

GUHRING

The Tool Company

Includes:



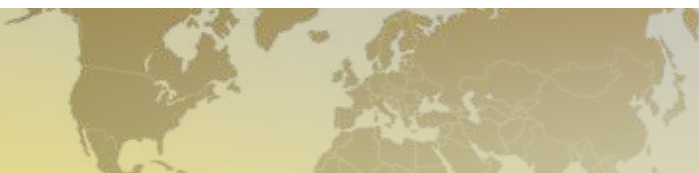
Insert geometry for the machining of steel beams

- ▶ Outstanding self centering characteristics
- ▶ Minimum burr development
- ▶ Maximum performance under most machining conditions



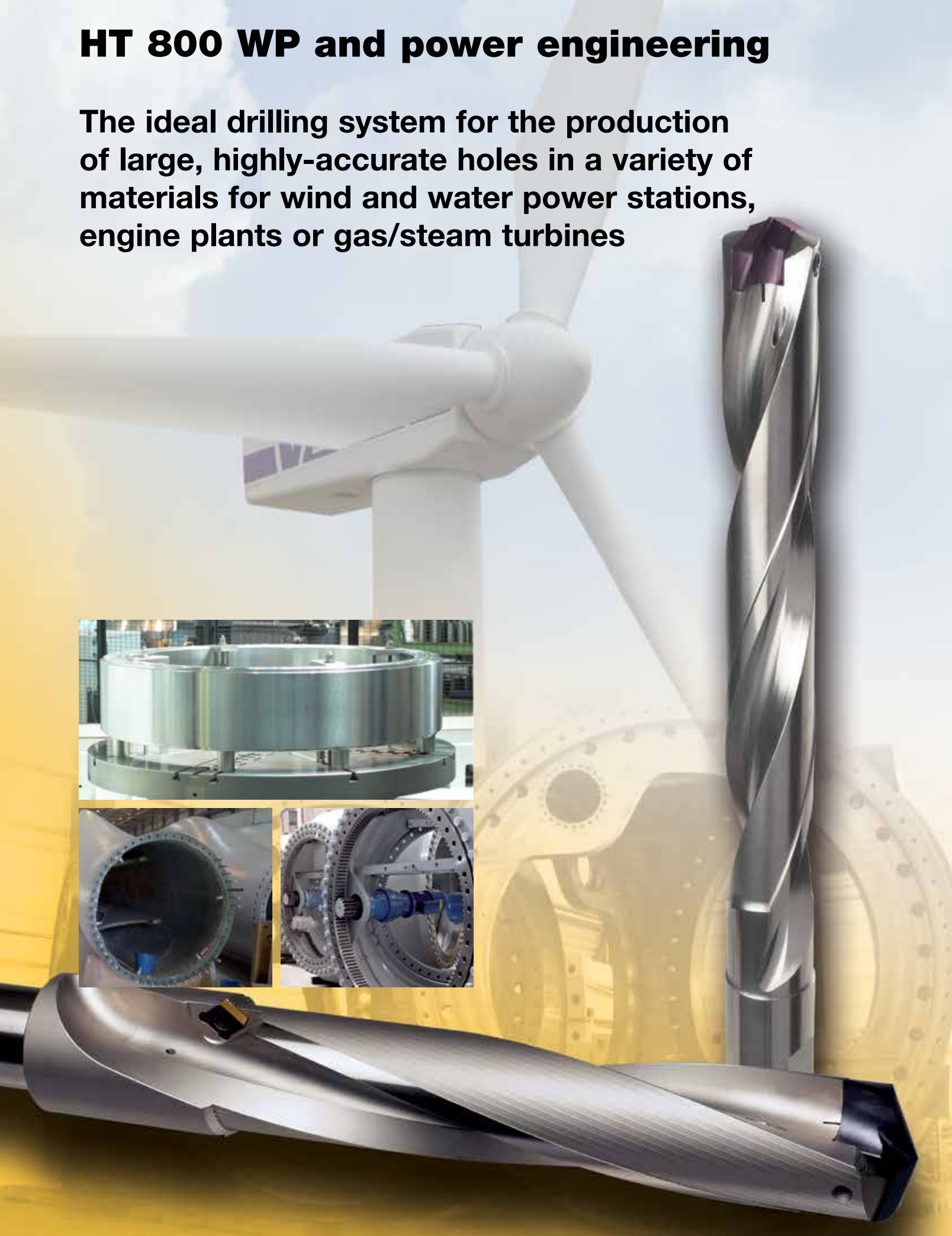
HT 800 WP

The interchangeable insert drilling system



HT 800 WP and power engineering

The ideal drilling system for the production of large, highly-accurate holes in a variety of materials for wind and water power stations, engine plants or gas/steam turbines



INSERTS

• Technical features	Page	6
• Application recommendations	Page	7
• Offering overview	Page	8
• Standard offering	Page	10

DRILL BODIES

• Technical features	Page	6
• Offering overview	Page	9
• Standard offering	Page	17

ACCESSORIES

• Spare parts	Page	24
---------------	------	----

SPEEDS & FEEDS

• Insert series 4111	Page	28
• Insert series 4112	Page	29
• Insert series 4113	Page	30
• Insert series 4114	Page	31
• Insert series 4115	Page	32
• Insert series 4229	Page	33

TROUBLESHOOTING

Page	26
------	----



NEW

MACHINING OF STEEL BEAMS

Steel beams for a wide variety of metal constructions are generally prepared on special drilling / sawing systems for assembly. The clamping conditions on these machines are often insufficiently rigid and consequently place especially high demands on drilling tools. The tool geometry must be adapted to compensate for the non-rigid conditions and ensure a smooth drilling performance.

With the new HT 800 carbide drill, Guhring provides the optimal solution for the machining of steel beams. It has excellent self-centering characteristics resulting in a smooth drilling operation.



HT 800 WP



The point geometry of the new indexable inserts ensures optimal centering characteristics and therefore compensates non-rigid machining conditions in the manufacture of steel beams.

- new interchangeable inserts especially for the machining of steel beams
- reduced burr development
- optimal centering characteristics
- smooth drilling performance

Modular system enables simple insert change directly on the machine.

Can be applied with all HT 800 standard drill bodies 1xD, 1.5xD, 3xD, 5xD, 7xD and 10xD.

Minimized burr development thanks to reduced point angle in outer area.



Interchangeable insert for the machining of steel beams
HT 800 series 4229

With the HT 800 WP replaceable tip drilling system Guhring provides high-performance and cost-efficient drilling options for holes with a diameter range of 11.00 to 40.0 mm (0.433 - 1.575 in.) These drills excel thanks to the following advantages:

A Extended tool life

Thanks to application-specific, precision-ground cutting edge geometries and coatings, the interchangeable inserts of the HT 800 WP drilling system are especially wear resistant.

The hardened tool steel and nickel-plated surface treatment utilized during the manufacturing process for the drill bodies, combined with incremental body sizes in steps of 0.5mm up to 31.99mm diameter and 1.0mm above 32.00mm diameter, results in optimal wear resistance on the drill bodies as well.

B Effective chip evacuation

The optimized flute geometry of the drill bodies results in outstanding chip evacuation capabilities, even while drilling deeper holes.

C Optimal cooling and lubrication

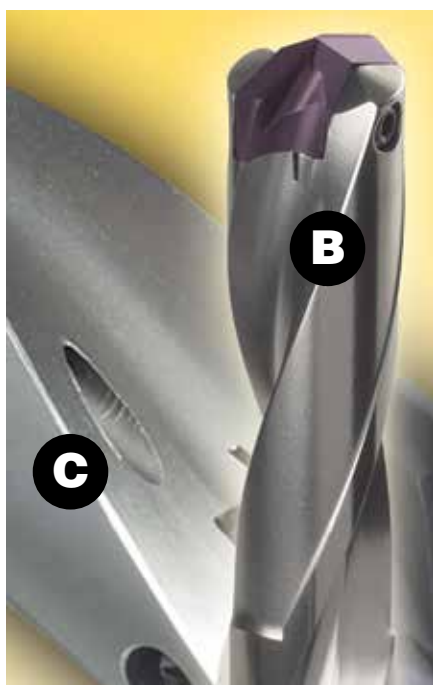
Optimal cooling and lubrication is applied through coolant ducts which exit into the flutes and directly onto the cutting edge, resulting in longer tool life and better chip evacuation.

D Highly accurate and rigid insert seat

The precise and easily accessible insert seat allows the insert to be changed while the drill remains in the machine spindle. Due to the unique clamping design, the insert can be changed more times than with competitors' systems before the body needs to be replaced due fatigue of the insert seat. The heavy-duty Torx clamping screws containing thread locker ensure secure clamping of the inserts, even during applications subject to high levels of vibration.

Rigid drill bodies

The small incremental diameter transitions of the drill bodies provide additional benefits other than simply reducing wear on the bodies. Due to the improved guidance and stabilization from margin contact while drilling, the rigidity is also increased, resulting in longer tool life and improved workpiece finishes.



HT 800 WP application recommendations

Please observe the following notes and recommendations for the application of Guhring's HT 800 WP drills:

We recommend replacing the clamping screw when changing the insert.

Therefore, every drill body is supplied with a clamping screw, series 4071, and screwdriver, series 1612. Every interchangeable insert is also supplied with a clamping screw, series 4071.

When changing the insert please observe the following tightening torques for the clamping screw. Adhering to them is absolutely necessary for optimal machining results!

Diameter range (mm)	11.0 - 12.99	13.0 - 13.99	14.0 - 15.99	16.0 - 17.99	18.0 - 19.99	20.0 - 21.99	22.0 - 29.99	30.0 - 40.00
Thread	M2.2	M2.5	M3	M3.5	M4	M4.5	M5	M6
Torx size	T7	T8	T9	T10	T15	T15	T20	T25
Tightening torque [Nm]	0.80	1.00	1.70	2.70	4.00	6.0	8.00	14.0

The information above applies to screws containing thread locker (Loctite). Guhring HT800 drill tip insert screws are supplied containing thread locker.

Examples of the HT800 WP extended tool life

Series	4107 + 4112	4109 + 4112	4109 + 4112	4107 + 4113	4108 + 4113
Diameter	17.5	17.5	17.5	17.5	14.1
Coating	nano-FIREX®	nano-FIREX®	nano-FIREX®	FIREX®	FIREX®
Material group	alloyed heat-treatable steel	alloyed heat-treatable steel	general structural steels	cast iron	cast iron
Material description	42CrMo4/ 1.7275	42CrMo4/ 1.7275	St52-3/ 1.0570	GG25/ 0.6025	GGG40/ 0.7040
Drill. depth [mm]	50	122.5	122.5	50	70
Hole type	blind hole	blind hole	blind hole	blind hole	blind hole
Cooling	IC 40 bar	IC 40 bar	IC 40 bar	IC 40 bar	IC 55 bar
Coolant	soluble oil	soluble oil	soluble oil	soluble oil	soluble oil
Machine type	machining center	machining center	machining center	machining center	machining center
v_c [m/min]	100	85	130	80	160
f_z [mm]	0.28	0.25	0.15	0.30	0.60
Tool life [m]	50	30	35	250	120



HT 800 WP interchangeable inserts

HT 800 WP interchangeable inserts utilize the perfect combination of carbide substrate, point geometry, and coating to accommodate your specific application. Dull inserts can be reliably changed out while the drill remains in the machine. Therefore, you will consistently achieve optimal machining results with the highest level of performance and economic efficiency.

Technical features and application recommendations

		Series	4112	4113	4114	4115	4111	4229
Tool material			solid carbide	solid carbide	solid carbide	solid carbide	solid carbide	solid carbide
Coating			nano-FIREX®	FIREX®	bright	nano-A	nano-A	nano-FIREX®
Point geometry			2-facet	2-facet	relieved cone	relieved cone	2-facet	2-facet
Point angle			140°	140°	140°	140°	145°	125° / 160°
Tolerance			h7	m7	h7	h7	m7	h7
Diameter			11.0 - 40.0	11.0 - 40.0	11.0 - 40.0	11.0 - 40.0	11.0 - 40.0	12.0 - 40.0
Application			steel	cast iron	aluminum	stainl. steel	pilot drilling	steel beams
Page			10-12	10-12	10-12	10-12	14-15	13
								
Application group	Material examples							
P	steel, cast steel, stainless steel (ferritic and martensitic)		●	○		○	○	●
M	stainless steel and cast steel (austenitic and austenitic/ferritic)		○			●	○	
K	grey cast iron, spheroidal graphite and malleable cast iron		○	●		○	○	
N	aluminum and other non-ferrous metals				●		○	
S	Special, Super- and Ti-alloys					○	○	
H	Hardened steels and chilled cast iron					○	○	

● optimal suitability
○ limited suitability

NEW

		Series	7645	7632	7635
Tool material			solid carbide	solid carbide	solid carbide
Coating			TiN	TiAlN	bright
Type			CPGT ... R	CPGW ...	CPGT ... R
Application			steel	cast iron	aluminum
Page			16	16	16
					
Application group	Material examples				
P	steel, cast steel, stainless steel (ferritic and martensitic)		●	○	
M	stainless steel and cast steel (austenitic and austenitic/ferritic)		○		
K	grey cast iron, spheroidal graphite und malleable cast iron		○	●	
N	aluminum and other non-ferrous metals				●
S	Special, Super- and Ti-alloys		○		
H	Hardened steels and chilled cast iron		○		

● optimal suitability
○ limited suitability

HT 800 WP drill bodies offer the highest accuracy and rigidity. The open flute geometry combined with internal cooling guarantees optimal chip evacuation across a broad range of hole depths. The reinforced shank ensures strong and accurate clamping of the drill in the tool holder. Due to the h6 shank tolerance, the drill bodies will fit a variety of tool holder options.

