



RT 100 T

**Solid carbide spiral-flute
deep hole drills**

EXCLUSIVELINE[®]

Made by Guhring

RT 100 T – ex-stock range

Available ex-stock now: The spiral-flute deep hole drill RT 100 T. The program includes standard drills for drilling depths up to 15 x D, 20 x D, 25 x D, 30 x D and 40 x D. The RT 100 T ex-stock range offers an outstanding cost-performance-ratio as well as availability. Moreover, the RT 100 T drills permit highest cutting and feed rates and subsequently achieve a considerable reduction in machining time.

These advantages are achieved thanks to the following attributes:

Optimised flute geometry

The spiral-flute deep hole drills possess a special flute geometry that is optimised to the specific demand for optimal chip evacuation from the deep hole. (fig. 1)

Maximised coolant duct profile

To provide the cutting edge with an optimum coolant supply, the tools possess a maximised coolant duct profile. It ensures an efficient coolant supply to the cutting edge as well as excellent chip evacuation. (fig. 2)

Problem-free swarf

The factors described above – in combination with the cutting parameters optimally adapted to the application task – result in chips that are evacuated problem-free even from deep holes. Chip congestion and a subsequent jamming of the tool is effectively prevented. (fig. 3)

Wear resistant cutting edges

Thanks to the TiAlN-tip coating the cutting edges, that are exposed to maximum forces, are protected against wear.

Ultimate cost-efficiency: Applied on machining centres, where the drilling operation is a time relevant criterion, RT 100 T can display its superiority. Its high feed rates lead to a shorter production time, its long tool life reduces the number of tool changes.

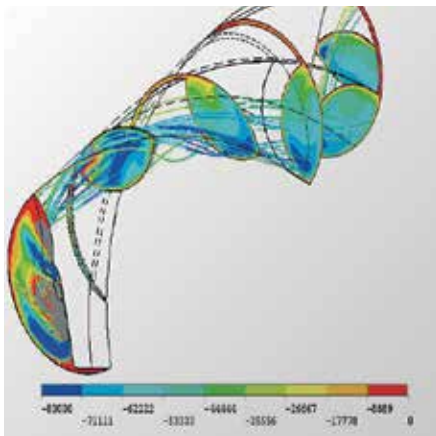
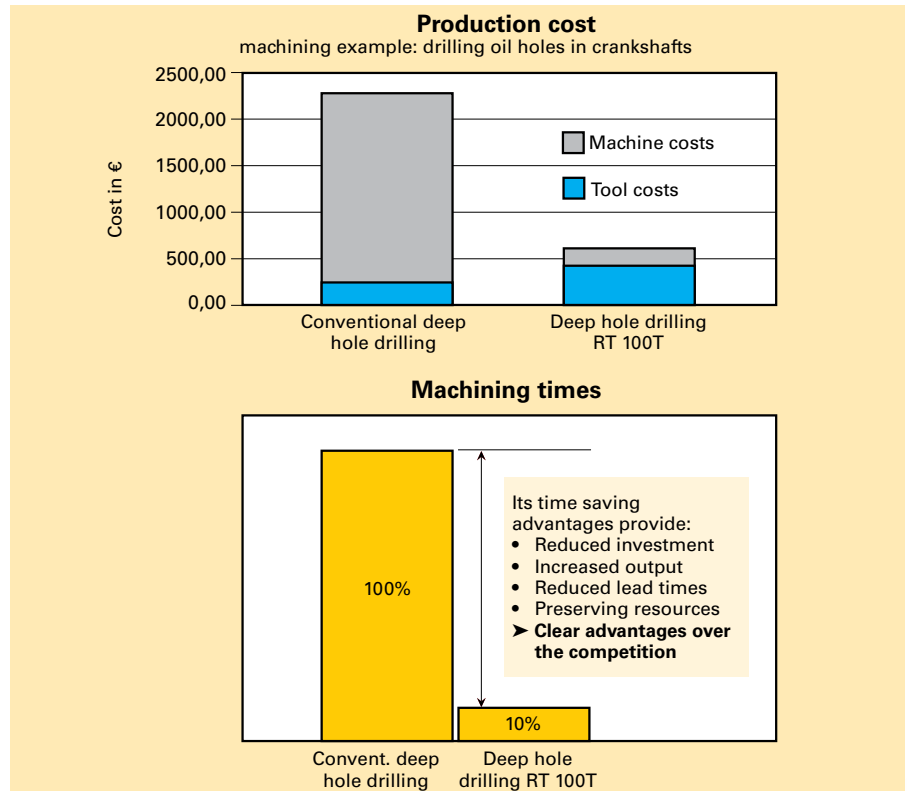


Fig. 1: Optimised flute geometry for optimal chip evacuation.



