

DORMER



Hydra High Performance Replaceable Head Drills

Range Extension 2012



Features & Benefits

MATERIAL

Replaceable heads in tough micrograin carbide and hardened steel body with high gloss nickel plating for high resistance to wear and corrosion. One body accommodates multiple head sizes with no compromise on tool rigidity and structural integrity.

SURFACE TREATMENT

Ti-phon coating on the drilling heads for high toughness and oxidation stability - enables high speeds and feeds and resists "built-up edge" which is common when machining softer materials.

POINT GEOMETRY

The self-centering 140° 4-facet split point geometry ensures that required thrust force is low. Pre-drilling / center drilling is neither necessary nor recommended.

SHANK

Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant. Best results are obtained using hydraulic holders; can also be held in ER type and Weldon type toolholders.

GEOMETRY

Heads are held securely in place by two screws; the perfect fit of body and head serrations transmits the torque evenly and allows for precise and easy assembly. The slow spiral offers optimised flute volume for efficient chip evacuation.

INTERNAL COOLANT

Coolant holes in the drill bodies are aligned perfectly with the replaceable heads for efficient delivery of coolant directly to the cutting edge. This not only disperses the heat generated during the hole making process when using high speeds and feeds, but also ensures smooth chip evacuation and long tool life.

HOLE DEPTH

Drilling depths of 3xDiameter and 5xDiameter:

- metric shank available for the entire range of heads
- fractional shank available up to head diameter 30.50mm

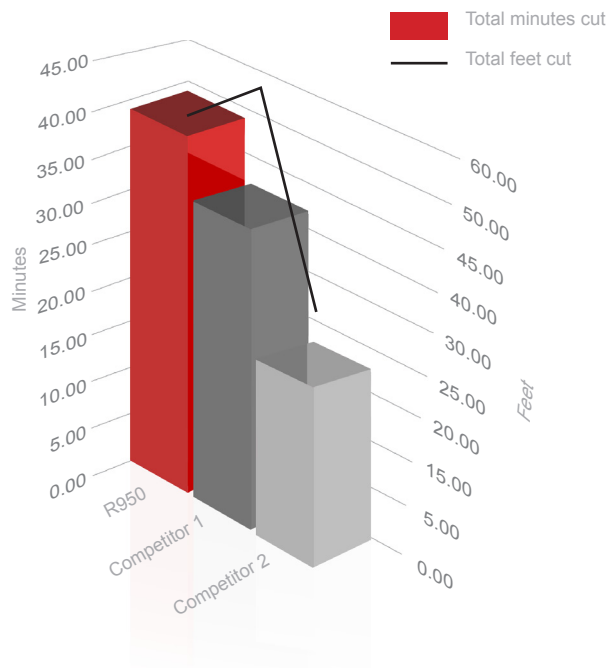
Drilling depth of 8xDiameter available on head diameters 13.50mm and larger.

DIAMETER RANGE

R950 metric sizes available 12.0mm-42.0mm diameter and fractional sizes 15/32"-1.5/8" diameter

R960 metric sizes available 12.0mm-30.5mm diameter and fractional sizes 15/32"-1.3/16" diameter

Test Results

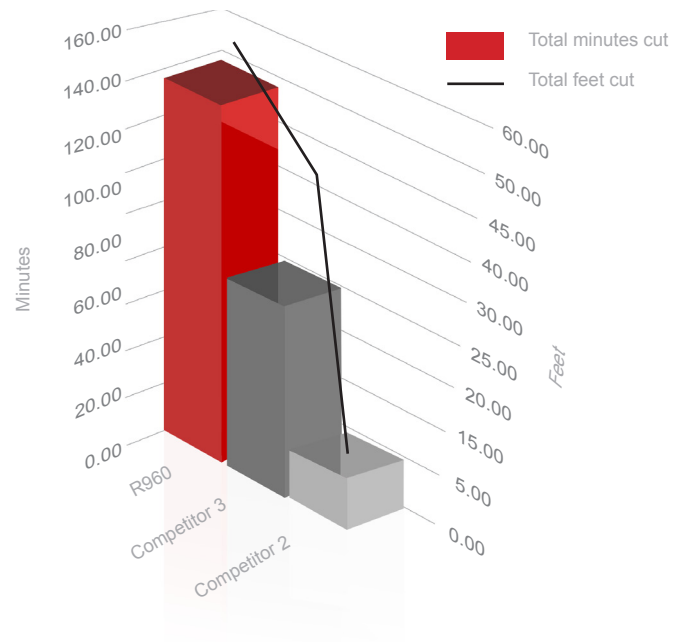


The Hydra for steel head was tested against 2 competitors at manufacturers' recommended cutting conditions in AMG 1.3. All drills were 12mm in diameter, and drilled to a hole depth of 5 x D. For all 3 tool types, the average number of minutes cut and the average number of feet cut until end of tool life were measured. The R950 drilled for almost 40 minutes, more than twice as long as Competitor 2.

Customer *Benefits*

- High productivity across a wide range of materials, including carbon and alloy steels, stainless steel, titanium, nickel and cast iron.
- Two head types available - the R960 head has been developed specifically to give optimum performance in stainless steel and cast iron. The R950 head is recommended for steels.
- Consistently high performance, even after numerous head changes.
- Reduction in inventory costs – one drill body fits multiple head sizes.
- Easy and quick head changes with minimal interruptions to the production process. Heads can be changed without removing the body from the machine.
- Exact fit of head to body maximizes tool rigidity for superior hole accuracy and precise tolerances.
- Shank design allows for versatile tool holding.
- A choice of drilling depths, up to 8 x diameter.
- Internal coolant channels provide optimized coolant direction and pressure to give efficient chip evacuation and longer tool life.