Series	4105	4106	4107	4108	4109	4110
Drilling depth	1 x D	1.5 x D	3 x D	5 x D	7 x D	10 x D
Diameter	11.0 - 40.00	11.0 - 40.00	11.0 - 40.00	11.0 - 40.00	11.0 - 31.99	11.0 - 31.99
Shank	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE
Page #	17	18-20	18-20	18-20	21-23	21-23
						

Special tools

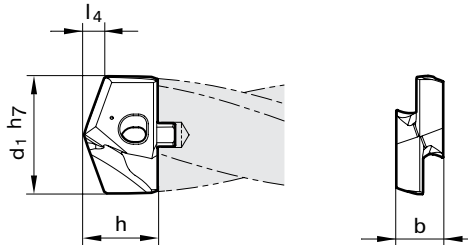
In addition to our HT 800 WP standard tools we also supply HT 800 WP stepped tools as well as alternative coatings for HT 800 WP interchangeable inserts as special solutions. Special sizes are available on request.



Material-specific drill inserts

Four unique material-specific drill insert geometries are available. The unique design of the central locating post and heavy-duty Torx clamping screw allows quick and accurate insert replacement.

The high-performance insert design provides maximum penetration rates that far exceed conventional spade drills or indexable insert drills.

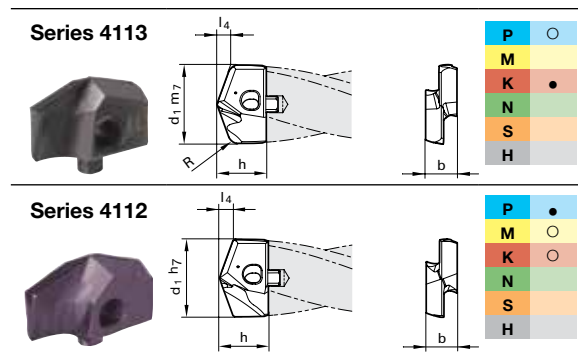
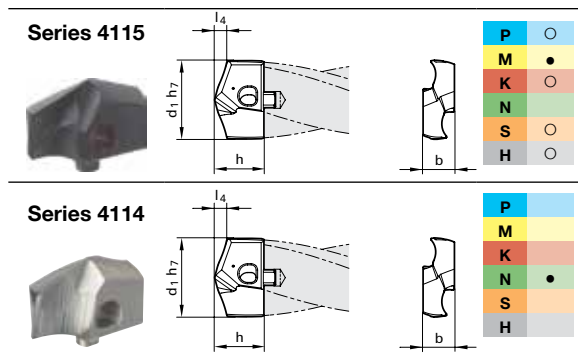


① Choose your diameter

② Choose the appropriate insert for your workpiece material

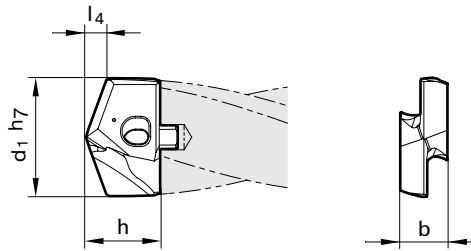
③ Determine corresponding drill body size; select desired length from drill body pages.

①					②				③	
d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4112 nano-FIREX® EDP No.	Series 4113 FIREX® EDP No.	Series 4114 bright EDP No.	Series 4115 nano-A EDP No.	Drill Body Size	Pilot Drill Body Size
29/64	11.00	7.5	4.5	2.1	9041120110000	9041130110000	9041140110000	9041150110000	110	110
	11.20				9041120112000	9041130112000	9041140112000	9041150112000		
	11.50				9041120115000	9041130115000	9041140115000	9041150115000		
	11.51				9041120115100	9041130115100	9041140115100	9041150115100		
15/32	11.70	7.5	4.5	2.1	9041120117000	9041130117000	9041140117000	9041150117000	115	110
	11.80				9041120118000	9041130118000	9041140118000	9041150118000		
	11.91				9041120119100	9041130119100	9041140119100	9041150119100		
	12.00				9041120120000	9041130120000	9041140120000	9041150120000		
31/64	12.10	7.7	5.0	2.2	9041120121000	9041130121000	9041140121000	9041150121000	120	120
	12.20				9041120122000	9041130122000	9041140122000	9041150122000		
	12.30				9041120123000	9041130123000	9041140123000	9041150123000		
	12.50				9041120125000	9041130125000	9041140125000	9041150125000		
1/2	12.60	7.7	5.0	2.3	9041120126000	9041130126000	9041140126000	9041150126000	125	120
	12.70				9041120127000	9041130127000	9041140127000	9041150127000		
	12.80				9041120128000	9041130128000	9041140128000	9041150128000		
	12.90				9041120129000	9041130129000	9041140129000	9041150129000		
33/64	13.00	8.5	5.5	2.4	9041120130000	9041130130000	9041140130000	9041150130000	130	130
	13.10				9041120131000	9041130131000	9041140131000	9041150131000		
	13.49				9041120134900	9041130134900	9041140134900	9041150134900		
	13.50				9041120135000	9041130135000	9041140135000	9041150135000		
35/64	13.60	8.5	5.5	2.4	9041120136000	9041130136000	9041140136000	9041150136000	135	130
	13.70				9041120137000	9041130137000	9041140137000	9041150137000		
	13.80				9041120138000	9041130138000	9041140138000	9041150138000		
	13.89				9041120138900	9041130138900	9041140138900	9041150138900		
9/16	14.00	9.6	6.0	2.5	9041120140000	9041130140000	9041140140000	9041150140000	140	140
	14.10				9041120141000	9041130141000	9041140141000	9041150141000		
	14.29				9041120142900	9041130142900	9041140142900	9041150142900		
	14.40				9041120144000	9041130144000	9041140144000	9041150144000		
37/64	14.50	9.6	6.0	2.6	9041120145000	9041130145000	9041140145000	9041150145000	145	140
	14.60				9041120146000	9041130146000	9041140146000	9041150146000		
	14.68				9041120146800	9041130146800	9041140146800	9041150146800		
	14.70				9041120147000	9041130147000	9041140147000	9041150147000		
19/32	14.80	9.8	6.0	2.7	9041120148000	9041130148000	9041140148000	9041150148000	150	140
	15.00				9041120150000	9041130150000	9041140150000	9041150150000		
	15.08				9041120150800	9041130150800	9041140150800	9041150150800		
	15.10				9041120151000	9041130151000	9041140151000	9041150151000		
39/64	15.20	9.8	6.0	2.8	9041120152000	9041130152000	9041140152000	9041150152000	155	140
	15.30				9041120153000	9041130153000	9041140153000	9041150153000		
	15.48				9041120154800	9041130154800	9041140154800	9041150154800		
	15.50				9041120155000	9041130155000	9041140155000	9041150155000		
5/8	15.60	9.8	6.0	2.9	9041120156000	9041130156000	9041140156000	9041150156000	155	140
	15.70				9041120157000	9041130157000	9041140157000	9041150157000		
	15.80				9041120158000	9041130158000	9041140158000	9041150158000		
	15.87				9041120158700	9041130158700	9041140158700	9041150158700		



d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4112 nano-FIREX® EDP No.	Series 4113 FIREX® EDP No.	Series 4114 bright EDP No.	Series 4115 nano-A EDP No.	Drill Body Size	Pilot Drill Body Size
41/64	16.00	11.0	7.0	2.9	9041120160000	9041130160000	9041140160000	9041150160000	160	160
	16.27			3.0	9041120162700	9041130162700	9041140162700	9041150162700		
	16.50			3.0	9041120165000	9041130165000	9041140165000	9041150165000		
21/32	16.67	11.0	7.0	3.0	9041120166700	9041130166700	9041140166700	9041150166700	165	160
	17.00			3.1	9041120170000	9041130170000	9041140170000	9041150170000		
43/64	17.07	11.0	7.0	3.1	9041120170700	9041130170700	9041140170700	9041150170700	170	160
11/16	17.46			3.1	9041120174600	9041130174600	9041140174600	9041150174600		
	17.50			3.2	9041120175000	9041130175000	9041140175000	9041150175000		
45/64	17.60	11.0	7.0	3.2	9041120176000	9041130176000	9041140176000	9041150176000	175	160
	17.86			3.3	9041120178600	9041130178600	9041140178600	9041150178600		
	18.00			3.3	9041120180000	9041130180000	9041140180000	9041150180000		
23/32	18.26	12.6	8.0	3.3	9041120182600	9041130182600	9041140182600	9041150182600	180	180
	18.50			3.4	9041120185000	9041130185000	9041140185000	9041150185000		
47/64	18.65	12.6	8.0	3.4	9041120186500	9041130186500	9041140186500	9041150186500	185	180
	19.00			3.5	9041120190000	9041130190000	9041140190000	9041150190000		
3/4	19.05	12.6	8.0	3.5	9041120190500	9041130190500	9041140190500	9041150190500	190	180
49/64	19.45			3.5	9041120194500	9041130194500	9041140194500	9041150194500		
	19.50			3.5	9041120195000	9041130195000	9041140195000	9041150195000		
	19.60			3.6	9041120196000	9041130196000	9041140196000	9041150196000		
25/32	19.84	12.6	8.0	3.6	9041120198400	9041130198400	9041140198400	9041150198400	195	180
	20.00			3.6	9041120200000	9041130200000	9041140200000	9041150200000		
51/64	20.24	13.9	9.0	3.6	9041120202400	9041130202400	9041140202400	9041150202400	200	200
	20.50			3.7	9041120205000	9041130205000	9041140205000	9041150205000		
13/16	20.64	13.9	9.0	3.8	9041120206400	9041130206400	9041140206400	9041150206400	205	200
	21.00			3.8	9041120210000	9041130210000	9041140210000	9041150210000		
53/64	21.03	13.9	9.0	3.8	9041120210300	9041130210300	9041140210300	9041150210300	210	200
	21.10			3.9	9041120211000	9041130211000	9041140211000	9041150211000		
27/32	21.43			3.9	9041120214300	9041130214300	9041140214300	9041150214300		
	21.50			3.9	9041120215000	9041130215000	9041140215000	9041150215000		
55/64	21.83	13.9	9.0	4.0	9041120218300	9041130218300	9041140218300	9041150218300	215	200
	22.00			4.0	9041120220000	9041130220000	9041140220000	9041150220000		
7/8	22.22	15.3	10.0	4.0	9041120222200	9041130222200	9041140222200	9041150222200	220	220
	22.50			4.1	9041120225000	9041130225000	9041140225000	9041150225000		
57/64	22.62	15.3	10.0	4.1	9041120226200	9041130226200	9041140226200	9041150226200	225	220
	23.00			4.2	9041120230000	9041130230000	9041140230000	9041150230000		
29/32	23.02	15.3	10.0	4.2	9041120230200	9041130230200	9041140230200	9041150230200	230	220
59/64	23.42			4.3	9041120234200	9041130234200	9041140234200	9041150234200		
	23.50			4.3	9041120235000	9041130235000	9041140235000	9041150235000		
15/16	23.81	15.3	10.0	4.3	9041120238100	9041130238100	9041140238100	9041150238100	235	220
	24.00			4.4	9041120240000	9041130240000	9041140240000	9041150240000		
	24.10			4.4	9041120241000	9041130241000	9041140241000	9041150241000		
61/64	24.21	15.8	11.0	4.4	9041120242100	9041130242100	9041140242100	9041150242100	240	240
	24.50			4.5	9041120245000	9041130245000	9041140245000	9041150245000		
31/32	24.61	15.8	11.0	4.5	9041120246100	9041130246100	9041140246100	9041150246100	245	240
	25.00			4.5	9041120250000	9041130250000	9041140250000	9041150250000		
1	25.40	15.8	11.0	4.6	9041120254000	9041130254000	9041140254000	9041150254000	250	240
	25.50			4.6	9041120255000	9041130255000	9041140255000	9041150255000		
	26.00			4.80	9041120260000	9041130260000	9041140260000	9041150260000		
1 1/32	26.19	20.00	12.00	4.80	9041120261900	9041130261900	9041140261900	9041150261900	260	260
	26.50			4.90	9041120265000	9041130265000	9041140265000	9041150265000		
1 3/64	26.59	20.00	12.00	4.90	9041120265900	9041130265900	9041140265900	9041150265900	265	260
	27.00			5.00	9041120270000	9041130270000	9041140270000	9041150270000	270	260