Fig. 2: Maximised coolant duct profile for effective cooling/lubrication.



Fig. 3: Problem-free chips preventing chip congestion and jamming of the tool.

RT 100 T – ex-stock range

Reinforced shank for high precision clamping

Drills from the RT 100 T ex-stock range have a reinforced shank to DIN 6535 HA, tolerance h6. This enables the powerful clamping of the tools with hydraulic expansion chucks (fig. 4) from the Guhring GM 300 range. The combination RT 100 T plus hydraulic expansion chuck guarantees highest concentricity, extreme clamping forces, minimal imbalance and optimal efficiency.

Intermediate diameters

In addition to the ex-stock range Guhring still offers RT 100 T drills as special tools to specific customer requirements. We realise intermediate diameters with maximum drilling depths up to $40 \times D$ or a total length up to max. 400 mm. Please use the request form on page 18!

The modification of the shank to the MQL shank end makes the ex-stock range suitable for MQL machining, see page 16.

Deep hole drilling? No problem!

The machining industry talks about deep hole drilling from a depth of $10 \times D$ and above, shorter holes can also be produced with deep hole drills. Therefore, only a few special conditions must be applied:

High-pressure cooling - now a matter of course

As in recent years internal cooling has prevailed with drilling tools, today every conventional machine tool is offered with high-pressure internal cooling and is therefore also suitable for deep hole drilling.

Tool guidance - a must

All deep hole drills must be guided during initial drilling. Deep hole drills must never operate at full speed unsupported.

RT 100 T - on deep hole drilling machines

After checking the clamping and the total length, the application of RT 100 T is possible on deep hole drilling machines with a guide bush.

Procedure

To achieve optimal machining results in the production of deep holes with the RT 100 T particularly when piloting on radii and/or uneven surface we recommend the following machining steps:

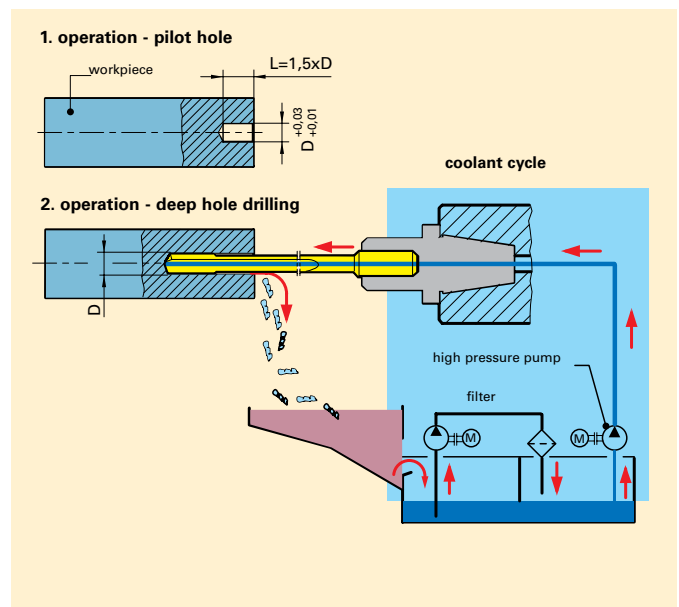
1. Milling of flat. The flat must be at right angles to the entry of the drilling operation.
2. Producing a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of $1 \times D$.
3. Entering the RT 100 T slowly into the pilot hole.
4. Setting the cooling lubricant pressure and speed.
5. Continuous drilling to full drilling depth without pecking cycle.
6. For through holes with oblique exit reduce feed rate.
7. Upon reaching the drilling depth switch off speed and cooling lubricant, withdraw with rapid feed rate.






