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THE UTILITYSOURCE

Products and Services for Today's Electric, Telecom, and CATV Utilities

Vol. 24 Issue 12

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Purpose-Built Forged Parts Optimized for Power Generation “End Use”

Working with an experienced supplier of open die forgings, seamless and contoured rolled rings, and complex forged parts that prioritizes the “end use” of the part form in the early stages of the process helps ensure quality, performance, safety, and compliance in critical applications.

When forging seamless rolled rings for the power and energy industries, it is crucial to tailor components for their specific applications, or “end use.” In the realm of metal parts, this term commonly denotes the ultimate form and state of the final machined part, along with a comprehension of the operating conditions it will face during service.

“By understanding the final application or purpose – the end use – for which these parts are designed and manufactured, forged parts suppliers can determine the appropriate materials, manufacturing processes, and quality standards necessary to ensure that the metal parts perform effectively and reliably in their intended applications,” says Jeff Klein, Director of Sales for All Metals & Forge Group. The ISO 9001:2015 and AS9100D-certified manufacturer produces open die forgings, seamless and contoured rolled rings, and complex forged parts to industry standard specifications in 8-10 weeks.

According to Klein, open die and forgings and seamless rolled rings play a crucial role as components in the power and energy sector for a wide variety of end uses. In this industry, forged shapes and seamless rolled rings are crucial for turbines and other power generation machinery as well as hydraulic applications including gears, shafts, hubs, and flanges. As such, these items must exhibit exceptional attributes such as strength, durability, precision, and resistance to fatigue, deformation, and harsh environments in saltwater or downhole uses to meet precise performance standards when deployed in the field.

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In some cases, failing to consider the end use can even introduce serious risk, including catastrophic failure of a part while in operation, resulting in safety hazards as well as very costly production downtime when essential replacement parts are not readily available.

Consider End Use, from the Start

The consideration and planning to meet end use requirements should begin with the service requirements outlined during the engineering phase of design and conclude when the part is in its operating position, performing as intended.

“It is vital that the manufacturer specify the end use of each part and ensure it is communicated throughout the production chain, from the design engineer, through purchasing, the forging operation, heat treating, finish machining, and final assembly of the end use, including the mechanical

property requirements and the heat or corrosive conditions in which the forged part will perform,” says Klein.

According to Klein, the power and energy industries have unique specifications and standards that metal parts must meet. The specific function of the part will dictate its design, dimensions, material selection, forging, heat treating and finishing processes. In all cases, the part must be manufactured to industry standard specifications such as ASTM or AISI unless the OEM has developed their own requirements by modifying one of those standards. In short, the finished product must comply with all quality, durability, chemistry, and mechanical properties within the selected standard.

Seamless rolled rings can be produced in a variety of alloys, sizes, and shapes specific to fit end use



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requirements. However, by collaborating closely with the forging supplier, engineers, buyers, and machinery builders can ensure the ideal selection of chemistry, mechanical properties, heat treatment, machining, and testing ultimately required for each part's end use.

The process often begins with the selection of the alloy grade used in for open die forging or seamless rolled ring production, which can apply to many specific uses. These range from low and medium carbon steels, through high-carbon steels, aluminum alloys, alloy steels, stainless steels, nickel alloys, tool steels and titanium alloys. The precise alloy for the intended end use should always be specified and stated in the purchasing process according to final mechanical property requirements and service conditions.

Material properties can also be altered for specific end uses by hot working as well as by using various chemistries, temperatures, heat treatment times, and cooling methods. This facilitates the production of seamless rolled rings or forged parts with optimized mechanical properties and structural integrity before the part moves on to finish machining.

Each metal possesses unique alloy chemical compositions formed during the steel mill process, along with diverse production procedures for generating ingots or billets of different grades and purities tailored for industry specifications. Consequently, the quality of steel mill output is critical.

In the case of All Metals & Forge Group, end use is emphasized from the very beginning in the re-

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quest for quote (RFQ) process. The company works with its steel mills to purchase the correct starting stock to achieve the specified properties and operating reliability required of every part. In addition, rough machined parts are tested at least three times to prove chemistry, mechanical properties, and soundness before shipping.

According to Klein, there are groups of alloys within each metal material that lend themselves to specific end uses.

High-nickel alloys (I625, I718, I825), for example, are used at high temperatures in such applications as nuclear power generation, where high oxidation resistance is required.

The Inconel 600 and 700 series were developed for specific end uses. Inconel 600 resists chloride-ion stress corrosion cracking. Inconel 690 resists sulfur-bearing gases. Inconel 718 is a precipitation-hardening alloy designed to give very high yield, ultimate tensile strengths, and resistance to creep rupture at temperatures up to 1300°F (705°C).

End use is equally important with stainless steels, where the various groups of martensitic (hardenable), ferritic, and austenitic cover a very wide range of properties and applications when resistance to corrosion and heat are critical.

