZ LLC – 阿拉伯**

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## 哈壳式管道冷切机

便携式哈壳钢管冷切机是DWT公司与European Offshore行业合作开发的。这种哈壳式切割机金属切割效率高、可调整范围大而且易于设置。这种便携式切管机避免了任何热影响区。专用于重型应用中重型厚壁管道的切割。其快速的切割和使用准备带来经济型生产。

便携式管道切割机用于现场管道切割，适合各种应用，而且可以执行许多操作。它还适用于新钢种钢管，如P91。便携式管道切割机适合各种应用，而且可以执行许多操作，比如：同步切割和

打坡口；焊接准备前的管端加工；管端内部车削以及现场修复法兰面。

该机器加工范围为外径76至1219毫米，壁厚100毫米。这种分体式构造的便携式切管机便于安装到组装好的管线上。特殊的用途，如远程控制，在管道焊接空间受限的情况下可用。这种便携式管道切割机切割效率高、可调整范围大，非常方便操作，而且结构坚固、紧凑。

**DWT GmbH – 德国**

网址: www.dwt-gmbh.de



Clamshell管道冷切机

## 不锈钢管质量检测

CONTROLE Mesure Systèmes公司专门设计、开发和制造完整系列涡流和超声波无损检测产品，包括高性能检测仪和系统、探头和传感器、配件、全套交钥匙机器以及相关机械装置。

对于优质精密钢管，CMS开发了

**RotoUTscan超声波旋转测头**



RotoUTscan超声波旋转测头，用于检测不锈钢、钛钢、铅钢和不锈钢(直径6到250毫米)管道纵向和横向缺陷检测、厚度测量、内径外径比以及椭圆度

它能够与其他CMS设备(磁化装置、旋转系统和支撑线圈)结合使用，对产品进行通体检测，还可以一起安装在强大的控制台里，包括定心装置。

Probus监控软件，用于收集无损检测设备提供的信息，能够显示组合信号(UT/ET)并生成检测报告，用作质量服务和客户控制依据。存储的数据可用于分析和质量处理。

**Contrôle Mesure Systèmes – 法国**

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## 管道永久性保护涂料

管道流体解决方案供应商Quaker Chemical公司为制造过程的最后阶段提供涂料。这些涂料系列包括环境友好性溶剂涂料；快干、低挥发性有机物水性涂料；以及满足不断增加的性能需求的定制紫外光固化涂料。公司的Quakercoat®024是一种100%固体紫外光固化防护涂料。为防止金属管道、钢管和镀锌钢管表面腐蚀，这些涂料具有的好处包括在低能下的即时固化、低气味以及低粘度，使涂料在较低温度下易于喷涂，而且带来了额外的能耗节省。

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# New material development and manufacture of crimping dies in UOE welded pipe plant

By Li Xin-wen, Zhou Gui-de, Li Jian-xin and Su Qi-shuang from Baoshan Iron & Steel Co Ltd, Shanghai, China and Shandong SiFang Technical Development Co Ltd, Jinan, Shandong, China

This article introduces the function of the crimping processing, the technical development and the structure of the crimping press at first; then narrates the status in active service of the crimping die, its critical quality requirements and also its manufacture technical difficulty.

The material and the corresponding manufacture process, which meet the requirements of the crimping processing, have been developed through the characteristics analysis of the former German dies, such as chemical composition, surface hardness and geometry size.

After manufacture completion of the new dies, the testing results show that there are no remarkable differences in surface hardness, tensile strength and impact toughness between new dies and former German dies; after volume production experiment of welded pipes, there are scarcely any quality defects in the new dies by offline inspection.

## 1 Introduction of crimping press

Crimping is one of the major processes of a LSAW (longitudinally submerged arc welding) steel pipe production line, which results in the bending deformation of both plate sides; after crimping, both sides become the arc of the curvature radius close to the finished pipe radius in order to ensure geometrical dimensional accuracy of the pipe welding seam area.