Detailed recommendations regarding the procedure on page 14.

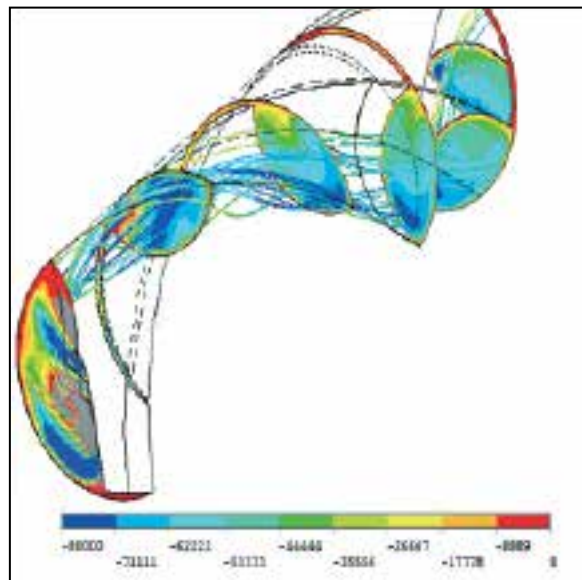
Fig. 4: Optimal tool clamping in hydraulic chucks thanks to reinforced shank design



Fig. 5: Deep hole drilling on conventional machine tools



Standard	Type	Tool illustration	Drilling depth	Tool material	Surface	Diameter range	Guhring no.	Discount group	Standard range. page
Spiral-fluted deep hole drills RT 100 T									
Guhring std.	RT 100 T		15 x D	Solid carbide	A	3.000 - 14.000	6509	165	5
Guhring std.	RT 100 T		20 x D	Solid carbide	A	3.000 - 14.000	6511	165	7
Guhring std.	RT 100 T		25 x D	Solid carbide	A	3.000 - 12.000	6512	165	9
Guhring std.	RT 100 T		30 x D	Solid carbide	A	3.000 - 10.000	6513	165	11
Guhring std.	RT 100 T		40 x D	Solid carbide	A	3.000 - 8.000	6514	165	13



TiAlN head coated for steel and cast material

RT 100 T – machining steps

Procedure

In order to achieve optimal machining results when producing deep holes with type RT 100 T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 U. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance F9) with a minimum drilling depth of 1 x D. For this operation we recommend our Ratio drills RT 100 U or RT 100 F respectively. Thanks to a 140° point angle and a m7 tolerance on diameter these Ratio drills are especially suitable for this machining task.
3. Entry of spiral-flute deep hole drill RT 100 T in the pilot hole at a speed of approx. 300 rev./min and with a feed rate of approx. 500 mm/min.
4. Setting of coolant pressure and speed.
5. Continuous drilling to complete hole depth without wood pecking.
6. For through holes with plain - i.e. 90° - exit, reduce feed rate v_f to 50 % approx. 1 mm prior to break-through.
7. For through holes with oblique exit, reduce the feed rate v_f to 40% approx. 1 mm prior to break-through.
8. After reaching hole depth stop machine spindle and coolant supply, withdrawal in top gear.

drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev)								
2.50	0.025	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160
3.15	0.032	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.160
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.200
5.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
6.30	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315
8.00	0.063	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.315
10.00	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.400
12.50	0.080	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500
16.00	0.100	0.125	0.160	0.200	0.250	0.315	0.400	0.500	0.630



Ratio end mill type RF 100 U, Guhring no. 3736

Thanks to its unequal helix angle, Guhring's FIRE-coated Ratio end mill RF 100 U offers highest feed rates and tool life for finishing and roughing operations in steel and cast materials as well as Ti- and Ni-alloys. Further information about the range can be found in Guhring's current main catalogue.



Ratio drill RT 100 U, Guhring no. 2477

Ratio drill RT 100 F, Guhring no. 1660

Thanks to their special cutting edge geometry, Guhring's Ratio drills excel with very good self-centering characteristics and alignment accurate holes. Type U is especially suitable for the machining of steel and high-alloyed AlSi-alloys, type F for high-alloyed, stainless, acid- and heat-resistant steels, Al and Al-alloys, Mg and Mg-alloys as well as Ti and Ti-alloys.