Test *Results*



The Hydra for stainless steel head was also tested against 2 competitors at manufacturers' recommended cutting conditions in AMG 2.2. Again, 12mm diameter drills were used to a drilling depth of 5xD. The R960 performance exceeded the nearest competitor, in terms of tool life.



Application *Material Groups*

Example

361 = Peripheral speed in feet/minute +/- 10%

W = Feed range - see drill feed chart below

R950			R960		
	HM			Ti-phon	
H853	H855	H858	H853	H855	H858
3XD	5XD	8XD	3XD	5XD	8XD
HSS	HSS	HSS	HSS	HSS	HSS
DIN 6535HB DIN 6535HE	DIN 6535HB DIN 6535HE	DIN 6535HB DIN 6535HE	DIN 6535HB DIN 6535HE	DIN 6535HB DIN 6535HE	DIN 6535HB DIN 6535HE

Feed Rate Chart

	Fn	Ø						
		1/2"	19/32"	5/8"	3/4"	1"	1.3/16"	1.1/2"
S	0.004	0.005	0.005	0.006	0.007	0.007	0.009	
T	0.005	0.006	0.007	0.007	0.008	0.009	0.010	
U	0.008	0.009	0.009	0.009	0.011	0.012	0.014	
V	0.011	0.012	0.013	0.013	0.016	0.017	0.020	
W	0.015	0.016	0.017	0.018	0.019	0.019	0.020	
inches/rev +/- 25%								

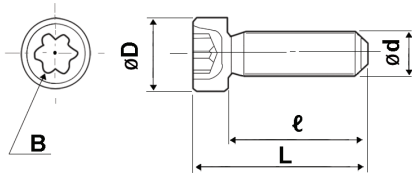
Application Material Groups (AMG)

		Hardness HB	Tensile Strength	15/32" - 42.00	15/32" - 42.00	15/32" - 42.00	15/32" - 30.50	15/32" - 30.50	13.50 - 30.50
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120	N/mm	361W	361V	328U		
	1.2 Structural Steel / case carburising steel	1005-1025, 1214, 1215, A36	<200	<700	328W	328V	295U		
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<250	<850	328W	328V	295U		
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<250	<850	279W	279V	246U		
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>250 <350	>850 <1200	279W	279V	246U		
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>350	>1200 <1620	230U	213U	197T		
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55HRC	>1620					
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63HRC	<1960					
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<250	<850			197V	164V	148U
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<320	<1100			164T	164S	131S
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, 15-4PH, 17-4PH, DUPLEX	<300	<1000			131T	131S	115S
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	>320 <410	>1100 <1400			115T	115S	98S
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150	<500			394V	374V	348U
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 <300	>500 <1000			380V	354V	328U
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200	<700			289V	279V	262U
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 <300	>700 <1000			289V	279V	262U
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200	<700			148T	148T	115S
	4.2 Titanium, alloyed	6A14V, 6A14V-2Sn, Monel, Monel K	<270	<900			115T	115T	98S
	4.3 Titanium, alloyed	6A14V-4Mo, 7A14V-4Mo, 4911-4967	>270 <350	>900 <1250			98S	98S	82S
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150	<500			115T	115T	98S
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<270	<900			98S	98S	82S
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>270 <350	>900 <1200			82S	82S	66S
6. Copper	6.1 Copper	Commercially Pure	<100	<350					
	6.2 β-Brass, Bronze	314-340, 350-370	<200	<700					
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200	<700					
	6.4 High Strength Bronze	Ampco 18-25	<470	<1500					
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100	<350					
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150	<500					
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120	<400					
	7.4 Al alloyed, Si>10% Whisker reinforced Al-alloys, Mg alloys	Magnesium Whisker Reinforced	<120	<400					
8. Synthetic Materials	8.1 Thermoplastics	Ultradid, Polystrol	---	---					
	8.2 Thermosetting plastics	Bakelit, Pertinax	---	---					
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	---					
9. Hard Materials	9.1 Cermets (Metal-ceramics)	Ferrotic	<550	<1700					
	10. Graphite	10.1 Standard graphite	---	<100					

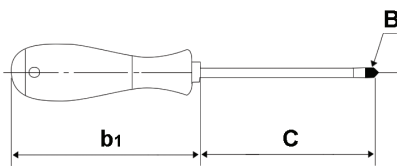
Torque Table

					TORQUE VALUES Nm (metric System)	TORQUE VALUES in/lbs (inch System)
H860	H861	H853 3xD	H855 5xD	H858 8xD		
H860N1	H861N1	12.0mm-15.0mm 31/64"-39/64"	12.0mm-15.0mm 31/64"-39/64"	14.0mm-15.0mm	0.75-0.99	6.6-8.8
H860N2	H861N2	16.0mm-18.0mm 41/64"-23/32"	16.0mm-18.0mm 41/64"-23/32"	16.0mm-18.0mm	0.93-1.24	8.2-11.0
H860N3	H861N3	19.0mm-21.0mm 49/64"-27/32"	19.0mm-21.0mm 49/64"-27/32"	19.0mm-21.0mm	1.84-2.44	16.3-21.6
H860N4	H861N3	22.0mm-24.0mm 57/64"-31/32"	22.0mm-24.0mm 57/64"-31/32"	22.0mm-24.0mm	2.73-3.72	24.2-32.9
H860N5	H861N4	25.0mm-27.0mm 1.1/64"-1.3/32"	25.0mm-27.0mm 1.1/64"-1.3/32"	25.0mm-27.0mm	4.14-5.52	36.6-48.8
H860N6	H861N5	28.0mm-33.5mm 1.1/8"-1.3/16"	28.0mm-33.5mm 1.1/8"-1.3/16"	28.0mm-33.5mm	4.97-6.63	44.0-58.7
H860N7	H861N6	35.0mm-42.5mm	35.0mm-42.5mm	35.0mm-42.5mm	7.20	63.7