There has been no crimping process in the early LSAW pipe production line, such as the world's first industrial production line of UOE welded pipe in McKeesport, USA, in 1951. The second generation of UOE welded pipe mills were built from 1955 to 1967, and a portion of a total of 18 sets of new mills and one set of reconstructive mill have adopted roller-type crimping presses. The third generation of UOE mills appeared between 1968 and 1979, during when the crimping process developed dramatically from roller-type to die-type, and in total there are 16 sets of new mills put in use and two sets of old ones reconstructed all over the world. Since the 1990s, there have been more than ten large diameter JCO (including PFP) or RB production lines constructed in the world, of which JCO lines have adopted the die-type crimping process.

Field practice experience and numerical simulation results demonstrate that during the UOE process, if there were no crimping process, both plate margins of about 300mm width (both sides of the welding seam after O-forming) would be difficult to improve significantly even after compression ratio 2 per cent of O press and expansion ratio 3 per cent of expanding machine, resulting in the difficulties of pre-welding process adjustment, burning through of submerged arc welding, cold cracking of expanding process and pipe defect peaks from normal pipe contour. In JCO (including PFP) processing method, if there were no crimping process, pipe defect peaks from normal pipe contour would be more serious than that in UOE processing.

As can be seen from the development of crimping technology, a roller-type crimping process has been used in the early crimping technology, which is generally used for thin steel plates but it does not have an ideal effect on high strength plate due to the longitudinal extending of plate margins. The die-type crimping process has been the advanced technology developed for thick plates, in which two presses of thousands of tons force crimp plates step by step by pushing both plate margins upwards with dies of several metres long at the same time. Desirable shape of the plate margins induced by the process prevents cold cracking of expanding process and

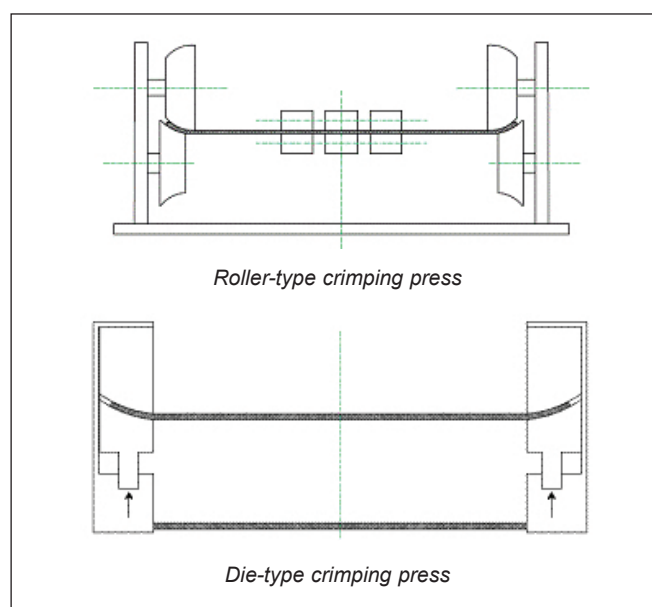


Figure 1: Structure schematic diagram of crimping press

C	Si	Mn	P	S	Cr	Mo	V
1.50~ 1.60	0.10~ 0.40	0.15~ 0.45	≤ 0.030	≤ 0.030	11.0~ 12.0	0.60~ 0.80	0.90~ 1.10

Table 1: Chemical composition of German die steel (mass fraction, %)

pipe defect peaks from normal pipe contour effectively [1, 2]. The die-type crimping press has the upper die and the lower die of the certain working surface curve. As with producing, the upper die is fixed and the lower die is driven upwards by hydraulic cylinders, resulting in the margin crimping deformation of the plate between the upper die and the lower die. The crimping step number of the whole plate depends on the length of the dies and the plate. The crimping quality of the die-type process is superior compared with that of the roller-type press, especially for high-strength thick-wall pipes, also avoiding longitudinal extending of plate margins in roller-type press.

