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**Boehlerit – Know-how in cutting of tubes**

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Boehlerit offers a uniquely wide variety of products for complete cutting machining solutions for the whole manufacturing process of tubes of all dimensions. This ranges from the processing of the welded edges and to the outer and inner burrs of the welds to tube-end machining. Other industries also benefit from Boehlerit's decades of experience, such as in sheet edge machining in shipbuilding, for example.

The manufacturing of large tubes, such as those used in, for example, pipelines for transporting liquids such as oil, or natural gas, is the supreme discipline in tube manufacturing, and is now carried out in highly integrated overall concepts with intelligent production lines. Equally demanding is the manufacturing of small tubes for precision applications in the automotive industry. The interlinked production steps from the coil or sheet to the finished tube therefore require a high degree of process reliability. This also applies, of course, to the various cutting machining steps incorporated into the machining operations. Here, extremely robust tool systems with long tool service lives are required in order to prevent interruptions of production caused by downtimes and/or set-up times of the expensive plants. In addition to this, a much greater machining precision is required than one might suppose at one's first glance at the finished product. All the same, these are tubes with diameters from around 500 millimetres upwards. For example, for the Nord Stream 2 pipeline, currently one of the world's largest and most complex offshore projects, tubes are being laid with an outer diameter of 48 inches and wall thicknesses between 33 and 41 millimetres. With tube diameters well over 3,000 millimetres, the production capabilities of some plants are substantially above even this. The high machining accuracies ultimately stem from the requirements for the weld seams. The smallest irregularities can cause leaks to occur later on. Their quality starts with the preparatory cutting machining and also includes, of course, the deburring of the longitudinal weld seams inside and outside.

In order to cover the different machining steps, Boehlerit has, over the decades, as the industry's leading tool supplier, created the market's most comprehensive product range, now also including standardised solutions. The first cutting machining step in the process sequence is the preparation of the weld edges. The considerably cheaper milling process is frequently used in addition to weld edge planing. In this, the edges of the strip or sheet are synchronously machined on both sides with opposing milling heads. These tools are designed and produced specifically for the respective plants, the materials to be cut, the material thicknesses, and the required edge profiles.

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### Modular Standard Components

Boehlerit offers modular profile milling heads as a particularly cost-effective and flexible solution. They consist of a base body with exchangeable milling cutters and indexable inserts. The cut contour that is produced is determined by the shape of the cutters. One advantage over conventional monoblock tools is that in the event of damage it is not necessary to replace the whole tool, but only the affected cutters. Additional adjustment work is not required. On top of this, the cutting profile can be easily and quickly changed when necessary by replacing the cutters, whereas otherwise an entirely new tool would have to be procured. This, of course, represents attractive added value for a pipe factory.

Boehlerit reproduces all edge profiles for which there is demand in the industry, with corresponding milling cutters and indexable inserts. This means that users have the choice between an I-profile, X-profile, Y-profile or tulip profile.

In the case of longitudinally welded tubes, the next cutting operation is the deburring of the weld seam from inside and/or outside using shaving tools. Boehlerit offers the necessary clamp holders, cutters and cutting inserts and/or cutting rings. These tools are also designed for the specific applications and geometrically adapted to the diameters of the pipes. The special challenge here is that the deburring is carried out very soon after the welding and so the cutting inserts are usually subjected to the still very high temperatures in the weld seam. Special cutting geometries and carbide varieties are used here for this reason.

Above all, large tubes for pipeline construction require machining at the tube ends, to make it possible to weld them together. The accuracy requirements are achieved with turning processes for which Boehlerit supplies complete tool systems, consisting of face-plates, sprung tool slides, cassette holders, copying roll and various spindles for adjustment. There is a comprehensive standard range for cutters and indexable inserts in the catalogue.

### Synergy Effects

“Innovations for tube production mainly take place in the area of cutting materials and tool concepts”, explains Raphael Pock, Product Manager at Boehlerit. In this segment, it is mostly high-strength special steels that are machined. These can withstand the powerful forces from inside and outside. The material range normally goes from X 50 to X 100 sheets. Increasingly, corrosion-resistant steels are used. The use of wear-resistant coatings and geometries for rust-free steels, for example, shows that the cutting material specialists from Upper Styria are also using their know-how in general cutting technologies synergistically here. This ensures improved chip removal due to a low tendency to stick, thus increasing service lives considerably.

The basic concept of the modular tool systems for sheet edge machining also comes from other machining fields, such as crankshaft production. Similar tool systems are used there, which make it possible to equip a base body flexibly with milling cutters and indexable inserts. “We can cover all profiles with base bodies, different cutters, and the comprehensive portfolio of indexable inserts”, adds Thomas Waltenberger, Segment Manager

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for Heavy Cutting at Boehlerit. Especially selectable indexable insert designs and system solutions ensure an optimal chip removal and heat dissipation in the dry machining of a wide variety of materials qualities.

Beyond this, the tool systems of Boehlerit can also be found in applications from general plant engineering to shipbuilding to the milling of slabs in steelworks.

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### The company

Boehlerit, headquartered in the Austrian town of Kapfenberg, sets global standards with carbides and tools for the processing of metal, wood, plastics and composites. With cutting materials, semi-finished products, precision tools and tool systems for milling, turning, drilling and forming, Boehlerit ensures process safety and efficiency on a global scale. The company's extensive product portfolio includes highly specialised tools for the machining of crankshafts as well as for the mining industry, for bar peeling, tube and sheet metal processing and heavy-duty machining. The Boehlerit product range also features carbides for construction components and wear protection. When it comes to coating technology, Boehlerit holds a global monopoly, ranging from the first-ever nano-CVD bonding layer to the hardest diamond layer worldwide. With its many years' experience in metallurgy, coating technology and state-of-the-art press technology, Boehlerit is a highly competent development partner for toolmakers.

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Pictures

Abb. 1: A makeover for Boehlerit