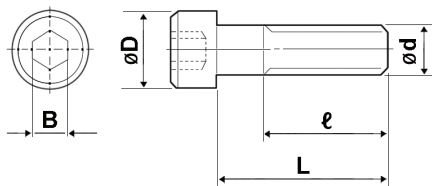
Screws and screw-drivers data



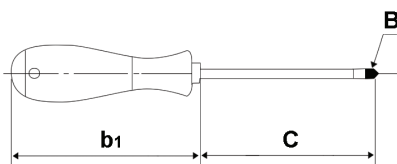
e-code	d	Pitch	L (mm)	l (mm)	D (mm)	B
H860N1	M2.2	0.45	7.5	5.7	3.5	8IP
H860N2	M2.5	0.45	9.0	7.0	4.1	10IP
H860N3	M3.0	0.50	10.5	8.0	4.9	15IP
H860N4	M3.5	0.60	11.5	8.8	5.5	15IP
H860N5	M4.0	0.70	12.5	9.5	6.0	20IP
H860N6	M4.5	0.75	14.3	10.8	6.8	25IP



code	B	C	b1
H861N1	8IP	60	104
H861N2	10IP	80	111
H861N3	15IP	80	111
H861N4	20IP	100	118
H861N5	25IP	100	118



e-code	d	Pitch	L (mm)	l (mm)	D (mm)	B
H860N7	M5.0	0.8	15	FULL	8.5	4



e-code	B	C	b1
H861N6	4	75	111



R950 • Hydra Drill Head for Steel

Replaceable heads in tough micro-grain carbide for quick and easy tool changes. High productivity in a wide range of steels. Superior hole accuracy and precise repeatable tolerances. Special Ti-phon coating for longer tool life.

1.1 1.2 1.3 1.4 1.5 1.6

R960 • Hydra Drill Head for Stainless Steel

Replaceable heads in tough micro-grain carbide for quick and easy tool changes. High productivity across a wide range of stainless steel, cast iron & heat resistant materials. Superior hole accuracy and precise repeatable tolerances. Special Ti-phon coating for longer tool life.

2.1 2.2 2.3 2.4 3.1 3.2 3.3 3.4

4.1 4.2 4.3 5.1 5.2 5.3



New larger diameter heads now available.

d ₁ ∅ Inch	d ₁ ∅ mm	d ₁ decimal Inch	l ₁ mm	R950		R960	
				E-Code	EDP#	E-Code	EDP#
15/32	11.91	0.4689	9.1	R95015/32	0010860	R96015/32	0013472
	12.00	0.4724	9.1	R95012.0	0010877	R96012.0	0013489
	12.10	0.4764	9.1	R95012.1	0037904	R96012.1	0038338
	12.20	0.4803	9.1	R95012.2	0037911	R96012.2	0038376
31/64	12.30	0.4843	9.1	R95031/64	0010884	R96031/64	0013496
	12.50	0.4921	9.4	R95012.5	0010907	R96012.5	0013519
	12.60	0.4961	9.4	R95012.6	0037928	R96012.6	0038413
1/2	12.70	0.5000	9.4	R9501/2	0010914	R9601/2	0013526
	12.80	0.5039	9.4	R95012.8	0037935	R96012.8	0038437
	12.90	0.5079	9.4	R95012.9	0037942	R96012.9	0038451
	13.00	0.5118	9.7	R95013.0	0010921	R96013.0	0013533
33/64	13.10	0.5157	9.7	R95033/64	0010938	R96033/64	0013540
	13.20	0.5197	9.7	R95013.2	0037959	R96013.2	0038468
17/32	13.49	0.5311	9.7	R95017/32	0010945	R96017/32	0013557
	13.50	0.5315	10.3	R95013.5	0010952	R96013.5	0016022
	13.60	0.5354	10.3	R95013.6	0037966	R96013.6	0038499
	13.70	0.5394	10.3	R95013.7	0037973	R96013.7	0038529
	13.80	0.5433	10.3	R95013.8	0037980	R96013.8	0038543
35/64	13.89	0.5469	10.3	R95035/64	0010969	R96035/64	0016039
	14.00	0.5512	10.3	R95014.0	0010983	R96014.0	0016046
	14.10	0.5551	10.3	R95014.1	0037997	R96014.1	0038567
	14.20	0.5591	10.3	R95014.2	0038000	R96014.2	0038574
9/16	14.29	0.5626	10.3	R9509/16	0011003	R9609/16	0016053
	14.50	0.5709	10.3	R95014.5	0011010	R96014.5	0016060
	14.60	0.5748	11.0	R95014.6	0038017	R96014.6	0038581
37/64	14.68	0.5780	11.0	R95037/64	0011140	R96037/64	0016077
	14.70	0.5787	11.0	R95014.7	0038024	R96014.7	0039601
	14.80	0.5827	11.0	R95014.8	0038031	R96014.8	0039618
	15.00	0.5906	11.0	R95015.0	0011201	R96015.0	0016084
19/32	15.08	0.5937	11.0	R95019/32	0011218	R96019/32	0016091
	15.10	0.5945	11.0	R95015.1	0038048	R96015.1	0039625
	15.20	0.5984	11.0	R95015.2	0038055	R96015.2	0039632