HT 800 WP drill inserts

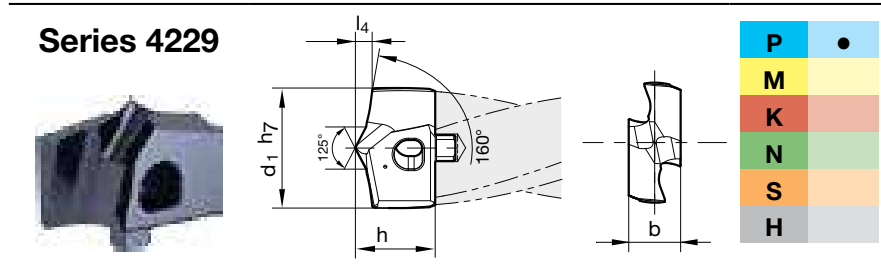


d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4112 nano-FIREX® EDP No.	Series 4113 FIREX® EDP No.	Series 4114 bright EDP No.	Series 4115 nano-A EDP No.	Drill Body Size	Pilot Drill Body Size
1 3/32	27.50	20.00	12.00	5.10	9041120275000	9041130275000	9041140275000	9041150275000	275	260
	27.70	20.00	12.00	5.10	9041120277000	9041130277000	9041140277000	9041150277000		
	27.78	20.00	12.00	5.10	9041120277800	9041130277800	9041140277800	9041150277800		
1 7/64	28.00	20.70	13.00	5.10	9041120280000	9041130280000	9041140280000	9041150280000	280	280
	28.18	20.70	13.00	5.20	9041120281800	9041130281800	9041140281800	9041150281800		
	28.50	20.70	13.00	5.20	9041120285000	9041130285000	9041140285000	9041150285000		
1 1/8	28.58	20.70	13.00	5.30	9041120285800	9041130285800	9041140285800	9041150285800	285	280
	29.00	20.70	13.00	5.30	9041120290000	9041130290000	9041140290000	9041150290000		
	29.37	20.70	13.00	5.40	9041120293700	9041130293700	9041140293700	9041150293700		
1 5/32	29.50	20.70	13.00	5.40	9041120295000	9041130295000	9041140295000	9041150295000	290	280
	29.60	20.70	13.00	5.50	9041120296000			9041150296000		
	29.77	20.70	13.00	5.50	9041120297700	9041130297700	9041140297700	9041150297700		
1 11/64	30.00	22.30	14.00	5.50	9041120300000	9041130300000	9041140300000	9041150300000	300	300
	30.16	22.30	14.00	5.60	9041120301600	9041130301600	9041140301600	9041150301600		
	30.50	22.30	14.00	5.70	9041120305000	9041130305000	9041140305000	9041150305000		
1 3/16	30.96	22.30	14.00	5.70	9041120309600	9041130309600	9041140309600	9041150309600	305	300
	31.00	22.30	14.00	5.80	9041120310000	9041130310000	9041140310000	9041150310000		
	31.50	22.30	14.00	5.80	9041120315000	9041130315000	9041140315000	9041150315000		
1 7/32	31.75	22.30	14.00	5.90	9041120317500	9041130317500	9041140317500	9041150317500	310	300
	32.00	23.10	15.00	6.00	9041120320000	9041130320000	9041140320000	9041150320000		
	32.50	23.10	15.00	6.00	9041120325000	9041130325000	9041140325000	9041150325000		
1 9/32	32.54	23.10	15.00	6.00	9041120325400	9041130325400	9041140325400	9041150325400	320	320
	32.94	23.10	15.00	6.10	9041120329400	9041130329400	9041140329400	9041150329400		
	33.00	23.10	15.00	6.10	9041120330000	9041130330000	9041140330000	9041150330000		
1 19/64	33.34	23.10	15.00	6.10	9041120333400	9041130333400	9041140333400	9041150333400	330	320
	33.50	23.10	15.00	6.20	9041120335000	9041130335000	9041140335000	9041150335000		
	34.00	23.10	15.00	6.30	9041120340000	9041130340000	9041140340000	9041150340000		
1 5/16	34.13	23.10	15.00	6.30	9041120341300	9041130341300	9041140341300	9041150341300	340	320
	34.50	23.10	15.00	6.40	9041120345000	9041130345000	9041140345000	9041150345000		
	34.93	23.10	15.00	6.40	9041120349300	9041130349300	9041140349300	9041150349300		
1 11/32	35.00	23.10	15.00	6.50	9041120350000	9041130350000	9041140350000	9041150350000	350	320
	35.50	23.10	15.00	6.60	9041120355000	9041130355000	9041140355000	9041150355000		
	35.72	23.10	15.00	6.60	9041120357200	9041130357200	9041140357200	9041150357200		
1 13/32	36.00	23.90	16.00	6.70	9041120360000	9041130360000	9041140360000	9041150360000	360	360
	36.50	23.90	16.00	6.70	9041120365000	9041130365000	9041140365000	9041150365000		
	36.51	23.90	16.00	6.80	9041120365100	9041130365100	9041140365100	9041150365100		
1 7/16	37.00	23.90	16.00	6.80	9041120370000	9041130370000	9041140370000	9041150370000	370	360
	37.31	23.90	16.00	6.90	9041120373100	9041130373100	9041140373100	9041150373100		
	37.50	23.90	16.00	7.00	9041120375000	9041130375000	9041140375000	9041150375000		
1 15/32	38.00	23.90	16.00	7.00	9041120380000	9041130380000	9041140380000	9041150380000	380	360
	38.10	23.90	16.00	7.00	9041120381000	9041130381000	9041140381000	9041150381000		
	38.50	23.90	16.00	7.10	9041120385000	9041130385000	9041140385000	9041150385000		
1 1/2	39.00	23.90	16.00	7.10	9041120390000	9041130390000	9041140390000	9041150390000	390	360
	39.50	23.90	16.00	7.20	9041120395000	9041130395000	9041140395000	9041150395000		
	40.00	23.90	16.00	7.30	9041120400000	9041130400000	9041140400000	9041150400000		

Inserts are supplied with clamping screw, series 4071.

Steel beam drill inserts

The steel beam drilling inserts, manufactured from Guhring carbide, utilize a specialized point geometry providing optimal centering characteristics. This compensates for the unstable conditions typically encountered when drilling steel beams. The nano-FIREX coating offers high wear resistance and exceptional tool life, resulting in an economical and efficient drilling process.



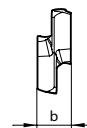
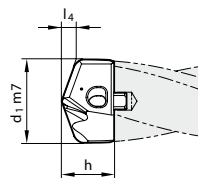
d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4229 nano-FIREX® EDP No.	Drill Body Size	Pilot Drill Body Size
	12.000	7.500	5.000	1.700	9042290120000	120	120
	14.000	9.600	6.000	2.000	9042290140000	140	140
	16.000	10.800	7.000	2.300	9042290160000	160	160
	18.000	12.300	8.000	2.600	9042290180000	180	180
	20.000	13.600	9.000	2.900	9042290200000	200	200
	21.000	13.600	9.000	3.000	9042290210000	210	200
	22.000	14.900	10.000	3.200	9042290220000	220	220
	24.000	15.500	11.000	3.500	9042290240000	240	240
63/64	25.000	15.500	11.000	3.600	9042290250000	250	240
	26.000	18.500	12.000	3.800	9042290260000	260	260
	27.000	18.600	12.000	3.900	9042290270000	270	260
	28.000	19.200	13.000	4.100	9042290280000	280	280
	29.000	19.600	13.000	4.200	9042290290000	290	280
	30.000	19.900	14.000	4.400	9042290300000	300	300
	32.000	21.300	15.000	4.600	9042290320000	320	320
	33.000	21.900	15.000	4.800	9042290330000	330	320
	34.000	22.000	15.000	4.900	9042290340000	340	320
	36.000	22.500	16.000	5.200	9042290360000	360	360
	38.000	22.700	16.000	5.500	9042290380000	380	360
	40.000	23.300	16.000	5.800	9042290400000	390	360

Pilot drill inserts - Series 4111

Carbide, nano-A™ coated

145° point angle, m7 tolerance on diameter

The Series 4105 is a pilot and chamfering tool specifically designed for pilot drilling 7xD and especially 10xD deep hole applications. The Series 4111 insert has a 145° point angle which is required for proper application of a pre-drill pilot operation. This pilot drilling insert is also interchangeable with all other HT 800 WP body series.

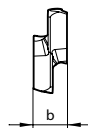
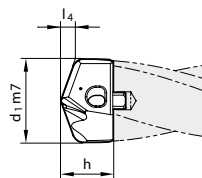


Series 4111

d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4111 nano-A insert EDP No.	Drill body Size	Pilot Drill body Size
29/64	11.00	7.2	4.5	1.5	9041110110000	110	110
	11.20	7.2	4.5	1.5	9041110112000		
	11.50	7.2	4.5	1.9	9041110115000		
	11.51	7.2	4.5	1.9	9041110115100		
15/32	11.70	7.2	4.5	1.9	9041110117000	115	110
	11.80	7.2	4.5	1.9	9041110118000		
	11.91	7.2	4.5	1.9	9041110119100		
	12.00	7.4	5.0	1.9	9041110120000		
31/64	12.10	7.4	5.0	2.0	9041110121000	120	120
	12.20	7.4	5.0	2.0	9041110122000		
	12.30	7.4	5.0	2.0	9041110123000		
	12.50	7.4	5.0	2.0	9041110125000		
1/2	12.60	7.4	5.0	2.0	9041110126000	125	120
	12.70	7.4	5.0	2.1	9041110127000		
	12.80	7.4	5.0	2.1	9041110128000		
	12.90	7.4	5.0	2.1	9041110129000		
33/64	13.00	8.2	5.5	2.1	9041110130000	130	130
	13.10	8.2	5.5	2.1	9041110131000		
	13.49	8.2	5.5	2.2	9041110134900		
	13.50	8.2	5.5	2.2	9041110135000		
35/64	13.60	8.2	5.5	2.2	9041110136000	135	130
	13.70	8.2	5.5	2.2	9041110137000		
	13.80	8.2	5.5	2.2	9041110138000		
	13.89	8.2	5.5	2.2	9041110138900		
9/16	14.00	9.4	6.0	2.3	9041110140000	140	140
	14.10	9.4	6.0	2.3	9041110141000		
	14.29	9.4	6.0	2.3	9041110142900		
	14.40	9.4	6.0	2.3	9041110144000		
37/64	14.50	9.4	6.0	2.3	9041110145000	145	140
	14.60	9.4	6.0	2.4	9041110146000		
	14.68	9.4	6.0	2.4	9041110146800		
	14.70	9.4	6.0	2.4	9041110147000		
19/32	14.80	9.4	6.0	2.4	9041110148000	150	140
	15.00	9.4	6.0	2.4	9041110150000		
	15.08	9.4	6.0	2.4	9041110150800		
	15.10	9.4	6.0	2.4	9041110151000		
39/64	15.20	9.4	6.0	2.4	9041110152000	155	140
	15.30	9.4	6.0	2.5	9041110153000		
	15.48	9.4	6.0	2.5	9041110154800		
	15.50	9.4	6.0	2.5	9041110155000		
5/8	15.60	9.4	6.0	2.5	9041110156000	160	160
	15.70	9.4	6.0	2.5	9041110157000		
	15.80	9.4	6.0	2.5	9041110158000		
	15.87	9.4	6.0	2.6	9041110158700		
41/64	16.00	10.6	7.0	2.6	9041110160000	165	160
	16.27	10.6	7.0	2.6	9041110162700		
21/32	16.50	10.6	7.0	2.7	9041110165000		
	16.67	10.6	7.0	2.7	9041110166700		

