

INDRILL Cool



High Precision
Deep Hole Drills

Ø 0.80 - Ø 6.00 mm

l / d
15x
20x
25x
30x

High Precision Deep Hole Drills

15Xd
H315

20Xd
H320

25Xd
H325

30Xd
H330

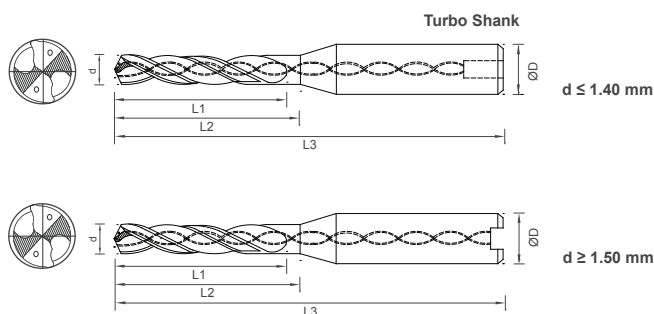
STEEL

SS

CAST
IRON

Titanium
Alloy

Nickel
Alloy



APPLICATION

Specially designed for deep hole Drilling in unalloyed and alloyed Steels, Stainless Steel, Cast Iron and heat treated Steels upto 50 HRC

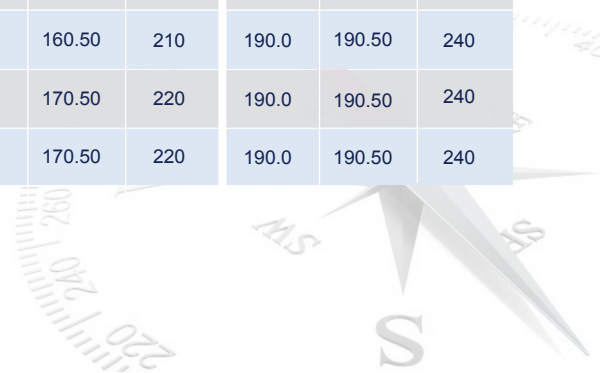


Dia h6 ød	Shank h6 ØD	H315 15xd			H320 20xd			H325 25xd			H330 30xd		
		L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
0.80	3.00	16.0	16.20	55	20.0	20.20	65						
0.90	3.00	16.0	16.20	55	20.0	20.20	65						
1.00	3.00	18.0	18.20	75	25.0	25.20	75	30.0	30.20	75	35.0	35.20	75
1.10	3.00	20.0	20.20	75	25.0	25.20	75	30.0	30.20	75	35.0	35.20	75
1.20	3.00	24.0	24.20	75	28.0	28.20	75	35.0	35.20	75	45.0	45.20	85
1.30	3.00	24.0	24.20	75	30.0	30.20	75	35.0	35.20	85	45.0	45.20	85
1.40	3.00	27.0	27.20	75	32.0	32.20	75	40.0	40.20	85	45.0	45.20	85
1.50	3.00	27.0	27.20	75	36.0	36.20	80	45.0	45.20	85	55.0	55.20	95
1.60	3.00	30.0	30.20	75	36.0	36.20	80	45.0	45.20	85	55.0	55.20	95
1.70	3.00	30.0	30.20	75	40.0	40.20	85	50.0	50.20	95	55.0	55.20	95
1.80	3.00	35.0	35.20	75	40.0	40.20	85	50.0	50.20	95	65.0	65.20	105
1.90	3.00	35.0	35.20	75	45.0	45.20	95	55.0	55.20	95	65.0	65.20	105
2.00	4.00	35.0	35.50	80	45.0	45.50	95	55.0	55.50	95	65.0	65.50	105
2.10	4.00	40.0	40.50	80	50.0	50.50	95	60.0	60.50	108	75.0	75.50	115
2.20	4.00	40.0	40.50	80	50.0	50.50	95	60.0	60.50	108	75.0	75.50	115
2.30	4.00	40.0	40.50	80	55.0	55.50	95	65.0	65.50	108	75.0	75.50	115
2.40	4.00	45.0	45.50	90	55.0	55.50	95	70.0	70.50	112	85.0	85.50	130
2.50	4.00	45.0	45.50	90	60.0	60.50	108	70.0	70.50	112	85.0	85.50	130
2.60	4.00	48.0	48.50	90	60.0	60.50	108	75.0	75.50	120	85.0	85.50	130
2.70	4.00	48.0	48.50	90	65.0	65.50	108	75.0	75.50	120	95.0	95.50	140
2.80	4.00	50.0	50.50	90	65.0	65.50	108	80.0	80.50	125	95.0	95.50	140
2.90	4.00	50.0	50.50	90	68.0	68.50	112	80.0	80.50	125	95.0	95.50	140
3.00	6.00	55.0	55.50	100	68.0	68.50	112	85.0	85.50	130	105.0	105.50	150

