botek®

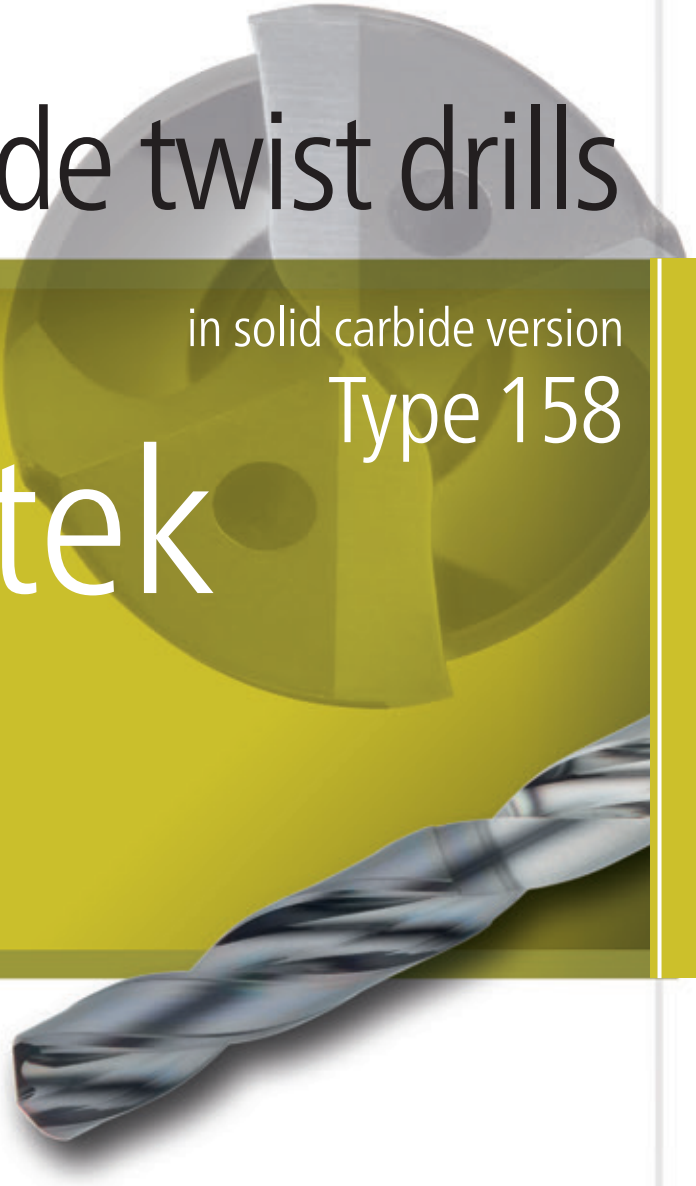
DEEP HOLE DRILLING SYSTEMS
SOLID CARBIDE TOOLS

Solid carbide twist drills

in solid carbide version

Type 158

botek



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botek – the company

botek is a globally active specialist for cutting tools with around 750 employees at the main plant in Riederich at the foot of the Swabian Alb. With production facilities in France, Hungary and India as well as over 50 international sales and support partners worldwide, we are always at your side around the globe.

For almost 50 years, our focus has been on the development and production of drilling tools: deep hole drilling tools with diameters from 0.5 mm to 1500 mm, milling cutters and reaming tools as well as the associated services. Today, we continue this specialisation successfully, sustainably and keep our innovation-oriented values for the next generation as well.

In the age of technological change, however, new demands also require new thinking.

Our focus is no longer solely on tool development and production but is being meaningfully complemented by innovative and goal-oriented project management.

Our objectives are the design and conception of optimisation processes along with the development and implementation of complete turnkey projects, which we implement effectively with the cooperation of our experienced team of technician and project managers as well as our customers.

