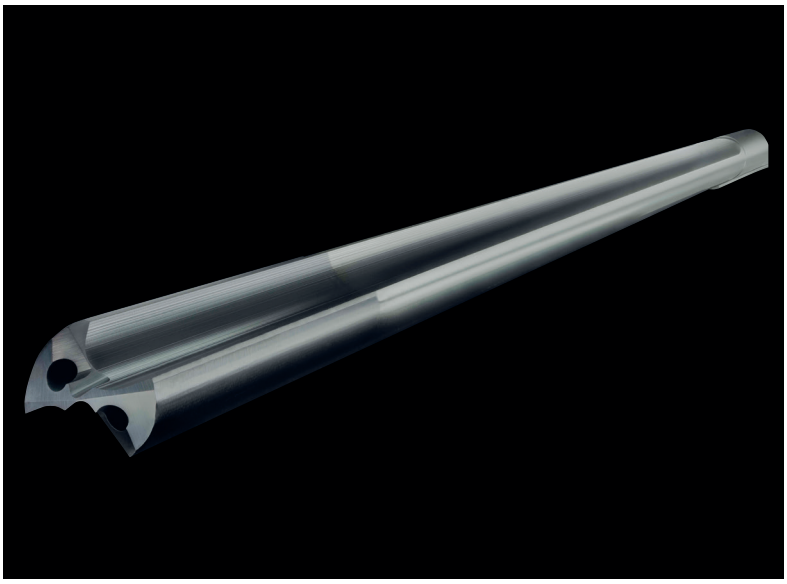
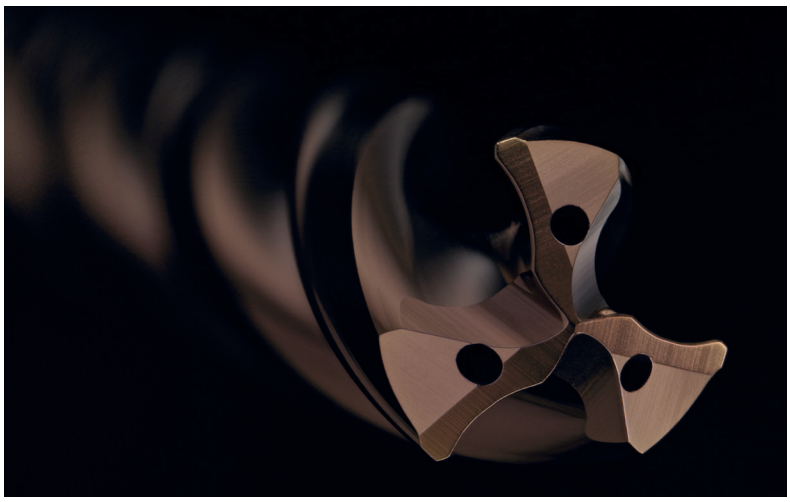


Solid carbide 2-fluted drill Type 123-04

At the international trade fair EMO, botek GmbH presents two new innovative tooling solutions. A twin-fluted drill has been developed for best bore qualities for stainless steel materials under emulsion which is unrivaled in terms of surface quality and tool life. A special three-fluted cutter for eccentric over drilling and spot drilling on surfaces guarantees maximum productivity.

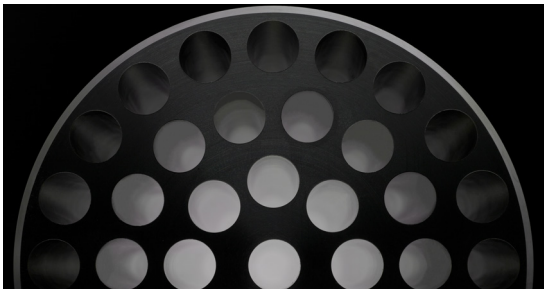
Best drilling quality for stainless steel

Whether in energy, medical and process engineering or engine development: stainless steels are becoming increasingly important. In the machining of these stainless steel materials, performing high-quality bores in particular present a challenge. If oil is used as the cooling lubricant, single flute drills can be used reliably and cost-effectively. However, most machining centers are operated with water-based cooling lubricants, which have significantly poorer lubrication properties. Therefore, the guide pads of single flute drills wear very quickly in chrome alloy steels, which leads to a significant deterioration of the surface roughness of the bore after only a few millimeters of drilling and to an early end of tool life after approx. 1-3 meters of feed travel.