Basic type 410 martensitic grade stainless, with around 13% chromium, is sufficient for mild corrosive conditions, whereas the ferritic type 430, with 17% chromium shows resistance to more severe environments. The performance of the austenitic stainless steels, based on the 18% chromium/10% nickel in type 304 is selected for certain end uses when correctly heat treated and not subject to



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carbide precipitation. The various additions to the base 304, such as molybdenum, improve resistance to pitting corrosion. The resultant molybdenum-containing grades are types 316 and 317, normally supplied in the low-carbon versions, 316L and 317L.

The range of stainless steels continues through

types 329 and 2205 duplex alloys – austenite and ferrite – that provide good resistance to pitting and stress corrosion cracking, to precipitation hardening grades such as 13-8Mo, 15-5PH, 15-7Mo and 17-4PH. These latter grades reach high yield and ultimate tensile strengths from a single, low-temperature heat treatment following a solution anneal. This makes these types of stainless

steels suitable for challenging applications such as nuclear reactor parts.

With so many options available, a thorough grasp of the end use is vital for establishing the correct material, dimensions, and properties needed during forging to guarantee peak performance in the eventual application.

By collaborating with an experienced seamless rolled ring manufacturer that can tailor the forging process to the specific end use, power sector OEMs can ensure their final product meets all the necessary requirements and industry standards for their specific application.

For more information, contact All Metals & Forge Group, LLC at 75 Lane Road, NJ 07004; (973) 276-5000; Canada 416-363-2244, toll-free (800) 600-9290; fax (973) 276-5050 or visit

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Facility Snow Clearing The Mandate in 2024-2025: Do More With Less

By Del Williams





Snow removal equipment innovations are enabling a wide range of facilities to clear more snow with significantly less equipment, labor, maintenance, and repair

To ensure safety and access, facility personnel are often tasked with clearing snow from roads, parking lots, and other common areas at hospitals, clinics, airports, ski resorts, transport hubs, schools, colleges, and universities, as well as retail, commercial, and industrial sites. In situations where the grounds are extensive, traffic is heavy, and prolonged access restrictions are impractical, many facilities choose to utilize in-house personnel for snow removal rather than relying on third-party services.

Due to the high cost of specialized snow clearing equipment, most facility managers opt to purchase snow clearing attachments compatible with existing skid steers or wheel loaders, which are also used for other tasks.

Often, the initial cost for the snow plow or snow pusher is the primary driver. However, the primary challenge with most fixed box snow pusher attachments is the lack of flexibility to back drag or angle. Those that offer these features tend to be bulky, restricting the skid steer's maneuverability. Given operators may only remove snow seasonally, not to mention high turnover in these types of positions, the equipment controls should also be easy to learn and simple to use.

Considering these factors, investing in more adaptable and agile snow removal attachments may involve a slightly higher initial cost but enhances the efficiency and quality of snow clearing with reduced training.

One option, from Minnesota-based SnowWolf Plows, is its patented AutoWing QuattroPlows. Founded in Minnesota in the 1990s, SnowWolf offers a variety of models and sizes of snow plows, pushers, blowers, and other snow removal accessories that are compatible with skid steers, wheel loaders, front-end loaders, tractors, and other machinery.

The AutoWing QuattroPlows are available for machines weighing from 6,000 to 30,000 pounds and widths from 8' to over 14'- specialized attachments that allow operators to switch between angle plowing, wide-angle plowing,



pushing, and back dragging on the fly.

A key feature of the AutoWing design is the ability to move the side wings 165 degrees on the go, depending on the width of pass you wish to take, the amount of snow you wish to carry, or whether you are pushing snow forward or back dragging. This allows operators to efficiently clear wider swaths of snow without manually adjusting the plow's position, increasing productivity and reducing the need for additional passes.

The AutoWing is also unique because it only requires one hydraulic circuit for efficient operation. Just plug in your two hoses and go. No machine set up is required, no wiring is necessary, and no specialized controls are needed, meaning you can move the Quattro Plow from machine to machine in minutes. The attachment can be angled left or right, and the desired wing position obtained right from the standard auxiliary function located on your machine's joystick. This user-friendly design greatly shortens the time required for operator training allowing them to become proficient much faster and be able to clear more acres of snow per hour.

The increased efficiency of snow removal can substantially improve operations. The customers are reporting the time required to clear a complex site

can be reduced by 30% or more.

SnowWolf's snow plow attachments are also available with ActivEdge, a unique design involving multiple cutting-edge sections with individual adjustability and adaptability. The floating cutting edges allow for more precise snow removal even on varied surfaces and minimizes the need for excessive salt or deicing agents.

Due to its ability to conform to surface contours, the ActivEdge more effectively clears the area, reducing the necessity for additional passes. The equipment requires almost no maintenance and is designed to withstand the rigors of commercial snow clearing.