All deep hole drills must have support for the pilot hole. Deep hole drills must never operate at full speed without support in the machine shop.

Tool material	Material examples Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm ²)	Hardness
Common structural steels	1.0035 S185. 1.0486 StE P275N. 1.0345 P235GH. 1.0425 P265GH 1.0050 E295. 1.0070 E360. 1.8937 P500NH	≤ 500 > 500-850	
Free-cutting steels	1.0718 11SMnPb30. 1.0736 115Mn37 1.0727 46 S20. 1.0728 60 S20. 1.0757 46SPb20	≤850 850-1000	
Unalloyed heat-treatable steels	1.0402 C22. 1.1178 C30E 1.0503 C45. 1.1191 C45E 1.0601 C60. 1.1221 C60E	≤700 700-850 850-1000	
Alloyed heat-treatable steels	1.5131 50MnSi4. 1.7003 38Cr2. 1.7030 28Cr4 1.5710 36NiCr6. 1.7035 41Cr4. 1.7225 42CrMo4	850-1000 1000-1200	
Unalloyed case hardened steels	1.0301 C10. 1.1121 C10E	≤750	
Alloyed case hardened steels	1.7043 38Cr4 1.5752 14NiCr14. 1.7131 16MnCr5. 1.7264 20CrMo5	850-1000 1000-1200	
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9. 1.8550 34CrAlNi7	850-1000 1000-1200	
Tool steels	1.1750 C75W. 1.2067 102Cr6. 1.2307 29CrMoV9 1.2080 X210Cr12. 1.2083 X42Cr13. 1.2419 105WCr6. 1.2767 X45NiCrMo4	≤850 850-1000	
High speed steels	1.3243 S 6-5-2-5. 1.3343 S 6-5-2. 1.3344 61CrV4	≥650-1000	
Spring steels	1.5026 55Si7. 1.7176 55Cr3. 1.8159 51CrV4		≤330 HB
Stainless steels. sulphured austenitic martensitic	1.4005 X12CrS13. 1.4104 X14CrMoS17. 1.4105 X6CrMoS17. 1.4301 X5CrNi18 10. 1.4541 X6CrNiTi18 10. 1.4571 X6CrNiMoTi 17 12 2 1.4057 X17CrNi16-1. 1.4122 X39CrMo17-1. 1.4521 X2CrMoTi18 2	≤850 ≤850 ≤850	
Hardened steels	-		≤40-60 HRC
Special alloys	Nimonic. Inconel. Monel. Hastelloy	≤1200	
Cast iron	0.6010 EN-GJL-100 (GG10). 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25). 0.6035 EN-GJL-350 (GG35)		≤240 HB <300 HB
New cast materials GGV	EN-GJV250 (GGV25). EN-GJV350 (GGV35) EN-GJV400 (GGV40). EN-GJV500 (GGV50). SiMo 6		
New cast materials ADI	EN-GJS-800-8 (ADI800). EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200). EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400	
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50). 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70). 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB <300 HB
Chilled cast iron	-		≤350 HB
Ti and Ti-alloys	3.7024 Ti99.5. 3.7114 TiAl5Sn2.5. 3.7124 TiCu2 3.7154 TiAl6Zr5. 3.7164 TiAl6V4. 3.7184 TiAl4Mo4Sn2.5. - TiAl8Mo1V1	≤850 850-1200	
Aluminium and Al-alloys	3.0255 Al99.5. 3.2315 AlMgSi1. 3.3515 AlMg1	≤400	
Al wrought alloys	3.0615 AlMgSiPb. 3.1325 AlCuMg1. 3.3245 AlMg3Si	≤450	
Al cast iron ≤ 10 % Si	3.2131 G-AlSi5Cu1. 3.2153 G-AlSi7Cu3. 3.2573 G-AlSi9	≤600	
> 10% Si	3.2581 G-AlSi12. 3.2583 G-AlSi12Cu. - G-AlSi12CuNiMg	≤600	
Magnesium alloys	MgMn2. G-MgAl8Zn1. G-MgAl6Zn3	≤450	
Copper. low-alloyed	2.0070 SE-Cu. 2.1020 CuSn6. 2.1096 G-CuSn5ZnPb	≤400	
Brass. short-chipping	2.0380 CuZn39Pb2. 2.0401 CuZn39Pb3. 2.0410 CuZn43Pb2	≤600	
langspanend	2.0250 CuZn20. 2.0280 CuZn33. 2.0332 CuZn37Pb0.5	≤600	
Bronze. short-chipping	2.1090 CuSn7ZnPb. 2.1170 CuPb5Sn5. 2.1176 CuPb10Sn	≤600	
	2.0790 CuNi18Zn19Pb	>600-850	
Bronze. long-chipping	2.0916 CuAl5. 2.0960 CuAl9Mn. 2.1050 CuSn10	≤850	
	2.0980 CuAl11Ni. 2.1247 CuBe2	850-1000	