d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4111 nano-A insert EDP No.	Drill body Size	Pilot Drill body Size
43/64	17.00	10.6	7.0	2.7	9041110170000	170	160
	17.07	10.6	7.0	2.7	9041110170700		
	17.46	10.6	7.0	2.8	9041110174600		
	17.50	10.6	7.0	2.8	9041110175000		
11/16	17.60	10.6	7.0	2.8	9041110176000	175	160
	17.86	10.6	7.0	2.9	9041110178600		
	18.00	12.1	8.0	2.9	9041110180000		
	18.26	12.1	8.0	2.9	9041110182600		
23/32	18.50	12.1	8.0	3.0	9041110185000	180	180
	18.65	12.1	8.0	3.0	9041110186500		
	19.00	12.1	8.0	3.0	9041110190000		
	19.05	12.1	8.0	3.1	9041110190500		
3/4	19.45	12.1	8.0	3.1	9041110194500	185	180
	19.50	12.1	8.0	3.1	9041110195000		
	19.60	12.1	8.0	3.1	9041110196000		
	19.84	12.1	8.0	3.2	9041110198400		
25/32	20.00	13.3	9.0	3.2	9041110200000	190	180
	20.24	13.3	9.0	3.2	9041110202400		
	20.50	13.3	9.0	3.3	9041110205000		
	20.64	13.3	9.0	3.3	9041110206400		
13/16	21.00	13.3	9.0	3.4	9041110210000	200	200
	21.03	13.3	9.0	3.4	9041110210300		
	21.10	13.3	9.0	3.4	9041110211000		
	21.43	13.3	9.0	3.4	9041110214300		
27/32	21.50	13.3	9.0	3.4	9041110215000	210	200
	21.83	13.3	9.0	3.5	9041110218300		
	22.00	14.8	10.0	3.5	9041110220000		
	22.22	14.8	10.0	3.6	9041110222200		
7/8	22.50	14.8	10.0	3.6	9041110225000	215	200
	22.62	14.8	10.0	3.6	9041110226200		
	23.00	14.8	10.0	3.7	9041110230000		
	23.02	14.8	10.0	3.7	9041110230200		
57/64	23.42	14.8	10.0	3.7	9041110234200	220	220
	23.50	14.8	10.0	3.8	9041110235000		
	23.81	14.8	10.0	3.8	9041110238100		
	24.00	15.3	11.0	3.8	9041110240000		
29/32	24.10	15.3	11.0	3.8	9041110241000	225	220
	24.21	15.3	11.0	3.9	9041110242100		
	24.50	15.3	11.0	3.9	9041110245000		
	24.61	15.3	11.0	3.9	9041110246100		
59/64	25.00	15.3	11.0	4.0	9041110250000	230	220
	25.40	15.3	11.0	4.1	9041110254000		
	25.50	15.3	11.0	4.1	9041110255000		
	26.00	19.4	12.00	4.1	9041110260000		
1 1/32	26.19	19.4	12.00	4.2	9041110261900	235	220
	26.50	19.4	12.00	4.2	9041110265000		
	26.59	19.4	12.00	4.2	9041110265900		
	27.00	19.4	12.00	4.3	9041110270000		

Inserts are supplied with clamping screw, series 4071.



Series 4111

d1 fract.	d1 mm	h mm	b mm	l4 mm	Series 4111 nano-A insert EDP No.	Drill body Size	Pilot Drill body Size
1 3/32	27.50	19.4	12.00	4.4	9041110275000	275	260
	27.70	19.4	12.00	4.4	9041110277000		
	27.78	19.4	12.00	4.4	9041110277800		
	28.00	20.1	13.00	4.5	9041110280000	280	280
	28.18	20.1	13.00	4.5	9041110281800		
1 5/32	28.50	20.1	13.00	4.5	9041110285000	285	280
	28.58	20.1	13.00	4.6	9041110285800		
	29.00	20.1	13.00	4.6	9041110290000	290	280
	29.37	20.1	13.00	4.7	9041110293700		
	29.50	20.1	13.00	4.7	9041110295000	295	280
1 11/64	29.77	20.1	13.00	4.7	9041110297700	295	280
1 3/16	30.00	21.7	14.00	4.8	9041110300000	300	300
	30.16	21.7	14.00	4.8	9041110301600		
	30.50	21.7	14.00	4.9	9041110305000	305	300
	30.96	21.7	14.00	4.9	9041110309600		
	31.00	21.7	14.00	4.9	9041110310000	310	300
1 1/4	31.50	21.7	14.00	5.0	9041110315000	315	300
	31.75	21.7	14.00	5.1	9041110317500		
	32.00	22.4	15.00	5.1	9041110320000	320	320
	32.50	22.4	15.00	5.2	9041110325000		
	32.54	22.4	15.00	5.2	9041110325400		
1 9/32	32.94	22.4	15.00	5.2	9041110329400	330	320
1 19/64	33.00	22.4	15.00	5.3	9041110330000		
1 5/16	33.34	22.4	15.00	5.3	9041110333400		
	33.50	22.4	15.00	5.3	9041110335000	340	320
	34.00	22.4	15.00	5.4	9041110340000		
1 11/32	34.13	22.4	15.00	5.4	9041110341300		
	34.50	22.4	15.00	5.5	9041110345000	350	320
	34.93	22.4	15.00	5.6	9041110349300		
	35.00	22.4	15.00	5.6	9041110350000		
	35.50	22.4	15.00	5.6	9041110355000	360	360
	35.72	22.4	15.00	5.7	9041110357200		
1 15/32	36.00	23.2	16.00	5.7	9041110360000	370	360
	36.50	23.2	16.00	5.8	9041110365000		
	36.51	23.2	16.00	5.8	9041110365100		
	37.00	23.2	16.00	5.9	9041110370000	380	360
	37.31	23.2	16.00	5.9	9041110373100		
1 1/2	37.50	23.2	16.00	6.0	9041110375000	390	360
	38.00	23.2	16.00	6.0	9041110380000		
	38.10	23.2	16.00	6.1	9041110381000		
	38.50	23.2	16.00	6.1	9041110385000	390	360
	39.00	23.2	16.00	6.2	9041110390000		
	39.50	23.2	16.00	6.3	9041110395000	390	360
	40.00	23.2	16.00	6.4	9041110400000		

Inserts are supplied with clamping screw, series 4071.

HT 800 WP countersink inserts



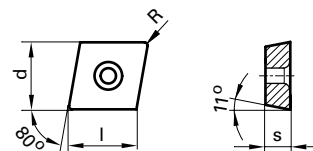
Series 7645 for steels



Series 7632 for cast iron



Series 7635 for aluminum



Type	d mm	s mm	R mm	l mm	Series 7645 TiN coated EDP No.	Series 7632 TiAlN coated EDP No.	Series 7635 Bright finish EDP No.	Drill body Size
CPGT050204R	5.56	2.38	0.4	5.64	9076450520400		9076350520400	110-140
CPGT060204R	6.35	2.38	0.4	6.45	9076450620400		9076350620400	160-280
CPGT09T308R	9.53	3.97	0.8	9.67	9076450930800		9076350930800	300-360
CPGW050204	5.56	2.38	0.4	5.60		9076320520400		110-140
CPGW060204	6.35	2.38	0.4	6.40		9076320620400		160-280
CPGT09T308	9.53	3.97	0.8	9.67		9076320930800		300-360

Slashing Cycle Time:

Guhring HT 800 vs. competitor's indexable insert drill

Material: Low alloy steel 1008

Hole diameter: 1.220"

Hole depth: 4.00"

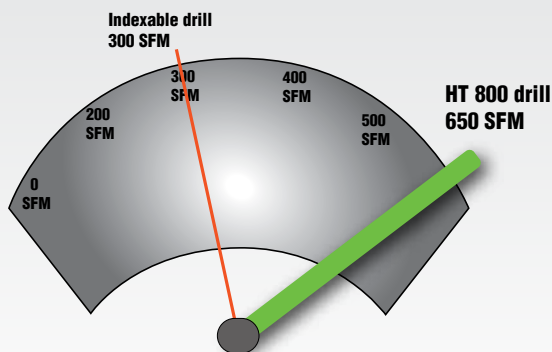
of holes to produce: 6,000

Machine tool: Vertical Machining Center

Objective: Reduce cycle time

Results:	HT 800 drill	Indexable drill
Spindle Speed	2,050 RPM	935 RPM
Feed rate (IPM)	37	11
Cycle Time	7 seconds	22 seconds
Cost per Hole	\$0.28	\$0.51
SAVINGS:	44.65%	

Surface Footage



Cycle Time, in seconds



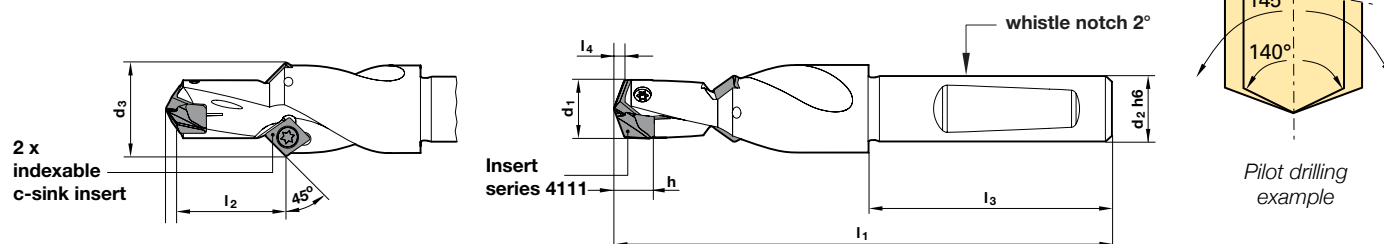
HT800 drill
7 seconds



Indexable drill
22 seconds

1xD pilot drill/c-sink bodies - Series 4105

Tool steel, coolant fed, nickel plated

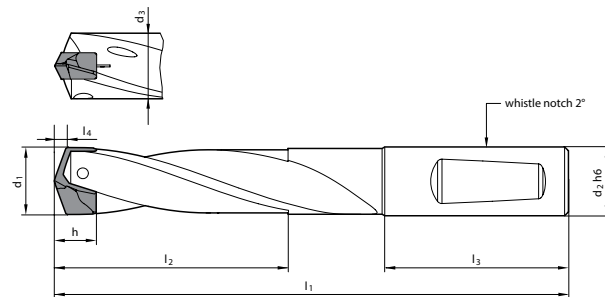


*l1 dimensions listed pertain to insert series 4111 only. Insert series 4112, 4113, 4114, 4115, and 4229 have different h and l4 dimensions.

Body Size	EDP No.	d1 Insert Range mm	d2 mm	d2 in	d3 mm	Series 4105 Bod (1xD w/countersink)		
						l1 mm	l2 mm	l3 mm
110	9041050110000	11.00-11.99	12.00		17.00	81.00	14.80	45.00
	9041050110050	11.00-11.99	12.70	1/2	17.00			
120	9041050120000	12.00-12.99	12.00		18.00	84.00	15.80	45.00
	9041050120050	12.00-12.99	12.70	1/2	18.00			
130	9041050130000	13.00-13.99	14.00		18.00	86.00	16.30	45.00
	9041050130050	13.00-13.99	15.875	5/8	18.00			
140	9041050140000	14.00-15.99	16.00		18.00	93.00	17.40	48.00
	9041050140050	14.00-15.99	15.875	5/8	18.00			
160	9041050160000	16.00-17.99	18.00		20.00	99.00	19.40	48.00
	9041050160050	16.00-17.99	19.05	3/4	20.00			
180	9041050180000	18.00-19.99	20.00		22.00	106.00	21.40	50.00
	9041050180050	18.00-19.99	19.05	3/4	22.00			
200	9041050200000	20.00-21.99	25.00		24.00	117.00	23.40	56.00
	9041050200050	20.00-21.99	25.40	1	24.00			
220	9041050220000	22.00-23.99	25.00		26.00	122.00	25.40	56.00
	9041050220050	22.00-23.99	25.40	1	26.00			
240	9041050240000	24.00-25.99	25.00		28.00	128.00	27.40	56.00
	9041050240050	24.00-25.99	25.40	1	28.00			
260	9041050260000	26.00 - 27.99	32.00		32.00	142.00	28.00	60.00
	9041050260050	26.00 - 27.99	31.75	1 1/4	32.00			
280	9041050280000	28.00 - 29.99	32.00		34.00	147.00	30.00	60.00
	9041050280050	28.00 - 29.99	31.75	1 1/4	34.00			
300	9041050300000	30.00 - 31.99	32.00		38.00	152.00	32.00	60.00
	9041050300050	30.00 - 31.99	31.75	1 1/4	38.00			
320	9041050320000	32.00 - 35.99	32.00		42.00	163.00	36.00	60.00
	9041050320050	32.00 - 35.99	31.75	1 1/4	42.00			
360	9041050360000	36.00 - 40.00	32.00		46.00	173.00	40.00	60.00
	9041050360050	36.00 - 40.00	31.75	1 1/4	46.00			