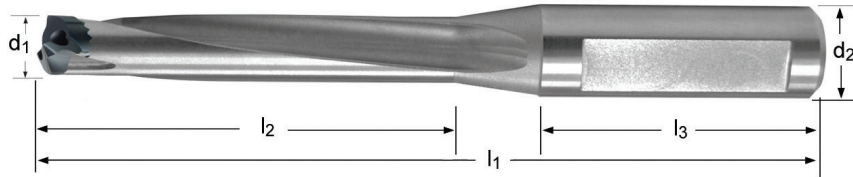
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				E-Code	EDP#	E-Code	EDP#
	15.24	0.6000	11.0	R95015.24	0032268	R96015.24	0032350
39/64	15.48	0.6094	11.0	R95039/64	0011232	R96039/64	0016107
	15.50	0.6102	11.0	R95015.5	0011362	R96015.5	0016114
	15.60	0.6142	11.6	R95015.6	0038062	R96015.6	0039649
	15.70	0.6181	11.6	R95015.7	0038079	R96015.7	0039656
5/8	15.88	0.6252	11.6	R9505/8	0011379	R9605/8	0016121
	16.00	0.6299	11.6	R95016.0	0011386	R96016.0	0016138
	16.08	0.6331	11.6	R95016.08	0032275	R96016.08	0032367
	16.10	0.6339	11.6	R95016.1	0038086	R96016.1	0039663
	16.20	0.6378	11.6	R95016.2	0038093	R96016.2	0039670
41/64	16.27	0.6406	11.6	R95041/64	0011393	R96041/64	0016145
	16.30	0.6417	11.6	R9506.3	0032282	R9606.3	0032374
	16.50	0.6496	11.6	R95016.5	0011409	R96016.5	0016152
	16.60	0.6535	12.2	R95016.6	0038109	R96016.6	0039687
21/32	16.67	0.6563	12.2	R95021/32	0012161	R96021/32	0016169
	16.70	0.6575	12.2	R95016.7	0038116	R96016.7	0039694
	17.00	0.6693	12.2	R95017.0	0012185	R96017.0	0016176
43/64	17.07	0.6720	12.2	R95043/64	0012215	R96043/64	0016183
	17.10	0.6732	12.2	R95017.1	0038123	R96017.1	0039700
	17.20	0.6772	12.2	R95017.2	0038130	R96017.2	0039717
11/16	17.46	0.6874	12.2	R95011/16	0012239	R96011/16	0016190
	17.50	0.6890	12.2	R95017.5	0012253	R96017.5	0016503
	17.60	0.6929	12.9	R95017.6	0032299	R96017.6	0032381
	17.70	0.6969	12.9	R95017.7	0038147	R96017.7	0039724
45/64	17.86	0.7031	12.9	R95045/64	0012260	R96045/64	0016640
	18.00	0.7087	12.9	R95018.0	0012277	R96018.0	0016664
	18.10	0.7126	12.9	R95018.1	0038154	R96018.1	0039731
	18.20	0.7165	12.9	R95018.2	0038161	R96018.2	0039748
23/32	18.26	0.7189	12.9	R95023/32	0012284	R96023/32	0016671
	18.50	0.7283	12.9	R95018.5	0012307	R96018.5	0016688
	18.60	0.7323	13.5	R95018.6	0038178	R96018.6	0039755
47/64	18.65	0.7343	13.5	R95047/64	0012321	R96047/64	0016695
	18.70	0.7362	13.5	R95018.7	0038185	R96018.7	0039762
	18.90	0.7441	13.5	R95018.9	0038192	R96018.9	0039779
	19.00	0.7480	13.5	R95019.0	0012338	R96019.0	0016817
3/4	19.05	0.7500	13.5	R9503/4	0012345	R9603/4	0016879
	19.10	0.7520	13.5	R95019.1	0038208	R96019.1	0039786
	19.20	0.7559	13.5	R95019.2	0038215	R96019.2	0039793
	19.25	0.7579	13.5	R95019.25	0032305	R96019.25	0032398
	19.30	0.7598	13.5	R95019.3	0032312	R96019.3	0032404
	19.35	0.7618	13.5	R95019.35	0032329	R96019.35	0032411
49/64	19.45	0.7657	13.5	R95049/64	0012376	R96049/64	0016886
	19.50	0.7677	13.5	R95019.5	0012383	R96019.5	0016947
	19.60	0.7717	14.1	R95019.6	0038222	R96019.6	0039809
	19.70	0.7756	14.1	R95019.7	0038239	R96019.7	0039816
25/32	19.84	0.7811	14.1	R95025/32	0012406	R96025/32	0016954
	20.00	0.7874	14.1	R95020.0	0012413	R96020.0	0017111
51/64	20.24	0.7969	14.1	R95051/64	0012437	R96051/64	0017128
	20.50	0.8071	14.1	R95020.5	0012451	R96020.5	0017159
13/16	20.64	0.8126	14.8	R95013/16	0012468	R96013/16	0017197
	21.00	0.8268	14.8	R95021.0	0012475	R96021.0	0017166
53/64	21.03	0.828	14.8	R95053/64	0012536	R96053/64	0017203
27/32	21.43	0.8437	14.8	R95027/32	0012550	R96027/32	0017227
	21.50	0.8465	14.8	R95021.5	0012574	R96021.5	0017234
55/64	21.83	0.8594	15.0	R95055/64	0012604	R96055/64	0017241
	22.00	0.8661	15.0	R95022.0	0012628	R96022.0	0017258
7/8	22.22	0.8748	15.0	R9507/8	0012635	R9607/8	0017371
	22.50	0.8858	15.0	R95022.5	0032336	R96022.5	0032428
57/64	22.62	0.8906	15.0	R95057/64	0012642	R96057/64	0017401
	22.70	0.8937	15.0	R95022.7	0038246	R96022.7	0039823
	23.00	0.9055	15.1	R95023.0	0012666	R96023.0	0017425
29/32	23.02	0.9063	15.1	R95029/32	0012673	R96029/32	0017432
59/64	23.42	0.9220	15.1	R95059/64	0012680	R96059/64	0017456
	23.50	0.9252	15.1	R95023.5	0038253	R96023.5	0039830
15/16	23.81	0.9374	15.4	R95015/16	0012703	R96015/16	0017562