## 2 Baosteel crimping press and characteristic of its dies

The crimping press of Baosteel UOE welded pipe production line consists of two oppositely arranged frameworks, which can move vis-à-vis depending on the width of the steel plate, and the upper die and the lower die are installed in the frameworks. Baosteel crimping press has the following characteristics:

- 1) high pressure; its maximum pressure reaches 40MN, making it possible to produce high steel grade size in the future; the capacity of great pressure can guarantee the production requirements of high steel grade and thick wall size, and also realise the large step operation of crimping press; as for its length, according to finite element analysis, the crimping force limit of 31.8mm X100 pipeline steel will reach 38MN
- 2) large length of single step; the effective length of its dies is about 4,900mm; there are only four crimping steps for completing the pipe of 18m long; the reduction of the step number means the improvement of production efficiency, and the reduction of the forming transition zone number so as to improve the product quality
- 3) few dies; as for 56" production line, there are only five sets of dies covering OD 508 ~ 1,422mm.

Forged alloy tool steel dies have been made in Germany for matching Baosteel 40MN crimping press before, and the chemical composition is shown in Table 1.

The field test shows that the surface hardness of the die is 50-60 HRC.

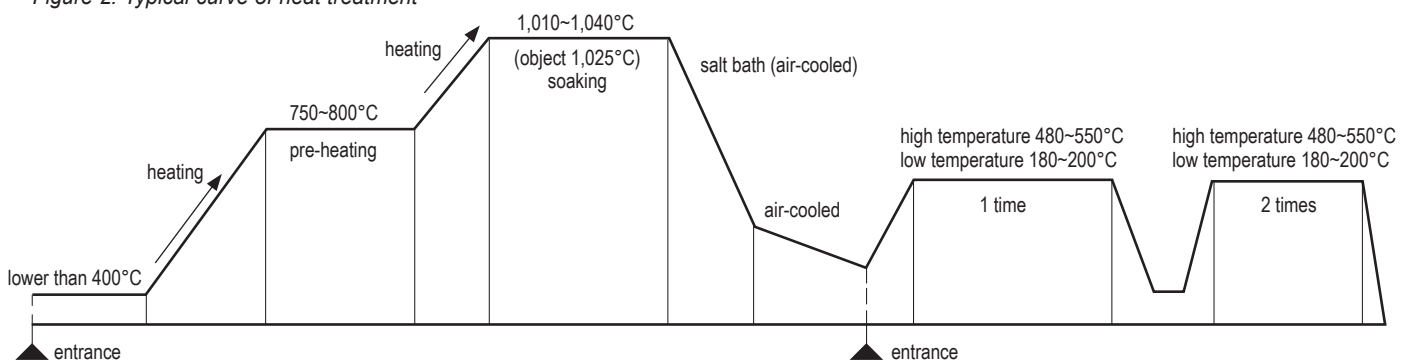
The German tool steel, as for the chemical composition, is equivalent to Chinese Cr12Mo1V1, American D2 and Japanese SKD11, which is cold working tool steel widely used internationally; it is ledeburite steel, and has high abrasion resistance and hardenability, which would be hardenable completely at less than 300-400mm in cross section. It is variously used as cold working die, cutting tools and measuring tools of high precision and long lifespan, such as punch dies, stretching dies, cut-off dies, cold extrusion dies, cold cutters, circular saw blades and standard measuring tools.

The smelting of this kind of steel requires high purity by electric furnace and vacuum refining furnace, and generally forging stock of large dies are obtained through the electroslag remelting system. The forgeable temperature zone is narrow, exactly speaking, from the starting forging temperature 1000°C to the ending forging temperature 850°C. The upper die and the lower die are elongated parts, and should be completed after repeatedly heating and forging; meantime contour forging is difficult for the small production quantity. Generally speaking, elongated parts are easy to be stretched and hard to be upset, resulting in significant anisotropy, whose mechanical property can vary more than once. Manufacturing crimping dies of forged die steel brings on process complexity, high-energy consumption, low material utilisation and high cost.

The heat treatment of this kind of steel is difficult and demanding, and the typical curve of heat treatment is shown in Figure 2.