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

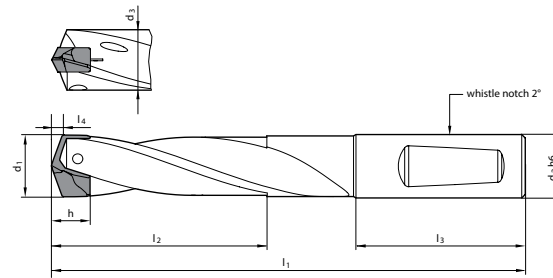
Series 4106 (1.5xD), 4107 (3xD) and 4108 (5xD) Tool steel, coolant fed, nickel plated



*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm	Series 4106 (1.5xD)				Series 4107 (3xD)			Series 4108 (5xD)		
		d2 mm	d2 in	d3 mm	l3 mm	EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm
110	11.00-11.49	12.00		10.70	45.00	9041060110000	84.00	19.30	9041070110000	101.00	36.60
	11.00-11.49	12.70	1/2	10.70	45.00	9041060110050			9041070110050		
115	11.50-11.99	12.00		11.20	45.00	9041060115000	85.00	20.10	9041070115000	103.00	38.10
	11.50-11.99	12.70	1/2	11.20	45.00	9041060115050			9041070115050		
120	12.00-12.49	12.00		11.70	45.00	9041060120000	87.00	21.00	9041070120000	106.00	39.70
	12.00-12.49	12.70	1/2	11.70	45.00	9041060120050			9041070120050		
125	12.50-12.99	14.00		12.20	45.00	9041060125000	89.00	21.90	9041070125000	108.00	41.30
	12.50-12.99	15.875	5/8	12.20	45.00	9041060125050			9041070125050		
130	13.00-13.49	14.00		12.70	45.00	9041060130000	90.00	22.60	9041070130000	110.00	42.90
	13.00-13.49	15.875	5/8	12.70	45.00	9041060130050			9041070130050		
135	13.50-13.99	14.00		13.20	45.00	9041060135000	92.00	23.60	9041070135000	113.00	44.60
	13.50-13.99	15.875	5/8	13.20	45.00	9041060135050			9041070135050		
140	14.00-14.49	14.00		13.70	45.00	9041060140000	93.00	24.50	9041070140000	115.00	46.20
	14.00-14.49	15.875	5/8	13.70	45.00	9041060140050			9041070140050		
145	14.50-14.99	16.00		14.20	48.00	9041060145000	98.00	25.30	9041070145000	120.00	47.80
	14.50-14.99	15.875	5/8	14.20	48.00	9041060145050			9041070145050		
150	15.00-15.49	16.00		14.70	48.00	9041060150000	100.00	26.10	9041070150000	123.00	49.30
	15.00-15.49	15.875	5/8	14.70	48.00	9041060150050			9041070150050		
155	15.50-15.99	16.00		15.20	48.00	9041060155000	101.00	27.00	9041070155000	125.00	50.90
	15.50-15.99	15.875	5/8	15.20	48.00	9041060155050			9041070155050		
160	16.00-16.49	16.00		15.70	48.00	9041060160000	102.00	27.80	9041070160000	127.00	52.90
	16.00-16.49	15.875	5/8	15.70	48.00	9041060160050			9041070160050		
165	16.50-16.99	18.00		16.20	48.00	9041060165000	105.00	28.70	9041070165000	130.00	54.10
	16.50-16.99	19.05	3/4	16.20	48.00	9041060165050			9041070165050		
170	17.00-17.49	18.00		16.70	48.00	9041060170000	106.00	29.60	9041070170000	132.00	55.80
	17.00-17.49	19.05	3/4	16.70	48.00	9041060170050			9041070170050		
175	17.50-17.99	18.00		17.20	48.00	9041060175000	107.00	30.40	9041070175000	134.00	57.40
	17.50-17.99	19.05	3/4	17.20	48.00	9041060175050			9041070175050		
180	18.00-18.49	18.00		17.70	48.00	9041060180000	109.00	31.20	9041070180000	137.00	58.90
	18.00-18.49	19.05	3/4	17.70	48.00	9041060180050			9041070180050		
185	18.50-18.99	20.00		18.20	50.00	9041060185000	113.00	32.10	9041070185000	141.00	60.50
	18.50-18.99	19.05	3/4	18.20	50.00	9041060185050			9041070185050		
190	19.00-19.49	20.00		18.70	50.00	9041060190000	114.00	32.90	9041070190000	143.00	62.10
	19.00-19.49	19.05	3/4	18.70	50.00	9041060190050			9041070190050		
195	19.50-19.99	20.00		19.20	50.00	9041060195000	116.00	33.70	9041070195000	146.00	63.70
	19.50-19.99	19.05	3/4	19.20	50.00	9041060195050			9041070195050		

Bodys are supplied with clamping screw, series 4071, and screwdriver, series 1612.

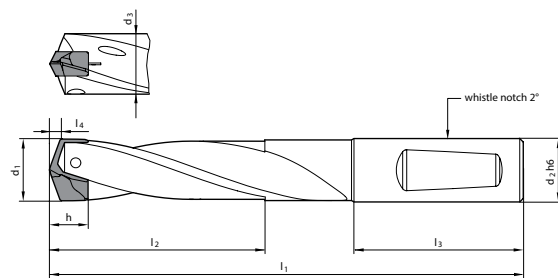


*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm	Series 4106 (1.5xD)				Series 4107 (3xD)			Series 4108 (5xD)		
		d2	d2	d3	l3	l1*		l2	l1*		l2
		mm	in	mm	mm	EDP No.	mm	mm	EDP No.	mm	mm
200	20.00-20.49	20.00		19.70	50.00	9041060200000	117.00	34.60	9041070200000	148.00	65.30
	20.00-20.49	19.05	3/4	19.70		9041060200050			9041070200050		
205	20.50-20.99	25.00		20.20	56.00	9041060205000	128.00	35.50	9041070205000	159.00	67.00
	20.50-20.99	25.40	1	20.20		9041060205050			9041070205050		
210	21.00-21.49	25.00		20.70	56.00	9041060210000	129.00	36.40	9041070210000	161.00	68.60
	21.00-21.49	25.40	1	20.70		9041060210050			9041070210050		
215	21.50-21.99	25.00		21.20	56.00	9041060215000	130.00	37.20	9041070215000	163.00	70.10
	21.50-21.99	25.40	1	21.20		9041060215050			9041070215050		
220	22.00-22.49	25.00		21.70	56.00	9041060220000	131.00	38.00	9041070220000	165.00	71.70
	22.00-22.49	25.40	1	21.70		9041060220050			9041070220050		
225	22.50-22.99	25.00		22.20	56.00	9041060225000	134.00	38.90	9041070225000	168.00	73.30
	22.50-22.99	25.40	1	22.20		9041060225050			9041070225050		
230	23.00-23.49	25.00		22.70	56.00	9041060230000	135.00	39.80	9041070230000	170.00	74.90
	23.00-23.49	25.40	1	22.70		9041060230050			9041070230050		
235	23.50-23.99	25.00		23.20	56.00	9041060235000	137.00	40.60	9041070235000	173.00	76.50
	23.50-23.99	25.40	1	23.20		9041060235050			9041070235050		
240	24.00-24.49	25.00		23.70	56.00	9041060240000	138.00	41.50	9041070240000	175.00	78.10
	24.00-24.49	25.40	1	23.70		9041060240050			9041070240050		
245	24.50-24.99	25.00		24.20	56.00	9041060245000	140.00	42.30	9041070245000	177.00	79.70
	24.50-24.99	25.40	1	24.20		9041060245050			9041070245050		
250	25.00-25.49	25.00		24.70	56.00	9041060250000	142.00	43.20	9041070250000	180.00	81.30
	25.00-25.49	25.40	1	24.70		9041060250050			9041070250050		
255	25.50-25.99	32.00		25.20	60.00	9041060255000	148.00	44.00	9041070255000	187.00	82.90
	25.50-25.99	31.75	1 1/4	25.20		9041060255050			9041070255050		
260	26.00-26.49	32.00		25.70	60.00	9041060260000	151.00	44.30	9041070260000	191.00	84.00
	26.00-26.49	31.75	1 1/4	25.70		9041060260050			9041070260050		
265	26.50-26.99	32.00		26.20	60.00	9041060265000	153.00	45.10	9041070265000	193.00	86.10
	26.50-26.99	31.75	1 1/4	26.20		9041060265050			9041070265050		
270	27.00-27.49	32.00		26.70	60.00	9041060270000	155.00	46.00	9041070270000	196.00	87.20
	27.00-27.49	31.75	1 1/4	26.70		9041060270050			9041070270050		
275	27.50-27.99	32.00		27.20	60.00	9041060275000	156.00	46.80	9041070275000	198.00	88.90
	27.50-27.99	31.75	1 1/4	27.20		9041060275050			9041070275050		
280	28.00-28.49	32.00		27.70	60.00	9041060280000	157.00	47.70	9041070280000	200.00	90.50
	28.00-28.49	31.75	1 1/4	27.70		9041060280050			9041070280050		
285	28.50-28.99	32.00		28.20	60.00	9041060285000	159.00	48.50	9041070285000	202.00	92.50
	28.50-28.99	31.75	1 1/4	28.20		9041060285050			9041070285050		
290	29.00-29.49	32.00		28.70	60.00	9041060290000	161.00	49.40	9041070290000	205.00	94.60
	29.00-29.49	31.75	1 1/4	28.70		9041060290050			9041070290050		
295	29.50-29.99	32.00		29.20	60.00	9041060295000	162.00	50.20	9041070295000	207.00	95.10
	29.50-29.99	31.75	1 1/4	29.20		9041060295050			9041070295050		

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

HT 800 WP drill bodies



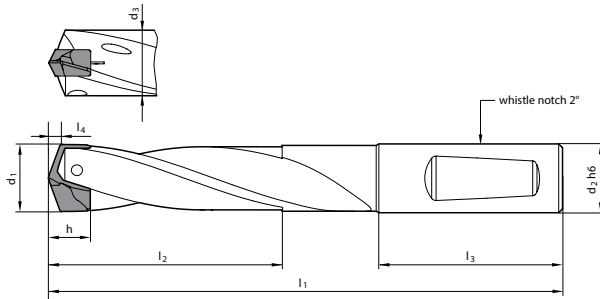
*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm	d2 mm	d2 in	d3 mm	l3 mm	Series 4106 (1.5xD)			Series 4107 (3xD)			Series 4108 (5xD)		
						EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm
300	30.00-30.49	32.00		29.70		9041060300000	164.00	50.90	9041070300000	210.00	96.70	9041080300000	271.00	157.60
	30.00-30.49	31.75	1 1/4	29.70	60.00	9041060300050			9041070300050			9041080300050		
305	30.50-30.99	32.00		30.20		9041060305000	166.00	51.70	9041070305000	212.00	98.30	9041080305000	274.00	160.20
	30.50-30.99	31.75	1 1/4	30.20	60.00	9041060305050			9041070305050			9041080305050		
310	31.00-31.49	32.00		30.70		9041060310000	167.00	52.60	9041070310000	214.00	99.80	9041080310000	277.00	162.80
	31.00-31.49	31.75	1 1/4	30.70	60.00	9041060310050			9041070310050			9041080310050		
315	31.50-31.99	32.00		31.20		9041060315000	168.00	53.40	9041070315000	216.00	101.40	9041080315000	280.00	165.40
	31.50-31.99	31.75	1 1/4	31.20	60.00	9041060315050			9041070315050			9041080315050		
320	32.00-32.99	32.00		31.70		9041060320000	172.00	55.10	9041070320000	221.00	104.60	9041080320000	287.00	170.60
	32.00-32.99	31.75	1 1/4	31.70	60.00	9041060320050			9041070320050			9041080320050		
330	33.00-33.99	32.00		32.70		9041060330000	175.00	56.80	9041070330000	226.00	107.80	9041080330000	294.00	175.80
	33.00-33.99	31.75	1 1/4	32.70	60.00	9041060330050			9041070330050			9041080330050		
340	34.00-34.99	32.00		33.70		9041060340050	178.00	58.50	9041070340050	230.00	111.00	9041080340050	300.00	181.00
	34.00-34.99	31.75	1 1/4	33.70	60.00	9041060340050			9041070340050			9041080340050		
350	35.00-35.99	32.00		34.70		9041060350000	181.00	60.20	9041070350000	235.00	114.20	9041080350000	307.00	186.20
	35.00-35.99	31.75	1 1/4	34.70	60.00	9041060350050			9041070350050			9041080350050		
360	36.00-36.99	32.00		35.70		9041060360000	184.00	61.80	9041070360000	240.00	117.30	9041080360000	314.00	191.30
	36.00-36.99	31.75	1 1/4	35.70	60.00	9041060360050			9041070360050			9041080360050		
370	37.00-37.99	32.00		36.70		9041060370000	188.00	63.50	9041070370000	245.00	120.50	9041080370000	321.00	196.50
	37.00-37.99	31.75	1 1/4	36.70	60.00	9041060370050			9041070370050			9041080370050		
380	38.00-38.99	32.00		37.70		9041060380000	191.00	65.20	9041070380000	249.00	123.70	9041080380000	327.00	201.70
	38.00-38.99	31.75	1 1/4	37.70	60.00	9041060380050			9041070380050			9041080380050		
390	39.00-40.00	32.00		38.70		9041060390000	194.00	66.90	9041070390000	254.00	126.90	9041080390000	334.00	206.90
	39.00-40.00	31.75	1 1/4	38.70	60.00	9041060390050			9041070390050			9041080390050		

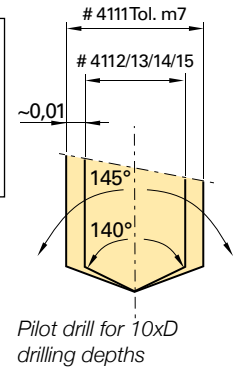
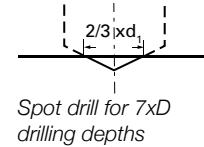
Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

Series 4109 (7xD) and 4110 (10xD)

Tool steel, coolant fed, nickel plated



For drilling depths over 5xD, we generally recommend spot drilling. Drilling depths over 7xD will typically require piloting operation using shorter drill body and series 4111 insert.