d ₁ Ø Inch	d ₁ Ø mm	d ₁ decimal Inch	l ₁ mm	R950		R960	
				E-Code	EDP#	E-Code	EDP#
	24.00	0.9449	15.4	R95024.0	0012727	R96024.0	0017579
61/64	24.21	0.9531	15.4	R95061/64	0012741	R96061/64	0017586
	24.50	0.9646	15.4	R95024.5	0038260	R96024.5	0039847
31/32	24.61	0.9689	15.4	R95031/32	0012772	R96031/32	0017593
	25.00	0.9843	15.8	R95025.0	0012826	R96025.0	0017746
63/64	25.00	0.9843	15.8	R95063/64	0012819	R96063/64	0017722
1"	25.40	1.0000	15.8	R9501	0012833	R9601	0017753
	25.50	1.0039	15.8	R95025.5	0038277	R96025.5	0039854
	25.65	1.0098	15.8	R95025.65	0032343	R96025.65	0032435
1.1/64	25.80	1.0157	15.8	R9501.1/64	0012840	R9601.1/64	0018958
	26.00	1.0236	16.4	R95026.0	0013090	R96026.0	0018965
1.1/32	26.19	1.0311	16.4	R9501.1/32	0013120	R9601.1/32	0018972
	26.50	1.0433	16.4	R95026.5	0038284	R96026.5	0039878
1.3/64	26.59	1.0469	16.4	R9501.3/64	0013229	R9601.3/64	0018989
1.1/16	26.99	1.0626	17.1	R9501.1/16	0013243	R9601.1/16	0018996
	27.00	1.0630	17.1	R95027.0	0013267	R96027.0	0019009
1.5/64	27.38	1.0780	17.1	R9501.5/64	0013274	R9601.5/64	0019016
	27.50	1.0827	17.1	R95027.5	0038291	R96027.5	0039885
1.3/32	27.78	1.0937	17.1	R9501.3/32	0013281	R9601.3/32	0019023
	28.00	1.1024	17.7	R95028.0	0013304	R96028.0	0019030
1.7/64	28.18	1.1094	17.7	R9501.7/64	0013311	R9601.7/64	0019047
	28.50	1.1220	17.7	R95028.5	0038307	R96028.5	0039892
1.1/8	28.58	1.1252	17.7	R9501.1/8	0013328	R9601.1/8	0019054
1.9/64	28.97	1.1406	18.3	R9501.9/64	0013342	R9601.9/64	0019061
	29.00	1.1417	18.3	R95029.0	0013366	R96029.0	0019078
1.5/32	29.37	1.1563	18.3	R9501.5/32	0013380	R9601.5/32	0019085
	29.50	1.1614	18.3	R95029.5	0038314	R96029.5	0039908
1.11/64	29.77	1.1720	18.3	R9501.11/64	0013427	R9601.11/64	0019092
	30.00	1.1811	19.0	R95030.0	0013434	R96030.0	0019108
1.3/16	30.16	1.1874	19.0	R9501.3/16	0013441	R9601.3/16	0019115
	30.50	1.2008	19.0	R95030.5	0013465	R96030.5	0019122
1.7/32	30.96	1.2189	21.0	R9501.7/32	46104481	—	—
	31.00	1.2205	21.0	R95031.0	46104482	—	—
1.1/4	31.75	1.2500	21.0	R9501.1/4	46104483	—	—
	32.00	1.2598	21.0	R95032.0	46104484	—	—
	32.50	1.2795	21.0	R95032.5	46104485	—	—
1.19/64	32.94	1.2969	21.0	R9501.19/64	46104486	—	—
	33.00	1.2992	21.0	R95033.0	46104487	—	—
	33.50	1.3189	21.0	R95033.5	46104488	—	—
	34.00	1.3386	23.0	R95034.0	46104489	—	—
1.11/32	34.13	1.3437	23.0	R9501.11/32	46104530	—	—
	34.50	1.3583	23.0	R95034.5	46104531	—	—
1.3/8	34.93	1.3752	23.0	R9501.3/8	46104532	—	—
	35.00	1.3780	23.0	R95035.0	46104533	—	—
	36.00	1.4173	23.0	R95036.0	46104534	—	—
1.27/64	36.12	1.4220	23.0	R9501.27/64	46104535	—	—
	36.50	1.4370	23.0	R95036.5	46104536	—	—
	37.00	1.4567	25.0	R95037.0	46104537	—	—
1.15/32	37.31	1.4689	25.0	R9501.15/32	46104538	—	—
	37.50	1.4764	25.0	R95037.5	46104539	—	—
	38.00	1.4961	25.0	R95038.0	46104540	—	—
1.1/2	38.10	1.5000	25.0	R9501.1/2	46104541	—	—
	38.50	1.5157	25.0	R95038.5	46104542	—	—
1.17/32	38.89	1.5311	25.0	R9501.17/32	46104543	—	—
	39.00	1.5354	25.0	R95039.0	46104544	—	—
	39.50	1.5551	25.0	R95039.5	46104545	—	—
1.9/16	39.69	1.5626	27.0	R9501.9/16	46104546	—	—
	40.00	1.5748	27.0	R95040.0	46104547	—	—
	41.00	1.6142	27.0	R95041.0	46104548	—	—
1.5/8	41.28	1.6252	27.0	R9501.5/8	46104549	—	—
	42.00	1.6535	27.0	R95042.0	46104550	—	—