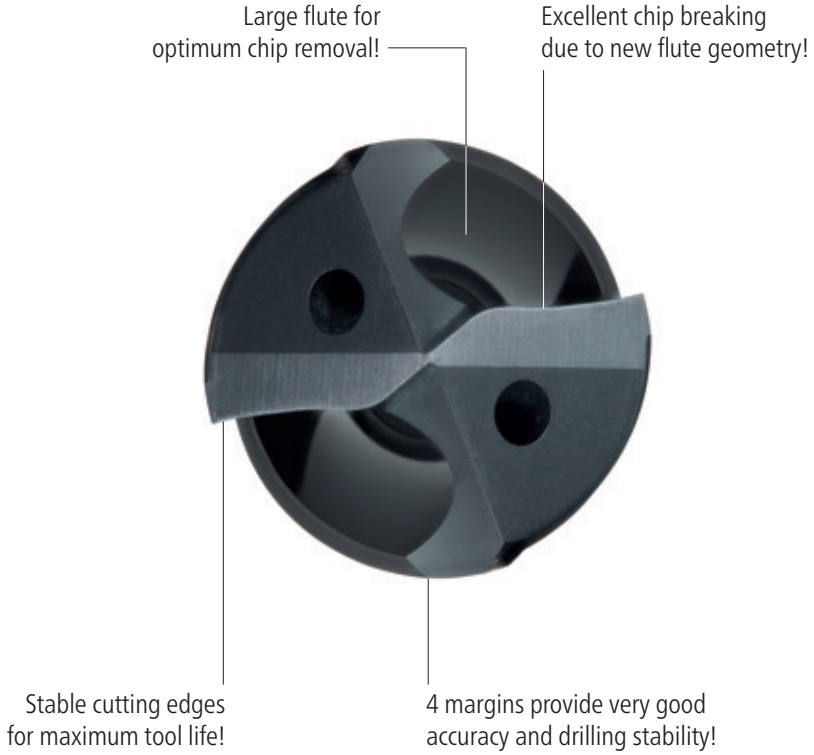
This is why botek technology leads the way – now and in the future.

- Please note our safety pointers at www.botek.de.
- Our General Standard Terms and Conditions, which we assume as known, apply.
- We reserve the right to make modifications in the interest of technical improvement.
  Such modifications cannot, in principle, be accepted as justifiable reasons for complaints.
- Subject to change. The manufacturer accepts no responsibility for misprints and other errors.

Contents

botek advantages
NEW: Carbide twist drills with internal coolant supply

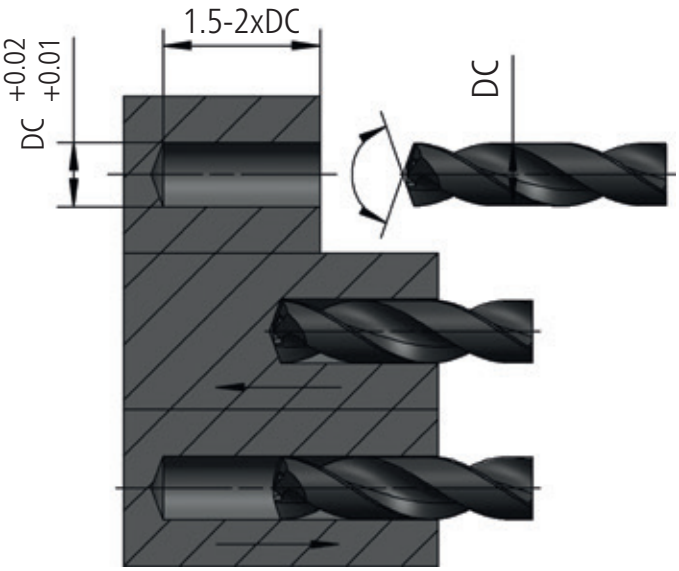
1. Twist drills from the deep hole drilling tool specialist.
2. Top product quality, since **development and manufacturing** take place at botek.
3. Extremely good productivity achieved by high feed rates.
4. Outstanding tool life and good breaking resistance due to improved toughness of the carbide.
5. Problem-free chip evacuation thanks to special geometries and surface finish in the flute, making chip removal strokes largely unnecessary
6. 4-chamfers for precise guidance of the drill, resulting in high drilling accuracy and low hole centre run-out.
7. Suitable for use with emulsion, deep hole drilling oil and minimum quantity lubrication.
8. Benefit from our reproducible quality in the area of regrinding for maximum performance. Regrinding and coating service from botek.



Conditions for successful deep hole drilling:

1. An efficient coolant and filtration system with a filtration of 20 µm to 30 µm (the smaller the diameter, the better the coolant and filtration should be).
2. Suitable coolant, i. e. oil or emulsion (min. 6 % concentration, with additives) has to be provided in sufficient quantity and pressure. Minimum quantity lubrication (MQL) is also possible.
3. Guidance with a botek pilot hole in the workpiece.