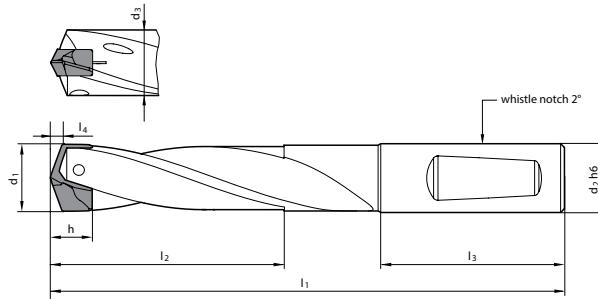


*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm	d2 mm	d2 in	d3 mm	l3 mm	Series 4109 (7xD)			Series 4110 (10xD)		
						EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm
110	11.00-11.49	12.00		10.70	45.00	9041090110000	147.00	82.60	9041100110000	182.00	117.10
	11.00-11.49	12.70	1/2	10.70	45.00	9041090110050			9041100110050		
115	11.50-11.99	12.00		11.20	45.00	9041090115000	151.00	86.10	9041100115000	187.00	122.10
	11.50-11.99	12.70	1/2	11.20	45.00	9041090115050			9041100115050		
120	12.00-12.49	12.00		11.70	45.00	9041090120000	156.00	89.70	9041100120000	194.00	127.20
	12.00-12.49	12.70	1/2	11.70	45.00	9041090120050			9041100120050		
125	12.50-12.99	14.00		12.20	45.00	9041090125000	160.00	93.30	9041100125000	199.00	132.30
	12.50-12.99	15.875	5/8	12.20	45.00	9041090125050			9041100125050		
130	13.00-13.49	14.00		12.70	45.00	9041090130000	164.00	96.90	9041100130000	205.00	137.50
	13.00-13.49	15.875	5/8	12.70	45.00	9041090130050			9041100130050		
135	13.50-13.99	14.00		13.20	45.00	9041090135000	169.00	100.60	9041100135000	211.00	142.50
	13.50-13.99	15.875	5/8	13.20	45.00	9041090135050			9041100135050		
140	14.00-14.49	14.00		13.70	45.00	9041090140000	173.00	104.20	9041100140000	217.00	147.70
	14.00-14.49	15.875	5/8	13.70	45.00	9041090140050			9041100140050		
145	14.50-14.99	16.00		14.20	48.00	9041090145000	180.00	107.80	9041100145000	225.00	152.80
	14.50-14.99	15.875	5/8	14.20	48.00	9041090145050			9041100145050		
150	15.00-15.49	16.00		14.70	48.00	9041090150000	185.00	111.30	9041100150000	232.00	157.80
	15.00-15.49	15.875	5/8	14.70	48.00	9041090150050			9041100150050		
155	15.50-15.99	16.00		15.20	48.00	9041090155000	189.00	114.90	9041100155000	237.00	162.90
	15.50-15.99	15.875	5/8	15.20	48.00	9041090155050			9041100155050		
160	16.00-16.49	16.00		15.70	48.00	9041090160000	193.00	118.90	9041100160000	243.00	168.00
	16.00-16.49	15.875	5/8	15.70	48.00	9041090160050			9041100160050		
165	16.50-16.99	18.00		16.20	48.00	9041090165000	198.00	122.10	9041100165000	249.00	173.10
	16.50-16.99	19.05	3/4	16.20	48.00	9041090165050			9041100165050		
170	17.00-17.49	18.00		16.70	48.00	9041090170000	202.00	125.80	9041100170000	255.00	178.30
	17.00-17.49	19.05	3/4	16.70	48.00	9041090170050			9041100170050		
175	17.50-17.99	18.00		17.20	48.00	9041090175000	206.00	129.40	9041100175000	260.00	183.50
	17.50-17.99	19.05	3/4	17.20	48.00	9041090175050			9041100175050		
180	18.00-18.49	18.00		17.70	48.00	9041090180000	211.00	132.90	9041100180000	267.00	188.40
	18.00-18.49	19.05	3/4	17.70	48.00	9041090180050			9041100180050		

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

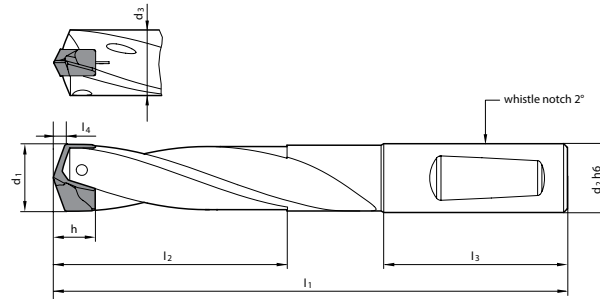
HT 800 WP drill bodies



*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm					Series 4109 (7xD)			Series 4110 (10xD)		
		d2 mm	d2 in	d3 mm	l3 mm	EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm
185	18.50-18.99	20.00		18.20	50.00	9041090185000			9041100185000		
	18.50-18.99	19.05	3/4	18.20	50.00	9041090185050	217.00	136.50	9041100185050	274.00	193.50
190	19.00-19.49	20.00		18.70	50.00	9041090190000			9041100190000		
	19.00-19.49	19.05	3/4	18.70	50.00	9041090190050	221.00	140.10	9041100190050	280.00	198.70
195	19.50-19.99	20.00		19.20	50.00	9041090195000			9041100195000		
	19.50-19.99	19.05	3/4	19.20	50.00	9041090195050	226.00	143.70	9041100195050	286.00	203.70
200	20.00-20.49	20.00		19.70	50.00	9041090200000			9041100200000		
	20.00-20.49	19.05	3/4	19.70	50.00	9041090200050	230.00	147.30	9041100200050	292.00	208.90
205	20.50-20.99	25.00		20.20	56.00	9041090205000			9041100205000		
	20.50-20.99	25.40	1	20.20	56.00	9041090205050	243.00	151.00	9041100205050	306.00	214.00
210	21.00-21.49	25.00		20.70	56.00	9041090210000			9041100210000		
	21.00-21.49	25.40	1	20.70	56.00	9041090210050	247.00	154.60	9041100210050	312.00	219.10
215	21.50-21.99	25.00		21.20	56.00	9041090215000			9041100215000		
	21.50-21.99	25.40	1	21.20	56.00	9041090215050	251.00	158.10	9041100215050	317.00	224.20
220	22.00-22.49	25.00		21.70	56.00	9041090220000			9041100220000		
	22.00-22.49	25.40	1	21.70	56.00	9041090220050	255.00	161.70	9041100220050	323.00	229.30
225	22.50-22.99	25.00		22.20	56.00	9041090225000			9041100225000		
	22.50-22.99	25.40	1	22.20	56.00	9041090225050	260.00	165.30	9041100225050	329.00	234.40
230	23.00-23.49	25.00		22.70	56.00	9041090230000			9041100230000		
	23.00-23.49	25.40	1	22.70	56.00	9041090230050	264.00	168.90	9041100230050	335.00	239.50
235	23.50-23.99	25.00		23.20	56.00	9041090235000			9041100235000		
	23.50-23.99	25.40	1	23.20	56.00	9041090235050	269.00	172.50	9041100235050	341.00	244.60
240	24.00-24.49	25.00		23.70	56.00	9041090240000			9041100240000		
	24.00-24.49	25.40	1	23.70	56.00	9041090240050	273.00	176.10	9041100240050	347.00	249.70
245	24.50-24.99	25.00		24.20	56.00	9041090245000			9041100245000		
	24.50-24.99	25.40	1	24.20	56.00	9041090245050	277.00	179.70	9041100245050	352.00	254.80
250	25.00-25.49	25.00		24.70	56.00	9041090250000			9041100250000		
	25.00-25.49	25.40	1	24.70	56.00	9041090250050	282.00	183.30	9041100250050	359.00	259.90
255	25.50-25.99	32.00		25.20	60.00	9041090255000			9041100255000		
	25.50-25.99	31.75	1 1/4	25.20	60.00	9041090255050	291.00	186.90	9041100255050	369.00	265.00
260	26.00 - 26.49	32.00		25.70	60.00	9041090260000			9041100260000		
	26.00 - 26.49	31.75	1 1/4	25.70	60.00	9041090260050	297.00	190.00	9041100260050	377.00	270.00
265	26.50 - 26.99	32.00		26.20	60.00	9041090265000			9041100265000		
	26.50 - 26.99	31.75	1 1/4	26.20	60.00	9041090265050	301.00	194.00	9041100265050	382.00	275.00
270	27.00 - 27.49	32.00		26.70	60.00	9041090270000			9041100270000		
	27.00 - 27.49	31.75	1 1/4	26.70	60.00	9041090270050	306.00	197.20	9041100270050	388.00	280.10

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.



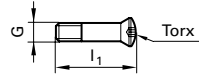
*l1 dimensions listed pertain to insert series 4112, 4113, 4114, and 4115 only. Insert series 4111 & 4229 have different h and l4 dimensions.

Body Size	d1 Insert Range mm					Series 4109 (7xD)			Series 4110 (10xD)		
		d2 mm	d2 in	d3 mm	l3 mm	EDP No.	l1* mm	l2 mm	EDP No.	l1* mm	l2 mm
275	27.50 - 27.99	32.00		27.20	60.00	9041090275000			9041100275000		
	27.50 - 27.99	31.75	1 1/4	27.20	60.00	9041090275050	310.00	200.80	9041100275050	394.00	285.20
280	28.00 - 28.49	32.00		27.70	60.00	9041090280000			9041100280000		
	28.00 - 28.49	31.75	1 1/4	27.70	60.00	9041090280050	314.00	204.40	9041100280050	400.00	290.30
285	28.50 - 28.99	32.00		28.20	60.00	9041090285000			9041100285000		
	28.50 - 28.99	31.75	1 1/4	28.20	60.00	9041090285050	318.00	208.40	9041100285050	405.00	295.40
290	29.00 - 29.49	32.00		28.70	60.00	9041090290000			9041100290000		
	29.00 - 29.49	31.75	1 1/4	28.70	60.00	9041090290050	323.00	212.50	9041100290050	412.00	300.50
295	29.50 - 29.99	32.00		29.20	60.00	9041090295000			9041100295000		
	29.50 - 29.99	31.75	1 1/4	29.20	60.00	9041090295050	327.00	215.10	9041100295050	418.00	305.60
300	30.00 - 30.49	32.00		29.70	60.00	9041090300000			9041100300000		
	30.00 - 30.49	31.75	1 1/4	29.70	60.00	9041090300050	332.00	218.60	9041100300050	424.00	310.60
305	30.50 - 30.99	32.00		30.20	60.00	9041090305000			9041100305000		
	30.50 - 30.99	31.75	1 1/4	30.20	60.00	9041090305050	336.00	222.20	9041100305050	429.00	315.70
310	31.00 - 31.49	32.00		30.70	60.00	9041090310000			9041100310000		
	31.00 - 31.49	31.75	1 1/4	30.70	60.00	9041090310050	340.00	225.80	9041100310050	435.00	320.80
315	31.50 - 31.99	32.00		31.20	60.00	9041090315000			9041100315000		
	31.50 - 31.99	31.75	1 1/4	31.20	60.00	9041090315050	344.00	229.40	9041100315050	441.00	325.90