H853 • Hydra Body 3xD




Cylindrical shank with flat for multi-purpose tool holding.
Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

	Hydra Body 3xD Metric Shank					Hydra Body 3xD Fractional Shank								
	DIN 6535HE 	d_1 Ø	l_2 mm	l_1 mm	l_3 mm	d_2 mm	DIN 6535HB 	e-Code EDP#	l_2 mm	l_1 mm			l_3 mm	d_2 mm
15/32 12.00 12.10 12.20 31/64	H85312.0 0017777	44.0	105.0	48.0	16.0	H85331/64 0033043	44.0	105.0	48.0	15.88	5/8	H860N1 0018835	H861N1 0018897	
12.50 12.60 1/2 12.80 12.90	H85312.5 0017791	44.0	105.0	48.0	16.0	H8531/2 0033050	44.0	105.0	48.0	15.88	5/8			
13.00 33/64 13.20 17/32	H85313.0 0017906	47.0	110.0	48.0	16.0	H85317/32 0033067	47.0	110.0	48.0	15.88	5/8			
13.50 13.60 13.70 13.80 35/64 14.00 14.10 14.20 9/16 14.50	H85314.0 0017913	52.5	116.5	48.0	16.0	H8539/16 0033074	52.5	116.5	48.0	19.05	3/4			
14.60 37/64 14.70 14.80 15.00 19/32 15.10 15.20 15.24 39/64 15.50	H85315.0 0018293	55.5	126.5	50.0	20.0	H85339/64 0033081	55.5	126.5	50.0	19.05	3/4			

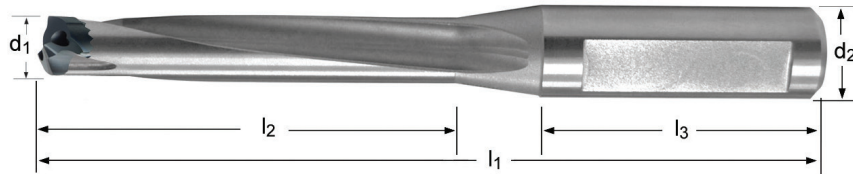
	Hydra Body 3xD Metric Shank					Hydra Body 3xD Fractional Shank							
	d₁ Ø	H853 e-Code	l₂ mm	l₁ mm	l₃ mm	d₂ mm	H853 e-Code	l₂ mm	l₁ mm	l₃ mm			d₂ mm
15.60 15.70 5/8 16.00 16.08 16.10 16.20 41/64 16.30 16.50	H85316.0 0018316	59.5	131.5	50.0	20.0	H85341/64 0033098	59.5	131.5	50.0	19.05	3/4	H860N2 0018842	H861N2 0018903
16.60 21/32 16.70 17.00 43/64 17.10 17.20 11/16 17.50													
17.60 17.70 45/64 18.00 18.10 18.20 23/32 18.50	H85318.0 0018330	66.5	141.5	50.0	20.0	H85323/32 0033111	66.5	141.5	50.0	19.05	3/4		
18.60 47/64 18.70 18.90 19.00 3/4 19.10 19.20 19.25 19.30 19.35 49/64 19.50	H85319.0 0018347	69.5	156.5	56.0	25.0	H85349/64 0033128	69.5	156.5	56.0	25.40	1"	H860N3 0018859	H861N3 0018910
19.60 19.70 25/32 20.00 51/64 20.50	H85320.0 0018354	73.5	156.5	56.0	25.0	H85351/64 0033135	73.5	156.5	56.0	25.40	1"		
13/16 21.00 53/64 27/32 21.50	H85321.0 0018361	76.5	156.5	56.0	25.0	H85327/32 0033142	76.5	156.5	56.0	25.40	1"		
55/64 22.00 7/8 22.50 57/64 22.70	H85322.0 0018378	80.1	161.5	56.0	25.0	H85357/64 0033159	80.1	161.5	56.0	25.40	1"	H860N4 0018866	
23.00 29/32 59/64 23.50	H85323.0 0018385	82.5	160.5	56.0	25.0	H85359/64 0033166	82.5	160.5	56.0	25.40	1"		
15/16 24.00 61/64 24.50 31/32	H85324.0 0018392	86.2	170.2	60.0	32.0	H85331/32 0033173	86.2	170.2	60.0	25.40	1"		