Dia h6 ød	Shank h6 ØD	H315 15xd			H320 20xd			H325 25xd			H330 30xd		
		L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
3.10	6.00	55.0	55.50	100	75.0	75.50	120	85.0	85.50	130	105.0	105.50	150
3.20	6.00	60.0	60.50	100	75.0	75.50	120	95.0	95.50	140	105.0	105.50	150
3.30	6.00	60.0	60.50	100	75.0	75.50	120	95.0	95.50	140	115.0	115.50	160
3.40	6.00	60.0	60.50	100	80.0	80.50	130	95.0	95.50	140	115.0	115.50	160
3.50	6.00	65.0	65.50	108	80.0	80.50	130	100.0	100.50	150	115.0	115.50	160
3.60	6.00	65.0	65.50	108	85.0	85.50	130	100.0	100.50	150	125.0	125.50	175
3.70	6.00	70.0	70.50	108	85.0	85.50	130	105.0	105.50	150	125.0	125.50	175
3.80	6.00	70.0	70.50	108	90.0	90.50	140	105.0	105.50	150	125.0	125.50	175
3.90	6.00	70.0	70.70	108	90.0	90.50	140	110.0	110.50	160	125.0	125.50	175
4.00	6.00	75.0	75.50	120	95.0	95.50	140	110.0	110.50	160	135.0	135.50	185
4.10	6.00	75.0	75.50	120	95.0	95.50	140	120.0	120.50	170	135.0	135.50	185
4.20	6.00	75.0	75.50	120	95.0	95.50	140	120.0	120.50	170	135.0	135.50	185
4.30	6.00	80.0	80.50	120	100.0	100.50	150	120.0	120.50	170	145.0	145.50	195
4.40	6.00	80.0	80.50	120	100.0	100.50	150	120.0	120.50	170	145.0	145.50	195
4.50	6.00	80.0	80.50	120	100.0	110.50	160	130.0	130.50	180	145.0	145.50	195
4.60	6.00	85.0	85.50	125	110.0	110.50	160	130.0	130.50	180	155.0	155.50	205
4.70	6.00	84.6	85.10	125	110.0	110.50	160	130.0	130.50	180	155.0	155.60	205
4.80	6.00	90.0	90.50	140	115.0	115.50	160	140.0	140.50	190	165.0	165.50	210
4.90	6.00	90.0	90.50	140	115.0	115.50	160	140.0	140.50	190	165.0	165.50	210
5.00	6.00	90.0	90.50	140	115.0	115.50	160	140.0	140.50	190	165.0	165.50	210
5.10	6.00	95.0	95.50	140	125.0	125.50	165	150.0	150.50	200	175.0	175.50	220
5.20	6.00	95.0	95.50	140	125.0	125.50	165	150.0	150.50	200	175.0	175.50	220
5.30	6.00	95.4	95.90	140	125.0	125.50	165	150.0	150.50	200	175.0	175.50	220
5.40	6.00	95.0	95.50	140	125.0	125.50	165	150.0	150.50	200	175.0	175.50	240
5.50	6.00	100.0	100.50	150	140.0	140.50	185	160.0	160.50	210	180.0	180.50	240
5.60	6.00	100.0	100.50	150	140.0	140.50	185	160.0	160.50	210	190.0	190.50	240
5.70	6.00	100.0	100.50	150	140.0	140.50	185	159.6	160.50	210	190.0	190.50	240
5.80	6.00	100.0	100.50	150	140.0	140.50	185	160.0	160.50	210	190.0	190.50	240
5.90	6.00	100.0	100.50	150	140.0	140.50	185	170.0	170.50	220	190.0	190.50	240
6.00	6.00	100.0	100.50	150	140.0	140.50	185	170.0	170.50	220	190.0	190.50	240