By selecting more flexible and nimble snow removal attachments instead of the lowest priced options, facility managers can improve the efficiency and effectiveness of their annual snow clearing efforts. When the return on investment is carefully analyzed, it becomes evident that the initial higher investment in advanced attachments pays off, making them an indispensable component of facility snow removal strategies.

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Simplifying the set-up and application process, the M18™ FORCELOGIC™ 5" Underground Cable Cutter with Wireless Remote features an enhanced ergonomic design for improved balance and maximum control. Designed with a guillotine jaw style, this cable cutter allows Cablemen to cut up to 5-inch (127 mm) Diameter Communications, Armored, Lead Sheath, Copper, and Aluminum Power Cables wirelessly. The adaptable forward handle rotates and pivots independently of the head to provide users maximum control, while its balanced design and hang hook enable the easiest setups in vaults. Featuring a head that rotates 180 degrees, the quick-release and turn-to-close style latch pin is easily opened or secured with just one touch. For added confidence, an integrated Last Cut application shut-off ensures a battery will never die in the middle of a remote cut and leave the application incomplete. Whether cutting locally or with a wireless remote, Milwaukee delivers an optimized cutting experience.

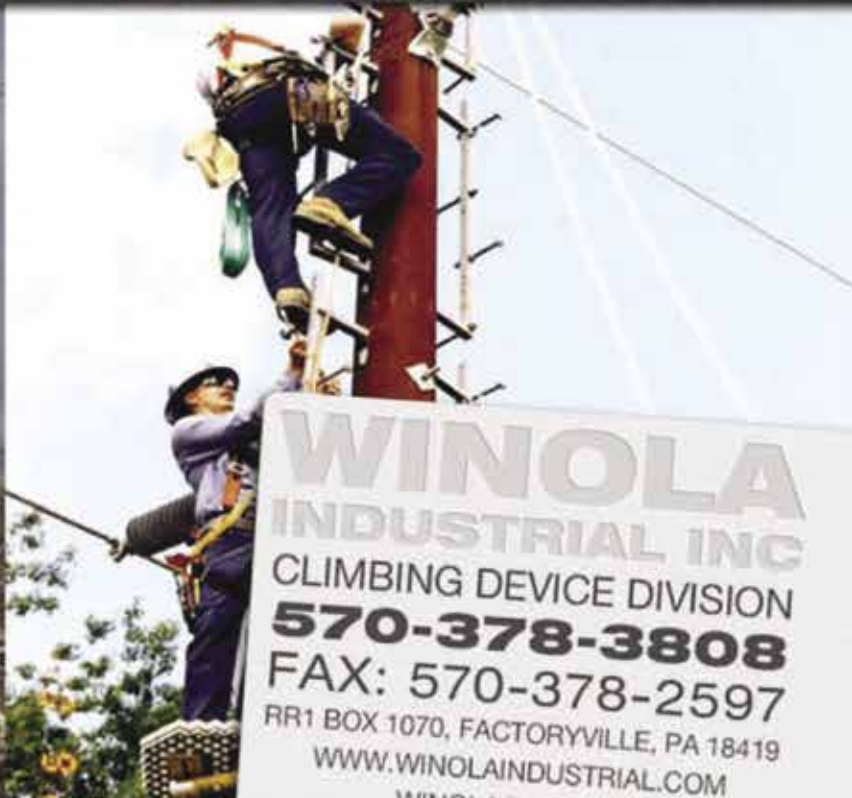
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on the jobsite. Increasing the distance between cable professionals and potential live wires serves as an effective strategy to mitigate these risks and build reassurance of a safe working environment. Utilizing cutting-edge Bluetooth® Technology, the M18™ FORCELOGIC™ 5" Underground Cable Cutter with Wireless Remote provides cut confirmation confidence for advanced user safety. The wireless remote operates via an exclusive connection, eliminating the possibility of interference from other smart devices. Following setup, Cablemen can activate the remote cutter and remove themselves from the hazardous area. Once the tool has completed the cut, a green LED on the wireless remote gives a positive indication to provide users confidence in the cut's completion. By providing the ability to remotely cut and separate the user from the tool, Milwaukee's Underground Cable Cutter eliminates the hazard of cutting potentially live cables for professionals on the job, driving safety and productivity.

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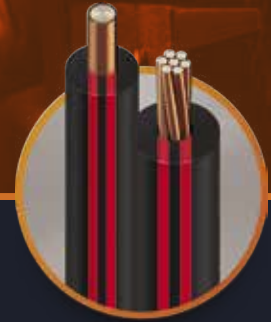
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GPS Location



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EMSCO	IFC	www.emscomn.com
Essex Steel	7	www.essexsteel.com
Grace Industries	23	www.graceindustries.com
LAN Shack	8	www.lanshack.com
Maddox Transformer	9	www.maddoxtransformer.com
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