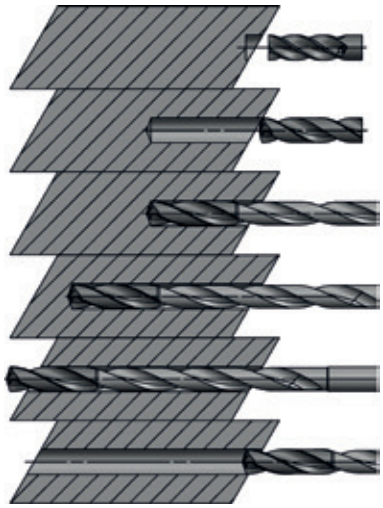
Machining sequence:



1. Drill pilot hole
   (for size see table "Dimensions for the guide hole").
   ➔ We recommend to use botek pilot drills.
2. The twist drill is fed into pilot hole while non rotating or rotated slowly at < 200 RPM.
3. Switch on the coolant.
4. Switch on RPM and feed.
5. After reaching the drilling depth switch off the RPM.
6. Switch off the coolant pump.
7. Fast retract with the spindle stopped or slowly rotated < 50 RPM. Please see our safety instructions.

Application requirements
for carbide twist drills

Angular drilling

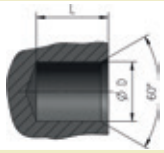


1. Spot facing.
2. Drill pilot hole (for size see table "Dimensions for the guide hole").
   ➔ We recommend to use botek pilot drills.
3. The twist drill is fed into pilot hole while non rotating or rotated slowly at < 200 RPM.
4. Switch on coolant pump und operating speed.
5. Switch on feed on the machine.
6. After reaching the drilling depth switch off the RPM.
7. Fast retract with the spindle stopped or slowly rotated < 50 RPM.
   Please see our safety instructions.

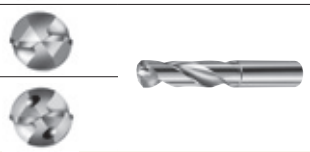
The mentioned values are guide values. The maximum possible values depend on the diameter and length ratio of the tool.

The carbide twist drill is a self centering drilling tool. However, a guidance by means of a pilot hole is necessary.
Drill lengths exceeding 15 x Dia., high feed rates while drilling and the resulting deflection forces might cause tool breakage.
Quality and accuracy of the pilot hole affect tool life and centreline deviation.

Guide values for drilling guidance

	Drill diameter (mm)	**Dimensions for the guide hole (pilot drills)**	
		L (mm)	**D** (mm) for **very precise** hole quality
	3.000 – 14.000 mm	1.5 – 2 x D	D + 0.01 to 0.02 mm

Overview – pilot drills

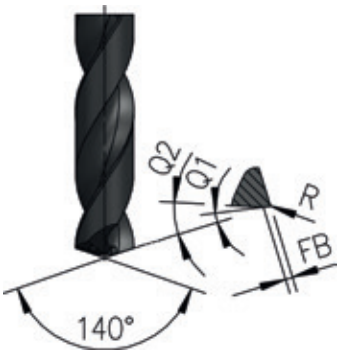
Type		
Type 153-02 not coolant fed / point angle 140° with chamfer, 3 x D (flute length)	Standard	
Type 153-03 coolant fed / point angle 140° with chamfer, 5 x D (flute length)		
Type 158-07 not coolant fed / point angle 145°, 3 x D (flute length)	Optimized	
Type 158-08 coolant fed / point angle 145°, 5 x D (flute length)		

Overview – carbide twist drills

Type	Tool diameter	
Type 158-00 Solid carbide twist drill / solid drilling tool / 4 margins (high-performance twist drill), coolant fed	Tool diameter **3.000 – 14.000 mm**	
All tools also available without internal cooling		

Standard nose grind

The drill point geometry and the resulting low axial forces allow very high feed rates. Stable cutting edges in combination with the special botek coating guarantee highest tool life.



Clamping shanks for Type 158-00

- Standard: DIN 6535 HAK. Others available on request (e.g. DIN 6535 HBK, DIN 6535 HEK).
- All shanks have optimized shank tolerances for hydraulic chucks.
- Optimised shank tolerance for shrinking, for hydraulic chucks and precision collet systems.

Service

➔ Coating
Carbide twist drills can be supplied with several botek coatings. The type of coating depends on the material, coolant and drilling application and is tailored to your requirements.

➔ Regrinding
botek provides an individual regrinding service and would be pleased to perform this task for you.