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

HT 800 WP spare parts & accessories

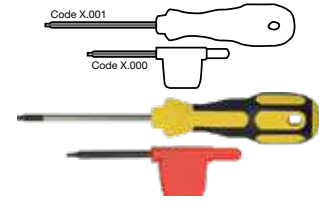
Clamping screws for HT 800 inserts



Series 4071

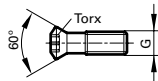
For body size	Size	OAL	with Torx	EDP No.
110/115	M2.2	9.50	T7	9040710022000
120/125	M2.2	10.50	T7	9040710022010
130/135	M2.5	11.40	T8	9040710025000
140/145	M3	12.10	T9	9040710030000
150/155	M3	13.10	T9	9040710030010
160 - 175	M3.5	14.25	T10	9040710035000
180 - 195	M4	16.00	T15	9040710040000
200 - 215	M4.5	18.00	T15	9040710045000
220 - 235	M5	19.75	T20	9040710050000
240 - 255	M5	21.75	T20	9040710050010
260 - 295	M5	23.40	T20	9040710050030
300 - 315	M6	27.00	T25	9040710060000
320 - 350	M6	28.50	T25	9040710060010
360 - 390	M6	32.50	T25	9040710060020

Screw driver Series 1612



For body size	for Torx	EDP No.
Pilot Body 110 - 140	T6	9016120060000
Pilot Body 160 - 280	T7	9016120070000
110 - 125	T7	9016120070010
130/135	T8	9016120080010
140 - 155	T9	9016120090010
160 - 175	T10	9016120100010
Pilot Body 300 - 360	T15	9016120150000
180 - 215	T15	9016120150010
220-295	T20	9016120200010
300 - 390	T25	9016120250000

Clamping screws for chamfering inserts



Series 6128

For body size	Size	OAL	with Torx	EDP No.
110 - 140	M2.0	5.5	T6	9061280020000
160 - 240	M2.5	5.3	T7	9061280025000
300 - 360	M4.0	9.5	T15	9061280040000

Torx Bits

Series 4917



for Torx	Drive	l1 mm	EDP No.
T7	1/4"	25	9049170070000
T8	1/4"	25	9049170080000
T9	1/4"	25	9049170090000
T10	1/4"	25	9049170100000
T15	1/4"	25	9049170150000
T20	1/4"	25	9049170200000
T25	1/4"	25	9049170250000

Torque wrench

Series 4915



Type	Drive	l1 mm	Tightening torque (Nm)	EDP No.
A	1/4"	160.00	0.8 - 2	9049150020000
A	1/4"	160.00	2 - 8	9049150080000
A	1/4"	200.00	5 - 14	9049150140000

Torque values for clamping screws

Diameter range (mm)	11.0 - 12.99	13.0 - 13.99	14.0 - 15.99	16.0 - 17.99	18.0 - 19.99	20.0 - 21.99	22.0 - 29.99	30.0 - 40.00
Thread	M2.2	M2.5	M3	M3.5	M4	M4.5	M5	M6
Torx size	T7	T8	T9	T10	T15	T15	T20	T25
Tightening torque [Nm]	0.80	1.00	1.70	2.70	4.00	6.0	8.00	14.0

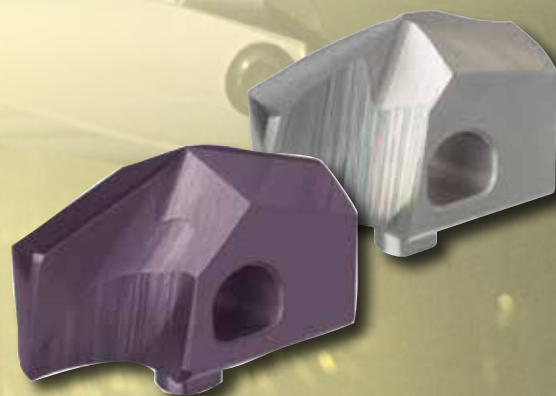
The information above applies to screws containing thread locker (Loctite). Guhring HT800 drill tip insert screws are supplied containing thread locker.

Bodies are supplied with clamping screw, series 4071, and screwdriver, series 1612.

Now get the **EXACT** diameter you need

Reduce your insert diameter by up to 0.20mm

Guhring can grind down HT 800 WP inserts by as much as 0.20mm in diameter to allow you an even more extensive range of sizes.



HT 800 WP Insert modification

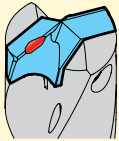
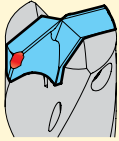
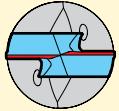
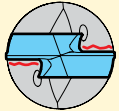
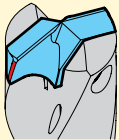
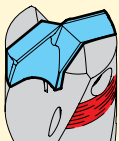
Can't find the exact drill size you're looking for? Problem solved!

Guhring now has the capability to modify our standard HT 800 replaceable tip drill inserts by grinding the diameters down by as much as .20mm (.0079") and recoating them with their original PVD coating. This service is provided through our manufacturing facility in Brookfield, WI.

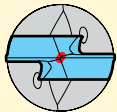
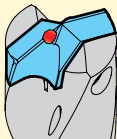
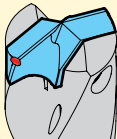
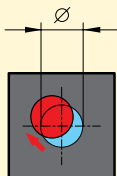
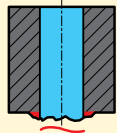
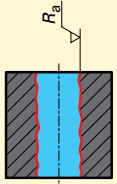
The HT 800 drill bodies recommended for each insert size have sufficient clearance to accommodate for the maximum allowable insert diameter reduction, so there is no need to modify the body. Our comprehensive selection of drill body lengths – 1xD, 1.5xD, 3xD, 5xD, 7xD, and 10xD – paired with the flexibility of modifying the insert diameters provides a vast array of replaceable tip drill options.

Contact Guhring's Reconditioning division for details at (800) 776-6170.

12 tips to help diagnose problems

Problem	Cause	Remedy
1 Cutting edge build up 	- low cutting speed - excessive honing of cutting lip - bright finish cutting lip	- increase cutting speed - reduce cutting lip honing - have tool coated
2 Crumbling of outer corners 	- non-rigid conditions, insufficient workpiece clamping - deviation from concentricity too large - interrupted cut	- rigid clamping of workpiece - check and correct concentricity if possible - reduce feed
3 Heavy wear at flank 	- cutting speed too high - feed too low - clearance angle too small	- reduce cutting speed - increase feed - increase clearance angle
4 Crumbling on cutting lips 	- non-rigid conditions, insufficient workpiece clamping - interrupted cut - max. wear values exceeded - incorrect tool type	- rigid clamping of workpiece - reduce feed - reduce tool change intervals - apply suitable tool
5 Land wear 	- non-rigid conditions, insufficient workpiece clamping - deviation from concentricity too large - back taper too small - incorrect coolant (oil), coolant too weak	- rigid clamping of workpiece - check and correct concentricity if possible - increase back taper - increase strength of coolant or use neat oil
6 Scoring on tool body 	- non-rigid conditions, insufficient workpiece clamping - deviation from concentricity too large - interrupted cut - abrasive workpiece material	- rigid clamping of workpiece - check and correct concentricity if possible - reduce feed - increase strength of coolant or use neat oil

12 tips to help diagnose problems

Problem	Cause	Remedy
7 Heavy chisel edge wear 	- cutting speed too low - feed too high - excessive honing of cutting lip	- increase cutting speed - reduce feed - reduce cutting lip honing
8 Crumbling at intersection, web thinning and cutting lip 	- clearance angle too small - excessive honing of cutting lip - incorrect tool type	- increase clearance angle - reduce cutting lip honing - apply suitable tool
9 Plastic deformation of outer corner 	- cutting speed too high - insufficient coolant volume - incorrect or no honing at corner	- reduce cutting speed - increase volume/pressure - correct honing
10 Misalignment 	- non-rigid conditions, insufficient workpiece clamping - deviation from concentricity too large - spotting area not flat - chisel edge too large	- rigid clamping of workpiece - check and correct concentricity if possible - use milling cutter (2-fluted) for spotting - reduce chisel edge
11 Heavy burring on break-through 	- feed too high - max. wear values exceeded - excessive honing of cutting lip	- reduce feed - reduce tool change intervals - reduce cutting lip honing
12 Unsatisfactory surface quality 	- non-rigid conditions, insufficient workpiece clamping - deviation from concentricity too large - insufficient coolant volume	- rigid clamping of workpiece - check and correct concentricity if possible - increase volume/pressure

Body 4105 & 4106

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	-	≤ 150	425				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 32	≤ 301	360				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Free-cutting steels	≤ 25	≤ 255	425				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
	≤ 32	≤ 301	360				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Unalloyed heat-treatable steels	≤ 20	≤ 220	425				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 25	≤ 255	410				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 32	≤ 301	360				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Alloyed heat-treatable steels	≤ 32	≤ 301	360				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 43	≤ 402	295				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Unalloyed case hardened steels	≤ 25	≤ 255	425				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Alloyed case hardened steels	≤ 32	≤ 301	360				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 43	≤ 402	230				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
Nitriding steels	≤ 32	≤ 301	345				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 43	≤ 402	230				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
Tool steels	≤ 25	≤ 255	195				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 43	≤ 402	180				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
High speed steels	≤ 43	≤ 402	180				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
Spring steels	≤ 38	≤ 354	165				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Hardened steels	≤ 48	≤ 460	80				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
	≤ 66	-	-										
Stainless steels, sulphured	≤ 28	≤ 273	180				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
austenitic	≤ 36	≤ 337	130				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
martensitic	≤ 46	≤ 435	115				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
Cast iron	≤ 23	≤ 242	330				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 38	≤ 354	295				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	395				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
	≤ 38	≤ 354	330				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Chilled cast iron	≤ 38	≤ 354	295				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
New cast materials GGV	≤ 20	≤ 220	260				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 32	≤ 301	260				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
New cast materials ADI	≤ 32	≤ 301	260				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 43	≤ 402	260				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Special alloys	≤ 54	≤ 549	80				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Ti and Ti-alloys	≤ 25	≤ 255	130				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
	≤ 43	≤ 402	115				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Aluminum and Al-alloys	-	≤ 120	655				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al wrought alloys	-	≤ 200	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al cast alloys ≤ 10 % Si	-	≤ 180	490				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
> 10 % Si	-	≤ 180	395				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Magnesium alloys	-	≤ 120	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Copper, low-alloyed	-	≤ 150	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Brass, short-chipping	-	≤ 180	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
long-chipping	-	≤ 180	395				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, short-chipping	-	≤ 180	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 25	≤ 255	165				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, long-chipping	≤ 25	≤ 255	150				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 32	≤ 301	115				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195

Body 4105 through 4107

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301	425 360				0.0100 0.0080	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0195 0.0155	0.0250 0.0195
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	425 360				0.0125 0.0100	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0250 0.0195	0.0250 0.0195	0.0315 0.0250
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	425 410 360				0.0100 0.0100 0.0080	0.0100 0.0100 0.0080	0.0125 0.0125 0.0100	0.0155 0.0155 0.0125	0.0195 0.0195 0.0155	0.0195 0.0195 0.0155	0.0250 0.0250 0.0195
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	360 295				0.0100 0.0080	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0195 0.0155	0.0250 0.0195
Unalloyed case hardened steels	≤ 25	≤ 255	425				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	360 230				0.0100 0.0065	0.0100 0.0065	0.0125 0.0080	0.0155 0.0100	0.0195 0.0125	0.0195 0.0125	0.0250 0.0155
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	345 230				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	195 180				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
High speed steels	≤ 43	≤ 402	180				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
Spring steels	≤ 38	≤ 354	165				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100

Body 4108

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301	410 345				0.0100 0.0080	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0195 0.0155	0.0250 0.0195
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 220	410 345				0.0125 0.0100	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0250 0.0195	0.0250 0.0195	0.0315 0.0250
Unalloyed heat-treatable steels	≤ 20	≤ 220	410				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 25	≤ 255	395				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 32	≤ 301	345				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Alloyed heat-treatable steels	≤ 32	≤ 301	345				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 43	≤ 402	280				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Unalloyed case hardened steels	≤ 25	≤ 255	410				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Alloyed case hardened steels	≤ 32	≤ 301	345				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	≤ 43	≤ 402	230				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
Nitriding steels	≤ 32	≤ 301	345				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 43	≤ 402	230				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
Tool steels	≤ 25	≤ 255	180				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 43	≤ 402	165				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
High speed steels	≤ 43	≤ 402	180				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
Spring steels	≤ 38	≤ 354	165				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100