Original dies are all made in Germany, so if imported, there would be some trouble, such as long manufacturing cycle, high cost and fussy purchasing process. Some dies have been in service for too long, are badly worn, and there are no

Figure 2: Typical curve of heat treatment



spares, so Baosteel is urgent to purchase new dies. Due to the intellectual property protection of the German manufacturer of the original dies, Baosteel has difficulty getting manufacturing details. Because of the tiny field of crimping die manufacturing and manufacturing difficulty, official publication and peer communication have demonstrated that crimping dies in large diameter pipe plants have not been manufactured of a similar material in China. So far the research on crimping processes has concentrated on crimping width setting under different pipes and different dies while, as for the die itself, there is less research on the die manufacturing, including the material selection and the manufacturing process<sup>[3-6]</sup>.

### 3 Self-development of crimping die

After the service condition analysis and research of the crimping die, neither the chemical composition nor the forging processing of the original German manufacturer has been imitated simply, and the cast processing solution of new high chromium alloy has been developed eventually. The detailed manufacturing drawings of the dies have been determined with the original dies through geometrical measurement of three-coordinates measuring machine and checking of the die assembly matching of the equipment body.

#### 3.1 Research and development of new high chromium alloy

High chromium alloy is a material of chemical composition that offers a wide range of uses; different chemical composition and heat treatment processing result in distinct microstructure, hardness and toughness. The development of new material must be in accordance with the service condition of the crimping dies.

In high chromium alloys the basic and important alloying elements are C and Cr, whose content has a decisive effect on the amount of carbide, the quantity ratio of  $M_7C_3$  carbide and total carbide, hardness, toughness and hardenability. The microhardness of  $M_7C_3$  carbide is about 1,800HV, while the microhardness of  $M_3C$  carbide is only about 800HV, therefore

the suitable ratio of Cr/C can result in excellent comprehensive performance of hardness and toughness.

Element Mo distribution in the phases of high chromium alloy is about 50 per cent in  $Mo_2C$ , about 25 per cent in  $M_7C_3$  carbide effective to improve hardness and wearing resistance, in addition about 23 per cent dissolved in the matrix, which significantly improves alloy hardenability.

The combination of V and C can generate primary carbide and afterwards secondary carbide, so that the solid solution amount of carbon in the matrix will decline and the point Ms will increase. Certain amounts of V can refine microstructure during solidification, having a favourable effect on elimination of bulky columnar grain.

The binding force between W and C atoms is large, improving martensite stability in high temperature, thereby increasing red hardness. In hot quenching, partial W carbide dissolves into the matrix to improve hardenability.

Ni can strengthen the matrix to improve the material comprehensive performance, and improve hardenability.

Ti can form stable TiC nuclei, and refine eutectic microstructure. Adding Nb can make the precipitation of high hard Nb (CN) particles (2,000HV) in the matrix, and these particles have a high melting point, regular shape, small size and uniform distribution in the matrix. Therefore, adding Nb can control the solidification segregation effectively, improving its comprehensive performance and saving Ni or Cr.

The chemical composition of new high chromium die steel has been designed based on service condition of crimping dies and effects of various alloying elements listed in Table 2.

#### 3.2 Research and development of cast form processing

Cast form processing is another key factor to ensure the die manufacturing quality. The new casting processing and equipment have been designed according to the crimping die shape and casting character of new high chromium die steel. Electrical furnace smelting and refining ensure purity of molten steel and advisable casting system ensures quick uniform filling, reducing segregation effectively.

The developed special device breaks up initially formed dendrites, and the small dendrites distribute throughout the alloy liquid, forming effective crystal nucleus, which result in fine uniform equiaxed grains in the cast dies; meantime, casting defects, such as shrinkage porosity, are avoided generating in order to obtain high quality casting blanks.