EXCLUSIVE LINE®

GÜHRING NAVIGATOR

Gühring no.
Tool material
Carbide grade
Surface finish
Drilling depth

6509		6511				6512				6513				6514	
Solid carbide		Solid carbide				Solid carbide				Solid carbide				Solid carbide	
K30/K40		K30/K40				K30/K40				K30/K40				K30/K40	
A TiAlN-tip-coated		A TiAlN-tip-coated				A TiAlN-tip-coated				A TiAlN-tip-coated				A TiAlN-tip-coated	
15 x D		20 x D				25 x D				30 x D				40 x D	
															
conventional cooling cool. pressure min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP.				conventional cooling cool. pressure min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP.		conventional cooling cool. pressure min. 40 bar		MQL by GÜHRING Lic. HORKOS CORP.		conventional cooling coolant pressure min. 40 bar	
V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
110	8			110	8			100	8			80	7	80	7
110	8			110	8			100	8			80	7	80	7
120	8			120	8			120	8			100-120	8	100	8
120	8			120	8			100	8			100	8	100	8
110	6			110	6			110	6			110	6	110	6
110	8			110	8			100	8			80	7	80	7
100	7			100	7			100	7			80	7	80	7
110	7	80	7	110	7	80	7	100	7	70	7	80	7	60	6-7
110	6	80	7	110	6	80	7	100	6	70	7	80	6	60	6
110	8			110	8			100	8			80	7	80	7
110	7	80	6-7	110	7	80	6-7	100	7	70	6-7	80	6	60	6-7
110	6	80	6-7	110	6	80	6-7	100	6	70	6-7	80	6	60	6-7
100	5			100	5			80	5			80	5	80	5
80	5			80	5			60	5			60	5	60	5
100	6-7			100	6-7			90	6-7			80	6-7	80	6-7
80	5			80	5			70	4			70	4	70	4
50	5			50	5			50	4			50	4	50	4
50	5			50	5			50	4			50	4	50	4
100	5			100	5			100	5			80	5	80	5
60-80	2-3			60-80	2-3			60-80	2-3			60-80	2-3	60-80	2-3
100	5			100	5			100	5			80	5	80	5
50	4			50	4			50	4			50	4	50	4
30	2			30	2			30	2			30	2	30	2
140	8			140	8			120	8			100	8	80	8
100	8			100	8			90	8			80	8	80	8
100	6			100	6			90	6			80	6	80	6
100	6			100	6			90	6			80	6	80	6
90	8	90	8	90	8	90	8	80	8	80	8	70	8	70	8
140	8			140	8			120	8			100	8	80	8
100	8			100	8			90	8			80	8	65	8
120	1			120	1			120	1			120	1	120	1
120	8			120	8			110	8			100	8	100	8

EXCLUSIVE LINE®

RT 100 T – special tools for MQL machining

Special shank end: RT 100 T for MQL machining

RT 100 T is available as a special tool with the shank end optimised for MQL machining.

Because an extremely low volume of coolant is applied with minimal quantity lubrication, the delivery of these low coolant quantities to the effective area is of utmost importance. The Guhring developed conical shank end optimally satisfies the relevant MQL conditions: It prevents lubricant build-up or dead pockets and offers simple operation and cost-efficient production.

In combination with Guhring hydraulic or shrink fit chucks and the Guhring MQL delivery set, it offers the optimum and cost-efficient solution for MQL machining producing the highest hole quality and extremely long tool life.