Body 4109

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301	395 345				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	395 345				0.0100 0.0080	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0195 0.0155	0.0250 0.0195
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	395 360 330				0.0080 0.0080 0.0065	0.0080 0.0080 0.0065	0.0100 0.0100 0.0080	0.0125 0.0125 0.0100	0.0155 0.0155 0.0125	0.0155 0.0155 0.0125	0.0195 0.0195 0.0155
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	330 280				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Unalloyed case hardened steels	≤ 25	≤ 255	395				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	330 230				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	345 230				0.0065 0.0050	0.0065 0.0050	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	180 165				0.0065 0.0050	0.0065 0.0050	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125
High speed steels	≤ 43	≤ 402	180				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Spring steels	≤ 38	≤ 354	165				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100

Body 4110

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	- ≤ 32	≤ 150 ≤ 301	360 310				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Free-cutting steels	≤ 25 ≤ 32	≤ 255 ≤ 301	330 310				0.0100 0.0080	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0195 0.0155	0.0250 0.0195
Unalloyed heat-treatable steels	≤ 20 ≤ 25 ≤ 32	≤ 220 ≤ 255 ≤ 301	330 310 295				0.0080 0.0080 0.0065	0.0080 0.0080 0.0065	0.0100 0.0100 0.0080	0.0125 0.0125 0.0100	0.0155 0.0155 0.0125	0.0155 0.0155 0.0125	0.0195 0.0195 0.0155
Alloyed heat-treatable steels	≤ 32 ≤ 43	≤ 301 ≤ 402	295 280				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Unalloyed case hardened steels	≤ 25	≤ 255	330				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Alloyed case hardened steels	≤ 32 ≤ 43	≤ 301 ≤ 402	295 230				0.0080 0.0065	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0155 0.0125	0.0155 0.0125	0.0195 0.0155
Nitriding steels	≤ 32 ≤ 43	≤ 301 ≤ 402	310 230				0.0065 0.0050	0.0065 0.0050	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125
Tool steels	≤ 25 ≤ 43	≤ 255 ≤ 402	180 165				0.0065 0.0050	0.0065 0.0050	0.0080 0.0065	0.0100 0.0080	0.0125 0.0100	0.0125 0.0100	0.0155 0.0125
High speed steels	≤ 43	≤ 402	180				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Spring steels	≤ 38	≤ 354	165				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100

Body 4105 through 4108

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	330 295				0.0100 0.0100	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0195 0.0195	0.0195 0.0195	0.0250 0.0250
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	395 330				0.0125 0.0100	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0250 0.0195	0.0250 0.0195	0.0315 0.0250
Chilled cast iron	≤ 38	≤ 354											
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301	260 260				0.0080 0.0080	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402	260 260				0.0080 0.0080	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195

Body 4109 & 4110

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	260 230				0.0100 0.0100	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0195 0.0195	0.0195 0.0195	0.0250 0.0250
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354	330 260				0.0125 0.0100	0.0125 0.0100	0.0155 0.0125	0.0195 0.0155	0.0250 0.0195	0.0250 0.0195	0.0315 0.0250
Chilled cast iron	≤ 38	≤ 354											
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301	195 195				0.0080 0.0080	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402	195 195				0.0080 0.0080	0.0080 0.0080	0.0100 0.0100	0.0125 0.0125	0.0155 0.0155	0.0155 0.0155	0.0195 0.0195

Body 4105 through 4107

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminum and Al-alloys	-	< 120	655				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al wrought alloys	-	< 200	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al cast alloys ≤ 10 % Si	-	< 180	490				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
> 10 % Si	-	< 180	395				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Magnesium alloys	-	< 120	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Copper, low-alloyed	-	< 150	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Brass, short-chipping	-	< 180	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
long-chipping	-	< 180	395				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, short-chipping	-	< 180	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	< 25	< 255	165				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, long-chipping	< 25	< 255	150				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	< 32	< 301	115				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195

Body 4108

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminum and Al-alloys	-	< 120	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al wrought alloys	-	< 200	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Al cast alloys ≤ 10 % Si	-	< 180	460				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
> 10 % Si	-	< 180	360				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Magnesium alloys	-	< 120	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
Copper, low-alloyed	-	< 150	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Brass, short-chipping	-	< 180	590				0.0125	0.0125	0.0155	0.0195	0.0250	0.0250	0.0315
long-chipping	-	< 180	395				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, short-chipping	-	< 180	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	< 25	< 255	165				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Bronze, long-chipping	< 25	< 255	150				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
	< 32	< 301	115				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195

Body 4109

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminum and Al-alloys	-	< 120	590				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Al wrought alloys	-	< 200	590				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Al cast alloys ≤ 10 % Si	-	< 180	460				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
> 10 % Si	-	< 180	360				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Magnesium alloys	-	< 120	590				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Copper, low-alloyed	-	< 150	230				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Brass, short-chipping	-	< 180	590				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
long-chipping	-	< 180	395				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Bronze, short-chipping	-	< 180	230				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	< 25	< 255	165				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Bronze, long-chipping	< 25	< 255	150				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	< 32	< 301	115				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155

Body 4110

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Aluminum and Al-alloys	-	< 120	490				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Al wrought alloys	-	< 200	490				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Al cast alloys ≤ 10 % Si	-	< 180	425				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
> 10 % Si	-	< 180	345				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Magnesium alloys	-	< 120	490				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
Copper, low-alloyed	-	< 150	230				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Brass, short-chipping	-	< 180	490				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
long-chipping	-	< 180	360				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Bronze, short-chipping	-	< 180	230				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	< 25	< 255	165				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Bronze, long-chipping	< 25	< 255	150				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	< 32	< 301	115				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155

Body 4105 through 4108

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Hardened steels	≤ 48 ≤ 66	≤ 460 -	80				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Stainless steels, sulphured austenitic martensitic	≤ 28	≤ 273	180				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
	≤ 36	≤ 337	130				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
	≤ 46	≤ 435	115				0.0050	0.0050	0.0065	0.0080	0.0100	0.0100	0.0125
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354											
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354											
Chilled cast iron	≤ 38	≤ 354	295				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301											
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402											
Special alloys	≤ 54	≤ 549	80				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402	130 115				0.0050 0.0040	0.0050 0.0040	0.0065 0.0050	0.0080 0.0065	0.0100 0.0080	0.0100 0.0080	0.0125 0.0100

Body 4109 & 4110

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Hardened steels	≤ 48 ≤ 66	≤ 460 -	80				0.0030	0.0030	0.0040	0.0050	0.0065	0.0065	0.0080
Stainless steels, sulphured austenitic martensitic	≤ 28	≤ 273	180				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
	≤ 36	≤ 337	130				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
	≤ 46	≤ 435	115				0.0040	0.0040	0.0050	0.0065	0.0080	0.0080	0.0100
Cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354											
Spheroidal graphite iron and malleable cast iron	≤ 23 ≤ 38	≤ 242 ≤ 354											
Chilled cast iron	≤ 38	≤ 354	230				0.0100	0.0100	0.0125	0.0155	0.0195	0.0195	0.0250
New cast materials GGV	≤ 20 ≤ 32	≤ 220 ≤ 301											
New cast materials ADI	≤ 32 ≤ 43	≤ 301 ≤ 402											
Special alloys	≤ 54	≤ 549	80				0.0030	0.0030	0.0040	0.0050	0.0065	0.0065	0.0080
Ti and Ti-alloys	≤ 25 ≤ 43	≤ 255 ≤ 402	130 115				0.0040 0.0030	0.0040 0.0030	0.0050 0.0040	0.0065 0.0050	0.0080 0.0065	0.0080 0.0065	0.0100 0.0080

Body 4107 through 4109

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	-	≤ 150	330				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
	≤ 32	≤ 301	260				0.0080	0.0080	0.0100	0.0125	0.0155	0.0155	0.0195
Free-cutting steels	≤ 25	≤ 255											
	≤ 32	≤ 301											
Unalloyed heat-treatable steels	≤ 20	≤ 220											
	≤ 25	≤ 255											
	≤ 32	≤ 301											
Alloyed heat-treatable steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Nitriding steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Tool steels	≤ 25	≤ 255											
	≤ 43	≤ 402											
High speed steels	≤ 43	≤ 402											
Spring steels	≤ 38	≤ 354											

Body 4110

Material group	Hardness		SFM	Feed Rate - IPR									
	HRc	Bhn		1/16 in. 1.590 mm	1/8 in. 3.170 mm	1/4 in. 6.350 mm	3/8 in. 9.520 mm	1/2 in. 12.700 mm	5/8 in. 15.870 mm	3/4 in. 19.050 mm	1 in. 25.400 mm	1 1/4 in. 31.750 mm	1 1/2 in. 38.100 mm
Common structural steels	-	≤ 150	280				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
	≤ 32	≤ 301	230				0.0065	0.0065	0.0080	0.0100	0.0125	0.0125	0.0155
Free-cutting steels	≤ 25	≤ 255											
	≤ 32	≤ 301											
Unalloyed heat-treatable steels	≤ 20	≤ 220											
	≤ 25	≤ 255											
	≤ 32	≤ 301											
Alloyed heat-treatable steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Unalloyed case hardened steels	≤ 25	≤ 255											
Alloyed case hardened steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Nitriding steels	≤ 32	≤ 301											
	≤ 43	≤ 402											
Tool steels	≤ 25	≤ 255											
	≤ 43	≤ 402											
High speed steels	≤ 43	≤ 402											
Spring steels	≤ 38	≤ 354											

HT 800 WP Special Solutions

- stepped drill bodies
- special monoblock drill bodies
- inserts with special coatings and geometries, e.g. radius inserts or inserts with point angles 90° to 180°



HT 800 WP Special Tools Quote Request Form

Email to:
specials@guhring.com

Distributor/customer name

Address

Telephone

Date

If a distributor inquiry list end user name, city, & state

City, Zip code

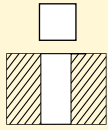
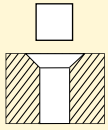
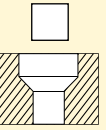
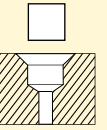
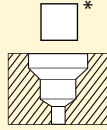
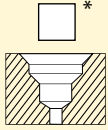
Email

Name of contact

Quantity holders inserts

Material to be machined

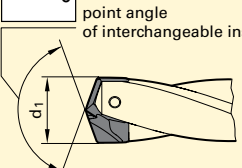
Type of hole to be machined

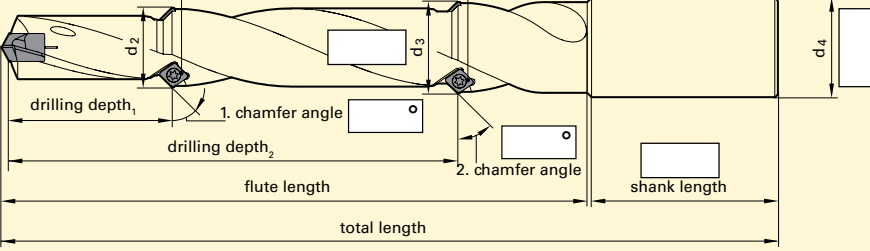
☐ 
☐ 
☐ 
☐ 
☐* 
☐* 

*please incl. separate drawing

Flute ☐ spiral ☐ partly spiral ☐ straight

Dimensions
For spiral- & straight-fluted types

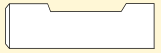
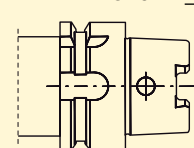
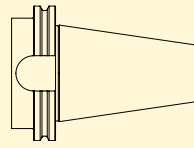
tol. ☐ h7 ☐ m7
 d1=  point angle of interchangeable insert

d2= 

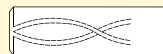
1st interchangeable insert
 2nd interchangeable insert
 drilling depth₁
 drilling depth₂
 flute length
 shank length
 total length
 1. chamfer angle
 2. chamfer angle

Shank form

☐ HA ☐ HB ☐ HSK form size ☐ CAT size

Internal cooling ☐ yes ☐ no

Insert coating ☐ FIREX ☐ TiAlN ☐ nano-A ☐ nano-Si ☐ Zenit ☐ Endurum ☐ bright



Guhring, Inc. Main Office
 1445 Commerce Avenue
 Brookfield, WI 53045
 Tel (262) 784-6730 (800) 776-6170
 Fax (262) 784-9096

East Coast Reconditioning Facility
 121 W Dudley Town Rd.
 Bloomfield, CT 06002

**West Coast Distribution Center and
 Reconditioning Facility**
 15581 Computer Ln
 Huntington Beach, CA 92649

**Michigan Manufacturing and
 Reconditioning Facility**
 24875 Trans-X Road
 Novi, MI 48375

Guhring Corp. (Canada)
 20 Steckle Place, Unit #14
 Kitchener, ON N2E 2C3
 Tel (519) 748-9664 (800) 463-5555
 Fax (519) 748-2954