ON REQUEST :
Inch Sizes / Special sizes

PACKING :
Single tool per pack



Salient Features

Cutting Edge Stabilization

Very consistent mICRO geometry on cutting edge enables narrow process capability

Flute Geometry

Specially designed flute geometry with optimal core design for effective chip breaking and tool rigidity

Super finishing

Super finish flute for highly efficient chip evacuation

Unique Pre+Post Coat Treatment

Unique, specially developed pre and post Coating treatment leads to reduced heat generation and smooth chip flow providing excellent Tool life

Shank

Robust Shank with optimized neck provides for rigid and precise drilling for high L/D ratios

Turbo Chamber

Shank with Turbo Chamber for small Diameters up to 1.4mm ensures continuous coolant flow even at low pressure



Operational Guidance

- Tools for **m**ICRO **m**ACHINING are very delicate in nature and need very careful handling while storage, mounting, usage and dismounting.
- Avoid touching **m**ICRO Tools with bare hands, it can cause injury.
- When removing tools from original packing tool case, be careful to not touch cutting edges.
- Please check tool dimensions and application material before starting operation.
- Ensure tool is firmly held by Collets / Tool holders with runout <0.003 mm.
- Tabulated parameters provide guidelines which are starting points for optimising speed and feeds at user end. Please ensure to adjust condition according to application and machining condition.
- Use suitable coolant as applicable to work material / machining environment. Coolant should be copious, continuous and exactly directed at cutting edges.
- Rigidity of elements : Tool holding, job holding and machine is very critical for optimum performance.
- Recommended coolant pressure ≥ 50 bar, at least 15 bar pressure is required.
- Use coolant filter with mesh $< 3\mu$ for coolant to prevent jamming inside coolant holes.



Cutting Performance

Pilot Drill

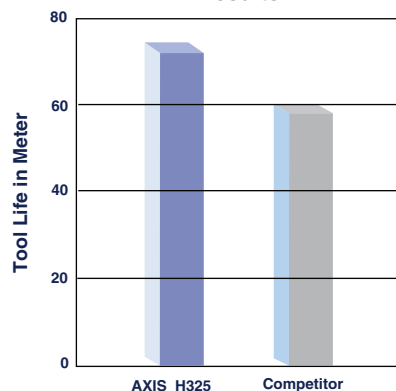
Dia	3.00 m7
Dilling Depth	9
Cutting Speed	52
feed	0.07

Pilot Drill

Dia	6.00 m7
Dilling Depth	18
Cutting Speed	66
feed	0.114

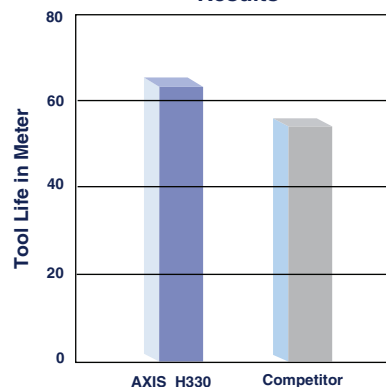
	AXIS	Competitor
Version	H3251 - Ø3x85mm	25D - Ø3mm
Material	C45	C45
Cutting Speed	79	70
Feed	0.09	0.08
Coolant	Water Soluble	Water Soluble
Coolant Pressure	15 bar	15 bar
Tool Life	75	60
Wear	Normal Wear	High wear marks

Results



	AXIS	Competitor
Version	H3301 - Ø6x190mm	30D - Ø6mm
Material	C45	C45
Cutting Speed	80	70
Feed	0.2	0.18
Coolant	Water Soluble	Water Soluble
Coolant Pressure	15 bar	15 bar
Tool Life	65	55
Wear	Normal Wear	High wear marks