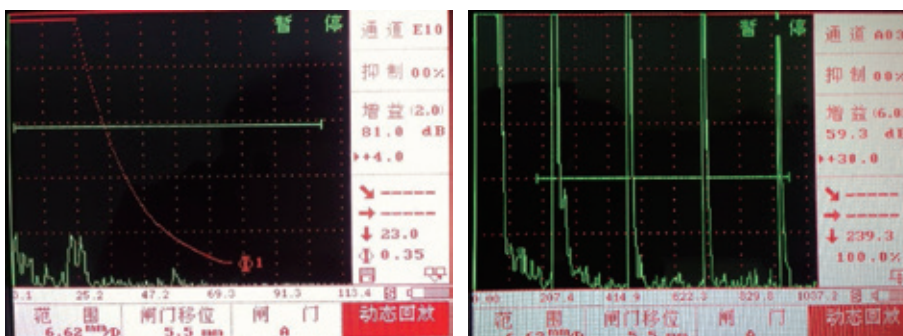


Figure 3: Ultrasonic testing results of cast dies (distance-amplitude curve)

C	Si	Mn	P	S	Cr	Ni	Mo	Ti	V	Cu	RE
1.80~	≤	≤	≤	≤	12.0~	0.5~3.0	0.8~	≤	≤	≤	0.01~
2.80	1.0	1.0	0.05	0.05	22.0		3.0	0.30	1.0	1.0	0.5

Table 2: Chemical composition of new high chromium die steel (mass per cent, %) <sup>[7]</sup>



Figure 4: Field hardness testing picture of experimental cylindrical sample profile

The high casting quality of dies has been verified in ultrasonic testing and performance testing.

Ultrasonic testing results show:

- a) good ultrasonic penetrability and detestability, few noise waves, so the microstructure is uniform, compact
- b) the part from the work surface to the depth of 100mm meets the Level 1 requirement of DIN EN-12680-2
- c) the internal space meets the Level 2 requirement of DIN EN-12680-2 at least

### 3.3 Hardness and performance of new crimping dies

Developed high chromium die steel is of excellent hardenability; the cross-sectional anatomy of large test

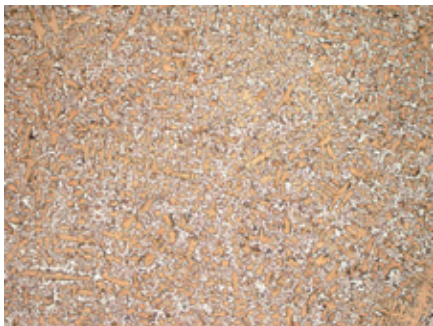


Figure 5: Microstructure of new high chromium die steel  
Austenite + Carbide,  $\times 200$

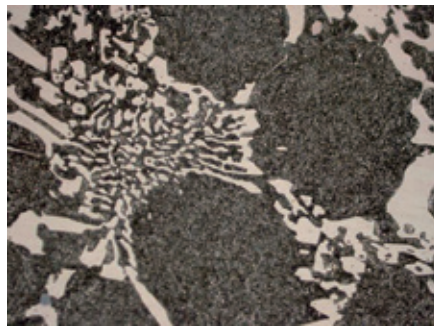


Figure 6: Microstructure of new high chromium die steel  
Martensite + Carbide,  $\times 500$



Figure 7: Microstructure of new high German die steel  
Martensite + Carbide,  $\times 100$

pieces of the same material and the same heat treatment processing demonstrates that the die has quenched fully, and the hardness range is 55 ~ 65HRC.

The mechanical property comparison of new high chromium die steel and German die steel is listed in Table 3. (Radial samples)

### 3.4 Microstructure of new crimping die steel

The carbide of high chromium die steel is mainly of  $M_7C_3$  type, and these carbides appears in incontinuous strip, block, grain and chrysanthemum-like shapes; their microhardness can reach 1,800HV and these carbides account for 20 per cent or so. Certainly, the matrix can be designed as austenite, bainite or martensite and so on according to the die service condition of different material types, and their macrohardness can reach HRC55 ~ 65.

The microstructure of new high chromium die steel is shown in Figure 5 and Figure 6.