MQL machining opens up a considerable saving potential

A look at the total manufacturing cost shows that conventional cooling is a considerable percentage of it. It doesn't only include the cost of the cooling lubricant itself, but also cleaning the workpiece and systems as well as the disposal of the cooling lubricant. The application of MQL can clearly reduce this part of the cost. Guhring MQL tools offer the prerequisites for a changeover. The RT 100 T with MQL suitable shank end is, for example, optimally suitable for wet machining as well as MQL.

Therefore, changing over your production does not require new tools! In addition, the MQL suitable shank end is designed for 1- as well as 2-channel MQL systems. You do not have to fear any restrictions when applying Guhring MQL tools.



Shank end suitable for minimal quantity lubrication without build-up or dead pockets of coolant.

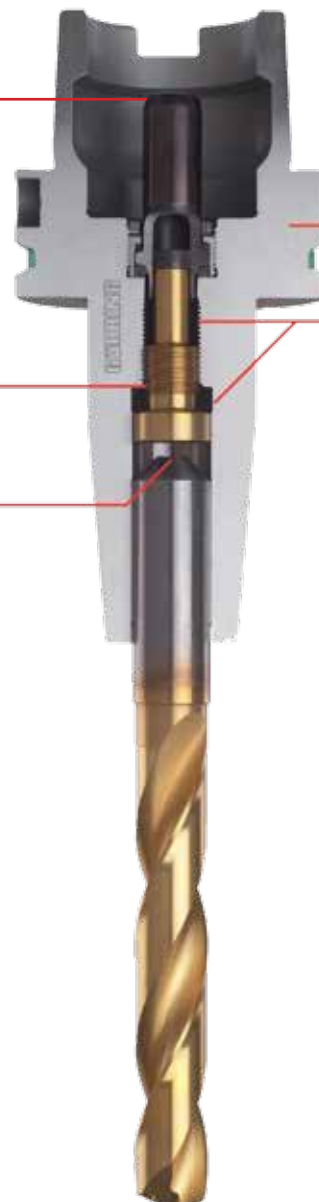
MQL coolant delivery set
Guhring no. 4939

HSK-A shrink chuck
Guhring no. 4741

Minimal dead area

Length adjustment screw

MQL suitable shank end



The Guhring MQL system
A MQL optimised drilling tool with Guhring's MQL shank end is located in a hydraulic expansion chuck. The delivery of the coolant is realised by a MQL length adjustment screw with sealing lip.

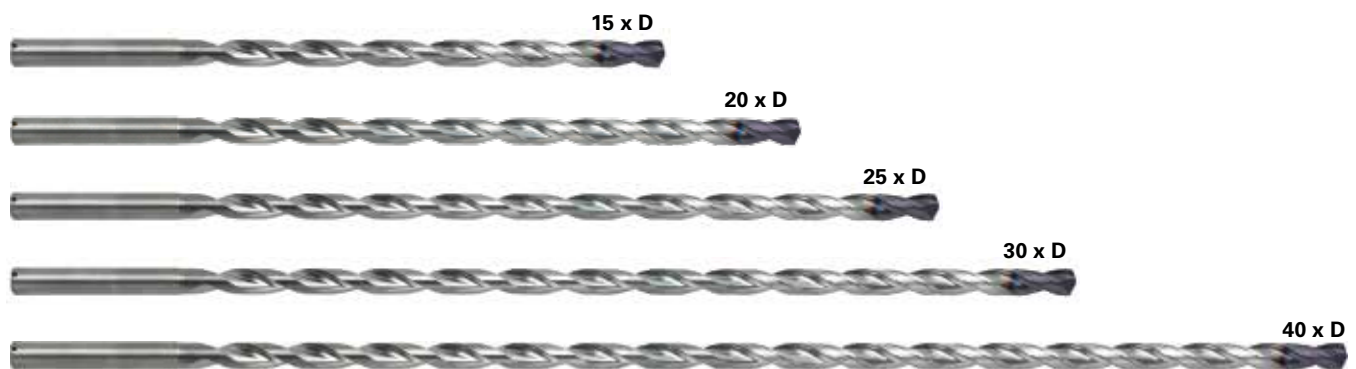
EXCLUSIVE LINE®

RT 100 T – re-grinding and re-coating

Even the most wear-resistant tools will wear when subjected to rigorous use. Through professional re-grinding to original geometries and re-coating with original coatings Guhring re-produces the original performance so that the tools continue to optimally fulfil all quality parameters. At the same time the refurbishment extends the longevity of tooling which means reduced consumption of new tools hence lower costs.