➔ Process design

➔ Customer testing in the botek testing field

Please contact us, Technical Hotline +49 7123 3808-300.

More information available at www.botek.de

Material groups	P			M		K	N		H
	Low alloyed steels	High alloyed steels	Annealed steel 35-45 HRC	VA steel martensitic	VA steel austenitic/ Duplex	Cast iron/ Cast steel	Aluminium Cast alloy	Aluminium Wrought Alloy	Hardened steel 45-50 HRC
Cutting speed Vc/ m/min	75 - 125	70 - 90	50 - 70	70 - 90	50 - 60	70 - 110	80 - 200	60 - 120	40 - 60
Type 158 10 x D/15 x D/20 x D/25 x D/30 x D									
Drill diameter	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)	F (mm/rev.)
3.0	**0.06 - 0.12**	**0.06 - 0.12**	**0.06 - 0.12**	**0.06 - 0.12**	**0.05 - 0.08**	**0.09 - 0.12**	**0.09 - 0.15**	**0.09 - 0.15**	–
4.0	**0.08 - 0.16**	**0.08 - 0.16**	**0.08 - 0.16**	**0.08 - 0.16**	**0.07 - 0.09**	**0.12 - 0.16**	**0.12 - 0.20**	**0.12 - 0.20**	**0.04 - 0.06**
5.0	**0.10 - 0.20**	**0.10 - 0.20**	**0.10 - 0.20**	**0.10 - 0.20**	**0.08 - 0.12**	**0.14 - 0.20**	**0.15 - 0.25**	**0.15 - 0.25**	**0.05 - 0.07**
6.0	**0.12 - 0.24**	**0.12 - 0.24**	**0.12 - 0.24**	**0.12 - 0.24**	**0.10 - 0.14**	**0.18 - 0.24**	**0.18 - 0.30**	**0.18 - 0.30**	**0.06 - 0.08**
8.0	**0.16 - 0.28**	**0.16 - 0.28**	**0.16 - 0.28**	**0.16 - 0.28**	**0.12 - 0.18**	**0.24 - 0.32**	**0.20 - 0.40**	**0.20 - 0.40**	**0.08 - 0.12**
10.0	**0.20 - 0.35**	**0.20 - 0.35**	**0.20 - 0.35**	**0.20 - 0.35**	**0.15 - 0.22**	**0.30 - 0.40**	**0.25 - 0.50**	**0.25 - 0.50**	**0.10 - 0.14**
12.0	**0.24 - 0.42**	**0.24 - 0.42**	**0.24 - 0.42**	**0.24 - 0.42**	**0.18 - 0.25**	**0.36 - 0.48**	**0.30 - 0.60**	**0.30 - 0.60**	**0.12 - 0.17**
14.0	**0.28 - 0.56**	**0.28 - 0.56**	**0.28 - 0.56**	**0.28 - 0.56**	**0.20 - 0.30**	**0.42 - 0.56**	**0.35 - 0.70**	**0.35 - 0.70**	**0.14 - 0.20**

Please note:

- **The guide values contained in the cutting value tables only apply to optimally clamped tools and the production of short chips.**
- The feed values must be adjusted accordingly.
- The feed rate must be adjusted in the case of interrupted cuts, e. g. bore exit cutting, especially with exit bevels, etc.

Drilling quality

To achieve optimum drilling results when using solid carbide twist drills, various criteria must be applied. In addition to tool design, key factors are machine design and construction, process techniques, pressurized and filtered deep hole drilling coolant. Selection of proper cutting parameters is also a significant factor.

The key factors botek considers when designing gundrills:

- Material type
- Diameter, tolerance and surface finish

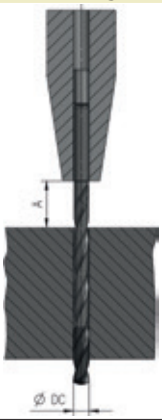
Our application engineers will be happy to support you with botek's expertise in designing your tools to suit your application.

Safety instructions:

1. **Before using** the drills make sure the machine has the necessary equipment to do proper deep hole drilling.
   The machine should have suitable safety guarding for protection from cutting chips and coolant for operator.
   Check with machine builder!