Results



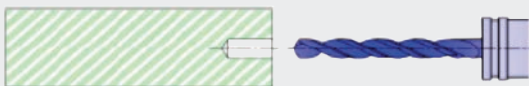
Excellent chip evacuation with short and curvy chips

H315 / H320 / H325 / H330

Materials						
			0.50-0.70	0.80-0.90	1.00-1.20	1.30-
P	Low/Unalloyed Steel <600 N/mm ²	N min-1	16000-25500	12500-16000	15300-19700	12300-
		F mm/rev	0.010-0.015	0.015-0.018	0.015-0.020	0.020-0
	Low/Unalloyed Steel 600-1000 N/mm ²	N min-1	15000-24000	11500-15000	13700-17800	11000-
		F mm/rev	0.010-0.015	0.015-0.018	0.015-0.020	0.020-0
	High Alloyed Steel 700-1500 N/mm ²	N min-1	12200-19000	10000-12000	10600-14000	8400-1
		F mm/rev	0.010-0.012	0.012-0.015	0.012-0.015	0.016-0
M	Ferritic / Austenitic <700 N/mm ²	N min-1	9100-14000	7100-9000	7900-10800	6300-8
		F mm/rev	0.010-0.012	0.012-0.014	0.012-0.014	0.018-0
K	GCI/NCI <180 BHN	N min-1	16000-25500	12500-16000	15300-19700	12300-
		F mm/rev	0.010-0.015	0.015-0.018	0.015-0.020	0.020-0
	GCI/NCI 200-250 BHN	N min-1	12200-19800	10000-12300	11600-15200	9300-1
		F mm/rev	0.010-0.012	0.012-0.015	0.012-0.015	0.015-0

Drilling Concept / Strategy

Step 1: Pilot Hole



- Uneven or Slant Surface must be spot faced before using Pilot drill
- Centering is essential during Horizontal machining
- Use AXIS Pilot drill to drill hole of minimum 2-3D
- Should you use third party pilot drill make sure the pilot drill dia. is minimum 10μ oversize & Point angle of Pilot drill is 140°
- Any chips from Pilot hole must be removed prior to drilling deep hole

Step 3: Deep Hole Drilling



- Start drilling the hole with recommended Cutting Data with continuous feed (No pecking up to 30D)
- In case of Interrupted drilling/through holes reduce the feed by 50% prior to break out

H315	Parameters as per above
H320	Reduce rpm by 5% from above, keep feed same

H325	Reduce rpm by 10% from above, keep feed same
H330	Reduce rpm by 15% from above, keep feed same

Dia Range						
1.50	1.60-2.00	2.10-2.40	2.50-3.00	3.10-4.00	4.10-5.00	5.10-6.00
15100	9200-12300	8600-10600	6900-8900	6600-9000	5700-7300	4700-5900
0.025	0.045-0.050	0.060-0.070	0.080-0.090	0.100-0.120	0.120-0.160	0.160-0.200
13700	8200-11100	8200-10000	6500-8400	6200-8400	5400-7000	4500-5600
0.025	0.045-0.050	0.060-0.070	0.080-0.090	0.100-0.120	0.120-0.150	0.150-0.190
0800	6300-8800	5900-7600	4700-6600	4600-6600	4100-5400	3400-4300
0.022	0.030-0.040	0.040-0.050	0.070-0.080	0.080-0.100	0.100-0.120	0.120-0.150
300	4700-6700	4600-6000	3700-5000	3500-5100	3100-4200	2600-3400
0.022	0.030-0.040	0.040-0.050	0.050-0.060	0.060-0.070	0.070-0.080	0.080-0.100
15100	9200-12300	8600-10600	6800-8900	6600-9000	5700-7300	4700-5900
0.025	0.045-0.050	0.060-0.070	0.080-0.090	0.100-0.120	0.120-0.160	0.160-0.200
1700	7000-9500	6600-8300	5300-7000	5100-7100	4500-5900	3800-4700
0.020	0.030-0.040	0.040-0.060	0.070-0.080	0.090-0.10	0.100-0.130	0.140-0.160