The matrix of German die steel is martensite, and the carbides take up about 15 per cent, which are mainly of  $M_7C_3$  type. Its microstructure is shown in Figure 7.

### 3.5 Wear-resisting property comparison of crimping die steel in laboratory

The MM-200 ring-block wear testing machine has been adopted in the experiment, and the homemade water system has been cooling the samples through the testing process.

There are the same testing parameters adopted, including loading force, spindle speed, testing time, cooling water rate,

Material and heat treatment method	Tensile strength /MPa	Average/MPa	Material and heat treatment method	Impact toughness /kJ·m <sup>-2</sup>	Average /kJ·m <sup>-2</sup>
High chromium die steel Quenching and tempering	705	695.8	High chromium die steel Quenching and tempering	40	39.2
	725			35	
	695			40	
	635			40	
	695			40	
German die steel Quenching and tempering	720	710.7	German die steel Quenching and tempering	40	30
	732			21	
	717			30	
	683				

Table 3: Mechanical property comparison of new high chromium die steel and German die steel

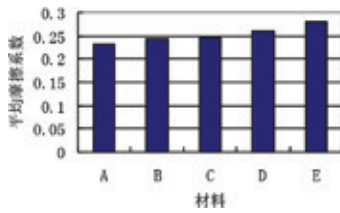


Figure 8: Average friction coefficient

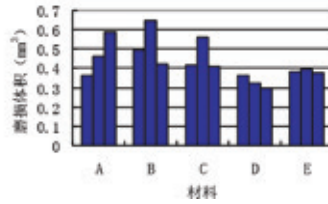


Figure 9: Volume wearing capacity

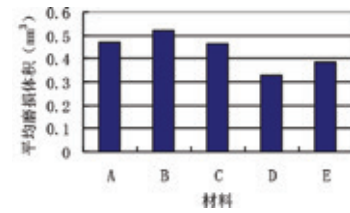


Figure 10: Average volume wearing capacity

wearing ring material and size, and testing sample block size. The testing sample blocks have been made of five kinds of materials, three blocks per kind, and the materials are listed as follows:

No.	A	B	C	D	E
Material	German die steel	American D2	Japanese SKD11	High chromium die steel- A	High chromium die steel- B

The test results show that the new crimping dies made of high chromium die steel are almost equivalent to the dies made in Germany in the wear-resisting property.

## 4 Field application of new crimping dies

After completing die manufacture of high chromium die steel, non-destructive testing has proved that the new crimping dies have satisfied the requirements of ultrasonic testing standards<sup>[9]</sup>, the Level 2 requirements of magnetic particle inspection standards<sup>[9]</sup> and the Level 2 requirements of PT inspection standards<sup>[10]</sup> and that there are no crack defects in the surface or near the surface.

After delivery of the new crimping dies, the die manufacturing precision and the physical and chemical properties have met the scheduled requirements in the die assembly and service in Baosteel.

In the volume experimental process, the forming quality indexes, the surface quality and the marginal extension after crimping are all in line with the quality control requirements.

From January 2014 to July 2014, 3,978 pipes have been formed with the new crimping dies; after off-line inspection, there has been uniform wear in the die surface and no surface defects affecting the quality of welded pipes and the die lifespan, as shown in Figure 11; NDT results have proven to be good.



Figure 11: Surface wear condition of new crimping dies

## 5 Conclusion

The developed high chromium die steel has fully met the service condition requirements of crimping dies. Its testing and usage results have demonstrated that the quality level of the new dies have reached that of the forged alloy steel dies made in Germany and that the new dies can substitute former crimping dies competently, enhancing the manufacture level of Chinese advanced dies used in production of UOE welded pipe. The development and application of new crimping die steel has made Baosteel and Sifang explore a lot in mastering core manufacture technology of crimping dies for UOE welded pipe formation. In future, the study will focus on design of the working surface profile and material improvement in order to enlarge the producible specification range of UOE welded pipe plant, extend the lifespan of dies and boost a controllable level of pipe forming processing.

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