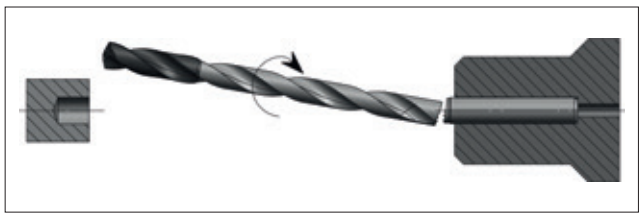
2. **Improper use or handling of deep hole drilling tools can cause serious injuries**,
   e. g. skin cuts from the cutting edge

3. **Operating instructions**

Tool holder	Tool length	Tool installation	Installation tolerance
			
The tool is securely clamped in a chuck.		Clamp on cylindrical part of tool only.	

4. The twist drill is fed into drill bush or pilot hole while non rotating or rotated slowly at < 50 RPM.
   Then the coolant and the machine spindle should get started.

5. **Consequences of failure** to comply with our usage instructions 1 – 4.



If our deep drilling tools are incorrectly used and our usage recommendations are not followed correctly, people may be injured and/or property may be damaged.

There is a risk of fatal injury if the tool breaks and flies through the air in an uncontrolled way!

Please note that all of the usage instructions and values are recommendations only.
We are not liable for damage resulting from incorrect handling of our deep drilling tools, operating mistakes, substandard mechanical requirements or improper use of our tools!

Do you have any questions? Please call us on our Hotline +49 7123 3808-300 an. We would be pleased to advise you.

	Example 1	Example 2
Tool type	Twist drill with IK, 4 margins Type 158-00 Ø 11.7 mm x 455 mm,	Twist drill with IK, 4 margins Type 158-00 Ø 9 mm x 437 mm,
	Flute length 405 mm = 35 x D	Flute length 380 mm = 42 x D
	Nose grind SA-0529	Nose grind SA-0529
Workpiece	Crankshaft	Transmission shaft
Material	20MnCr5 sulphur reduced	20MnCr5 sulphur reduced
Drilling situation	Solid drilling	Solid drilling
Pilot hole	Piloted step tool Ø 11.70 mm x 80, 2 x D piloted	Piloted drill Type 153-03 Ø 9 mm x 89 mm, 2 x D piloted
Drilling dia.	Ø 11.70 mm	Ø 9.00 mm
Drilling depth	405 mm (35 x D)	340 mm (37 x D)
Coolant pressure	60 bar	80 bar
Coolant	Emulsion	Emulsion
Cutting data		
Vc	85 m/min.	80 m/min
Fz	0.15 mm	0.15 mm
N	2063 rev./min.	2830 rev./min.
Vf	620 mm/min.	850 mm/min.
Result	No visible wear. Extremely good surface finish throughout.	Good chip formation. Quiet and smooth drilling all the way through.
		

botek®

Inquiry / Order

E-Mail verkauf@botek.de ☐ **Inquiry** ☐ **Order** (please mark with a cross where applicable)

Customer ID: _____ Order No.: _____

Address: _____ Shipping address: _____

_____ _____

_____ _____

Customer Contact: _____ Phone: _____

Drilling method: ☐ Solid drilling ☐ Interrupted cut ☐ Precast hole

☐ Hole exit under an angle ☐ Blind hole ☐ Through hole

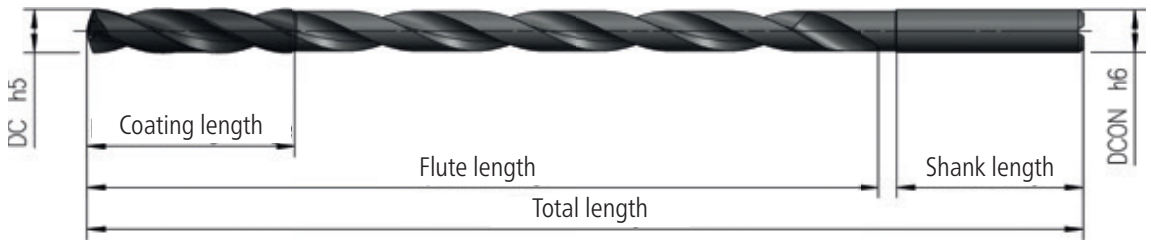
Material: ☐ Steel ☐ GG / GGG ☐ AL-Si-Leg ☐ _____

Machine: ☐ Machining center ☐ Deep hole drilling machine ☐ Turning/milling center

Cooling

☐ Internal cooling ☐ External cooling ☐ without cooling ☐ Minimum quantity lubrication

Ø (DC) h5	Length (OAL)	Drilling depth (mm)	Shank		Coating	Pieces	Delivery date
			Shank DIN 6535 HA (Standard)	Special-design			



☐ Type 158 Note: _____

☐ Type 158-08 _____

Mode of Shipment: ☐ UPS (delivery within 2 working days) ☐ TNT 9:00 a.m.