Step 2 : Entering Deep hole drill into Pilot Hole

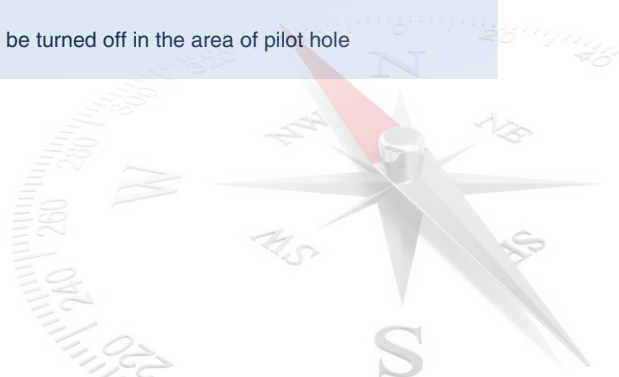


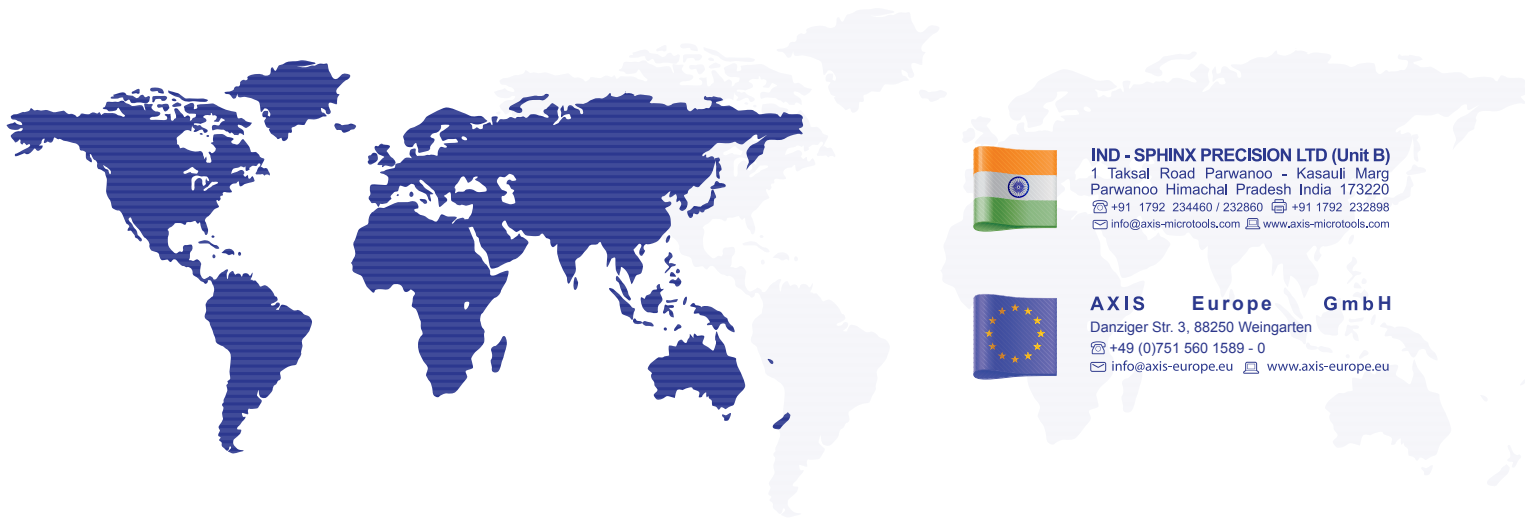
- Internal Coolant must be turned off
- Set Max rpm of 500-1000 (preferably anti-clockwise), feed = drilling feed (mm/rev)
- Stop the drill 1-1.5mm before the depth of Pilot Hole

Step 4: Retract the Drill



- After reaching the maximum drilling depth, retract the drill by 1-2mm for chip removal
- Then reduce the rotation speed to 500-1000 rpm and retract the drill at feed of 500-700 mm/min (not rapid traverse)
- Internal coolant can be turned off in the area of pilot hole





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AXIS
 Tools for **mi**CRO **ma**CHINING