	Hydra Body 3xD Metric Shank					Hydra Body 3xD Fractional Shank							
	DIN 6535 ^{HE}					DIN 6535 ^{HB}							
d_1 Ø	H853 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	H853 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	d_2 inch	H860 e-Code	H861 e-Code
25.00 63/64 1"	H85325.0 0018408	88.0	170.0	60.0	32.0	H8531.1/64 0033180	88.0	170.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927
25.50													
25.65													
1.1/64	H85326.0 0018415	92.0	175.0	60.0	32.0	H8531.3/64 0033197	92.0	175.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927
26.00													
1.1/32													
26.50	H85327.0 0018422	94.0	175.0	60.0	32.0	H8531.3/32 0033210	94.0	175.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927
1.3/64													
1.1/16													
27.00	H85328.0 0018439	97.0	180.0	60.0	32.0	H8531.1/8 0033227	97.0	180.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927
1.5/64													
27.50													
1.3/32	H85329.0 0018446	100.0	185.0	60.0	32.0	H8531.11/64 0033234	100.0	185.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927
28.00													
1.7/64													
28.50	H85330.0 0018453	104.0	185.0	60.0	32.0	H8531.3/16 0033425	104.0	185.0	60.0	31.75	1.1/4	H860N6 0018880	H861N5 0018934
1.1/8													
1.9/64													
29.00	H85332.0 46111405	111.5	196.5	60.0	32.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934
1.5/32													
29.50													
1.11/64	H85333.5 46111406	116.5	201.5	60.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934
30.00													
1.3/16													
30.50	H85335.0 46111407	121.5	216.5	70.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934
1.7/32													
31.00													
1.1/4	H85336.5 46111408	125.5	221.5	70.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934
32.00													
32.50													
1.19/64	H85338.0 46111409	131.5	226.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
33.00													
33.50													
34.00	H85339.5 46111410	136.5	231.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
1.11/32													
34.50													
1.3/8	H85341.0 46111411	146.5	246.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
35.00													
36.00													
1.27/64	H85342.5 46111412	151.6	251.6	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
36.50													
37.00													
1.15/32	H85341.0 46111411	146.5	246.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
37.50													
38.00													
1.1/2	H85342.5 46111412	151.6	251.6	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
38.50													
1.17/32													
39.00	H85341.0 46111411	146.5	246.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
39.50													
1.9/16													
40.00	H85342.5 46111412	151.6	251.6	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
41.00													
1.5/8													
42.00	H85342.5 46111412	151.6	251.6	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354
42.00													








H855 • Hydra Body 5 x D




Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant



Four (4) screws and one (1) screwdriver are included with a drill body

	Hydra Body 5xD Metric Shank					Hydra Body 5xD Fractional Shank							
	H855 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	H855 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm			d_2 inch
15/32 12.00 12.10 12.20 31/64	H85512.0 0018460	69.0	130.0	48.0	16.0	H85531/64 0033586	69.0	130.0	48.0	15.88	5/8	H860N1 0018835	H861N1 0018897
12.50 12.60 1/2 12.80 12.90	H85512.5 0018477	69.0	130.0	48.0	16.0	H8551/2 0034095	69.0	130.0	48.0	15.88	5/8		
13.00 33/64 13.20 17/32	H85513.0 0018484	74.0	140.0	48.0	16.0	H85517/32 0034132	74.0	140.0	48.0	15.88	5/8		
13.50 13.60 13.70 35/64 14.00 14.20 9/16 14.50	H85514.0 0018491	81.5	146.5	48.0	16.0	H8559/16 0034699	81.5	146.5	48.0	19.05	3/4		
14.60 37/64 14.70 14.80 15.00 19/32 15.10 15.20 15.24 39/64 15.50	H85515.0 0018507	86.5	156.5	50.0	20.0	H85539/64 0034705	86.5	156.5	50.0	19.05	3/4		

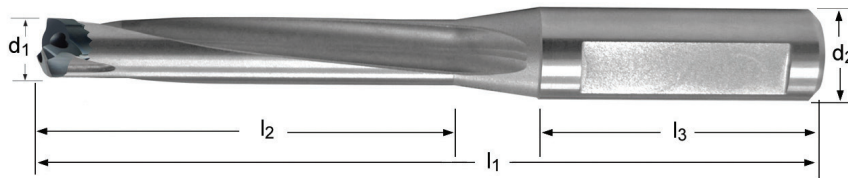
	Hydra Body 5xD Metric Shank						Hydra Body 5xD Fractional Shank																	
d_1 Ø	H855 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	H855 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	d_2 inch	H860 e-Code	H861 e-Code											
15.60 15.70 5/8 16.00 16.08 16.10 16.20 41/64 16.30 16.50	H85516.0 0018514	92.5	166.5	50.0	20.0	H85541/64 0034712	92.5	166.5	50.0	19.05	3/4	H860N2 0018842	H861N2 0018903											
16.60 21/32 16.70 17.00 43/64 17.10 17.20 11/16 17.50														H85517.0 0018521	97.5	171.5	50.0	20.0	H85511/16 0034736	97.5	171.5	50.0	19.05	3/4
17.60 17.70 45/64 18.00 18.10 18.20 23/32 18.50																								
18.60 47/64 18.70 18.90 19.00 3/4 19.10 19.20 19.25 19.30 19.35 49/64 19.50	H85519.0 0018545	108.5	191.5	56.0	20.0	H85549/64 0034798	108.5	191.5	56.0	25.40	1"			H860N3 0018859	H861N3 0018910									
19.60 19.70 25/32 20.00 51/64 20.50																H85520.0 0018552	114.5	196.5	56.0	25.0	H85551/64 0034804	114.5	196.5	56.0
13/16 21.00 53/64 27/32 21.50	H85521.0 0018569	119.5	196.5	56.0	25.0	H85527/32 0034811	119.5	196.5	56.0	25.40	1"													
55/64 22.00 7/8 22.50 57/64 22.70												H85522.0 0018576	125.1			201.1	56.0	25.0	H85557/64 0034835	125.1	201.1	56.0	25.40	1"
23.00 29/32 59/64 23.50	H85523.0 0018583	129.5	210.5	56.0	25.0	H85559/64 0034842	129.5	210.5	56.0	25.40	1"													
15/16 24.00 61/64 24.50 31/32												H85524.0 0018590	135.2	220.2	60.0	32.0	H85531/32 0034859	135.2	220.2	60.0	25.40	1"		