☐ TNT 12:00 a.m. ☐ Pick up

A surcharge will be applied depending on delivery requirement. You will be notified to this charge prior to production.
The number of tools for express orders is limited.

Date: _____ Signature: _____

A special inquiry sheet for new tool design is available at **www.botek.de**.
Stock program: While stock lasts – Subject to prior sale.

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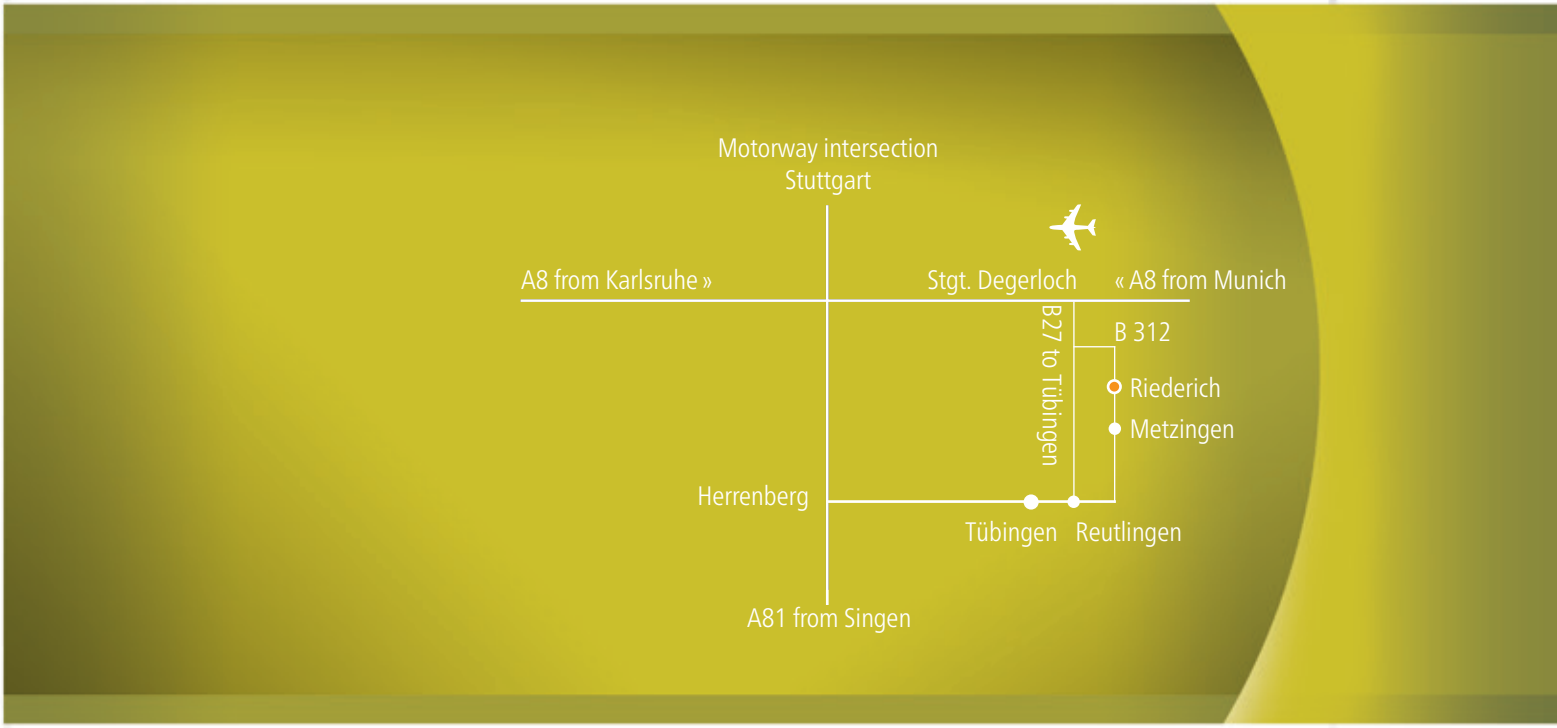

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