Our service centres

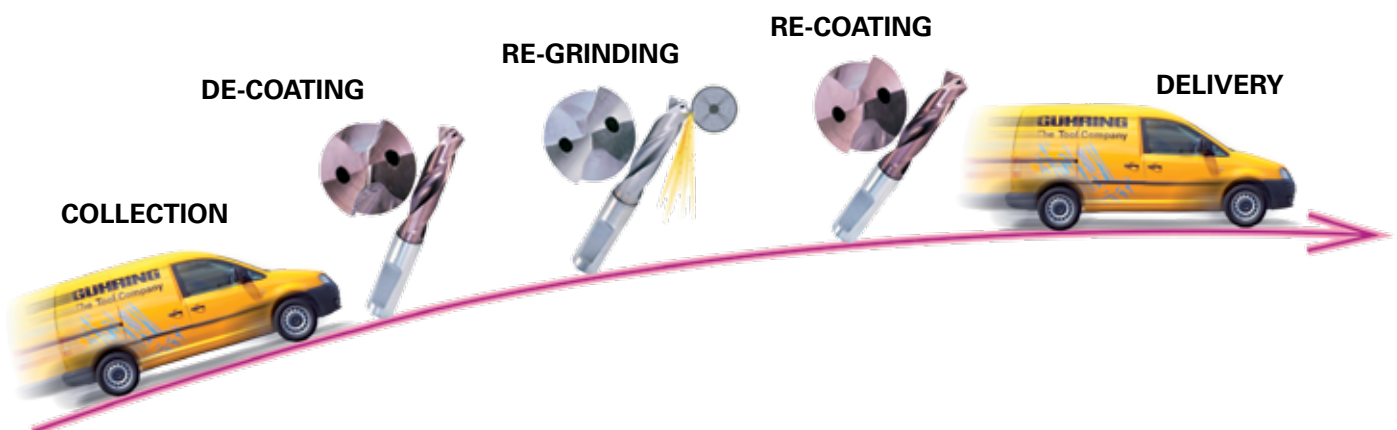
Fast service requires localised centres and this support is provided through 39 service centres world-wide. More will follow. All service centres are equipped with the latest production machines and Guhring developed coating plants. Every service centre provides a collection and delivery service to offer you our proven process for handling your orders in a flexible, fast and economical manner.



d1 mm	Re-grinding*	Tip-coating up to 20 x D up to 40 x D		Devamishing **
	Basic price per piece in €	Additional charge to the basic price in €		Additional charge to the basic price in €
up to Ø 6 mm	●	●	●	●
Ø > 6 - 8 mm	●	●	●	●
Ø > 8 - 10 mm	●	●	●	●
Ø > 10 - 12 mm	●	●	●	●
Ø > 12 - 14 mm	●	●	●	●

* axial removal max. 1 mm. the diameter is reduced according to the back taper value. Please specify minimum length and Ø-tolerances when placing order.

** it should be noted that continual re-coating of a tool without prior de-coating results in a diameter increase in the µm-range. Additional coatings are available on request.



EXCLUSIVE[®]LINE

Fax Inquiry / Order RT 100 T, Ø 1.4 to 2.99 mm, up to 30xD
 simply photo-copy. complete and fax...