High feed three-flute cutter Type B201

botek GmbH has taken on this special challenge and is presenting a new development of its solid carbide 2-fluted drill Type 123-04 at the EMO. This straight fluted drilling tool allows the machining of corrosion-resistant steels under emulsion, allowing for excellent bore qualities that can otherwise only be realized by using single fluted drills or via multi-stage machining processes. A special flute geometry guarantees optimum chip formation and reliable chip evacuation. The adapted nose grind, a TiAlN coating and large coolant channels ensure safe and constant chip formation and guarantee long tool life. Due to the straight flute, the tool can be regrinded easily and cost-effectively.



Workpiece machined with solid carbide 2-fluted drill Type 123-04

Application examples
Tool life test botek solid carbide 2-fluted tool Type 123-04:

➔ **Material: 1.4301**
– Round material Ø 100 x 200 mm
– Alternative designations: V2A, X5CrNi18-10
– Chrome (Cr): 17.5 – 19.5 %
– Nickel (Ni): 8.0 – 10.5 %
– Austenitic material tends to harden during machining

• **Machining**
– Tool: Ø 10 x 290 mm
– Drilling depth 200 mm (20 x D)
– Emulsion, p = 75 bar
– Cutting speed v_c = 40 m/min
– Feed f = 0.04 mm

• **Result**
– L_f = 54 m drilling path realized; process reliable; no end of tool life
– Hole diameter within 0.008 mm (8 µm), corresponds to IT6 in this case
– A centerline deviation could not be determined
– Surface roughness of the bore wall: Ra < 0.6 µm

Chip formation for 1.4301 (Pictures: botek)

➔ **Material: 1.2085**
– Alternative designations: X33CrS16
– Chrome (Cr): 15 – 17 %
– Nickel (Ni): approx. 0.5 %
– Strength 950 – 1,100 N/mm²
– Martensitic

• **Result**
– Depending on diameter, process reliable feed f = 0.2 … 0.3 mm possible

Another innovation from botek, the high feed three-flute cutter (HPC drill countersink) type B201, is characterized by optimized cutting edges, polished chip spaces and a specially developed flute geometry, which enables outstanding cutting performance with a wide range of materials. The 3-fluted tool not only allows very high feed rates and cutting speeds, but also enables eccentric cross-hole-drilling or spot-drilling on inclined surfaces. The XTS coating guarantees high temperature resistance and protection against abrasive wear. The tool, which is available with inner coolant (B201-00) and without (B201-01), guarantees reliable chip removal even at low coolant pressure or without inner coolant and can be used for materials with high strength and hardness as well as for long-chipping materials.

Application examples
Tool life test botek-high feed three-flute cutter Type B201:

➔ **Material: 1.2379**
– Alternative designations: X155CrVMo12-1
– Cold work steel
– Chrome (Cr): 11 %
– Moderate machinability

• **Specifications**
– Bores 3 x D
– Spot drilling on inclined surface 10°

• **Machining**
– Bores: Ø 5 x 66 mm
– Cutting speed v_c = 70 m/min
– Feed f = 0.3 mm
– Drilling depth 15 mm

• **Result**
– Reliable process
– Highly productive
– L_f = 52.5 m (3,500 Bores)
– Max. position deviation: 0.02 mm, despite oblique spot drilling (without need to face with a milling cutter prior)

➔ **Material: AlSi9Cu3**

• **Specifications**
– Special application with drilling depth 18 x D
– Supply bore Ø 12 in cylinderhead AlSi9Cu3

• **Result**
– Reliable and highly productive machining
– Tool life L_f = 880 m

The botek solid carbide 2-fluted drill Type 123-04 is available in diameters 6 - 16 mm and is designed according to the specific application. The high feed three-flute cutter Type B201 is available in Ø 3 - 20 mm, L = 3 x D as standard, other dimensions and lengths on request. The botek application engineers will be pleased to assist with the design of tools and processes. Contact via the botek technical hotline at +49 7123 3808-300 or via www.botek.de