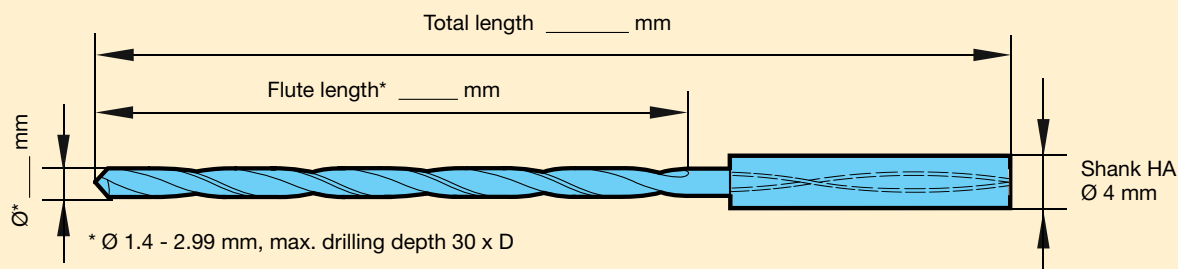
Inquiry

Order

Repeat order. no. of initial order

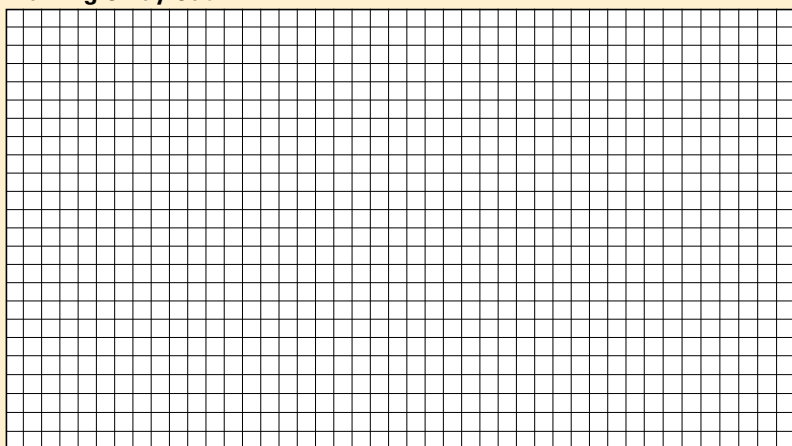


Required no. of pieces: Tool _____ pieces



The spiral-fluted deep hole drills RT 100T are also available in the diameter range from 1.4 to 2.99 mm as special solutions for drilling depths up to a maximum 30xD with internal cooling. With the ExclusiveLine solid carbide micro-precision drills and the RT 100 T standard range Guhring provides a complete range of solid carbide high-performance drills for the machining of extremely small and deep holes.

Drawing of lay-out



Cooling:

internal (high-pressure/50 bar)

Coating:

bright

TiAIN A A

Cooling lubricant:

neat oil

soluble oil

pressure _____ bar volume _____ l/min

required in special cases only

Shank: HA (recommended) _____

Workpiece: Drilling depth: _____ Hole tolerance: _____ Material/designation: _____
 Surface finish: _____

Machine type: Machining centre Turning centre
 Pilot hole

Machining: vertical horizontal

Coolant: Oil Soluble oil MQL
 Pressure _____ bar Quantity _____ l/min

Company: _____

Company stamp:

Telephone/fax: _____

Contact: _____

Signature: _____

Guhring KG

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Re-grinding
with and without
re-coating
to original
Guhring-quality
worldwide!



Our service centers

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------|
| 1 Germany
<i>Albstadt
Sigmaringen-Laiz
Berlin
Chemnitz
Eisenach
Geislingen
Gosheim
Mindelheim
Markt-Erlbach
Saarbrücken</i> | 3 Brazil-Diadema
Brazil-Joinville | 11 Japan | 21 Spain |
| 2 Australia | 4 China-Changzhou
China-Hubei
China-Liaoning
China-Liuzhou | 12 Korea-Chungcheongnam-do
Korea-Incheon
Korea-Ulsan City
Korea-Rizhao | 22 South Africa |
| | 5 France | 13 Mexico | 23 Taiwan |
| | 6 Great Britain | 14 Netherlands | 24 Thailand |
| | 7 Indien-Bangalore
Indien-Gurgaon
Indien-Pune | 15 Austria | 25 Czech Republic |
| | 8 Indonesia | 16 Poland-Dabrowa Gornicza
Poland-Bielsko Biala | 26 Turkey-Istanbul
Turkey-Ankara
Turkey-Izmir |
| | 9 Ireland | 17 Rumania | 27 Hungary |
| | 10 Italy | 18 Russia | 28 USA-Brookfield
USA-New Hudson
USA-Huntington Beach |
| | | 19 Sweden | 29 Vietnam |
| | | 20 Switzerland | 30 Belarus |

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