	Hydra Body 5xD Metric Shank					Hydra Body 5xD Fractional Shank																	
	d₁ Ø	H855 e-Code	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ mm	H855 e-Code	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ mm			d ₂ inch	H860 e-Code	H861 e-Code							
25.00 63/64 1"	H85525.0 0018606	140.0	225.0	60.0	32.0	H8551.1/64 0034866	140.0	225.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927										
25.50 1.1/32														146.0	230.0	60.0	32.0	H8551.3/64 0034873	146.0	230.0	60.0	31.75	1.1/4
25.65 1.1/64																							
26.00 1.1/32	H85526.0 0018613	146.0	230.0	60.0	32.0	H8551.3/64 0034873	146.0	230.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927										
26.50 1.3/64																							
27.00 1.5/64	H85527.0 0018620	151.0	235.0	60.0	32.0	H8551.3/32 0034897	151.0	235.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927										
27.50 1.3/32																							
28.00 1.7/64	H85528.0 0018637	157.0	240.0	60.0	32.0	H8551.1/8 0034903	157.0	240.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927										
28.50 1.1/8																							
29.00 1.5/32	H85529.0 0018644	162.0	245.0	60.0	32.0	H8551.11/64 0034934	162.0	245.0	60.0	31.75	1.1/4	H860N5 0018873	H861N4 0018927										
29.50 1.11/64																							
30.00 1.3/16	H85530.0 0018651	167.0	255.0	60.0	32.0	H8551.3/16 0034965	167.0	225.0	60.0	31.75	1.1/4	H860N6 0018880	H861N5 0018934										
30.50																							
31.00 1.1/4	H85532.0 46111413	176.5	261.5	60.0	32.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934										
32.00																							
32.50 1.19/64	H85533.5 46111414	186.5	271.5	60.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934										
33.00 33.50																							
34.00 1.11/32	H85535.0 46111415	196.5	291.5	70.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934										
34.50 1.3/8																							
35.00	H85536.5 46111416	201.5	296.5	70.0	40.0	—	—	—	—	—	—	H860N6 0018880	H861N5 0018934										
36.00 1.27/64																							
36.50	H85538.0 46111417	211.5	306.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354										
37.00 1.15/32																							
37.50 38.00	H85539.5 46111418	211.5	316.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354										
38.50 1.17/32																							
39.00 39.50	H85541.0 46111419	226.5	325.6	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354										
40.00 41.00																							
41.00	H85542.5 46111420	236.5	336.5	70.0	40.0	—	—	—	—	—	—	H860N7 46111949	H861N6 46260354										
42.00																							











H858 • Hydra Body 8 x D





Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

	Hydra Body 8xD Metric Shank							
	d_1 Ø	H858 e-Code	l_2 mm	l_1 mm	l_3 mm			
13.50	H85814.0 0018668	124.5	191.5	48.0	16.0	H860N1 0018835	H861N1 0018897	
13.60								
13.70								
13.80								
35/64								
14.00								
14.10								
14.20								
9/16								
14.50								
14.60	H85815.0 0018675	133.5	201.5	50.0	20.0			
37/64								
14.70								
14.80								
15.00								
19/32								
15.10								
15.20								
15.24								
39/64								
15.50								

	Hydra Body 8xD Metric Shank							
d ₁ Ø	H858 e-Code	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ mm	H860 e-Code	H861 e-Code	
15.60 15.70 5/8 16.00 16.08 16.10 16.20 41/64 16.30 16.50	H85816.0 0018682	141.5	211.5	50.0	20.0	H860N2 0018842	H861N2 0018903	
16.60 21/32 16.70 17.00 43/64 17.10 17.20 11/16 17.50	H85817.0 0018699	150.5	221.5	50.0	20.0			
17.60 17.70 45/64 18.00 18.10 18.20 23/32 18.50	H85818.0 0018705	158.5	226.5	50.0	20.0			
18.60 47/64 18.70 18.90 19.00 3/4 19.10 19.20 19.25 19.30 19.35 49/64 19.50	H85819.0 0018712	167.5	251.5	56.0	25.0	H860N3 0018859	H861N3 0018910	
19.60 19.70 25/32 20.00 51/64 20.50	H85820.0 0018729	175.5	264.5	56.0	25.0			
13/16 21.00 53/64 27/32 21.50	H85821.0 0018736	184.5	266.5	56.0	25.0			
55/64 22.00 7/8 22.50 57/64 22.70	H85822.0 0018743	192.1	271.1	56.0	25.0	H860N4 0018866		
23.00 29/32 59/64 23.50	H85823.0 0018750	200.5	280.5	56.0	25.0			
15/16 24.00 61/64 24.50 31/32	H85824.0 0018767	208.2	295.2	60.0	32.0			

	Hydra Body 8xD Metric Shank							
d_1 Ø	H858 e-Code	l_2 mm	l_1 mm	l_3 mm	d_2 mm	H860 e-Code	H861 e-Code	
25.00 63/64 1" 25.50 25.65 1.1/64	H85825.0 0018774	217.0	300.0	60.0	32.0	H860N5 0018873	H861N4 0018927	
26.00 1.1/32 26.50 1.3/64	H85826.0 0018781	225.0	310.0	60.0	32.0			
27.00 1.5/64 27.50 1.3/32	H85827.0 0018798	234.0	320.0	60.0	32.0			
28.00 1.7/64 28.50 1.1/8	H85828.0 0018804	242.0	325.0	60.0	32.0	H860N6 0018880	H861N5 0018934	
29.00 1.5/32 29.50 1.11/64	H85829.0 0018811	251.0	335.0	60.0	32.0			
30.00 1.3/16 30.50	H85830.0 0018828	259.0	345.0	60.0	32.0			
31.00 1.1/4 32.00	H85832.0 46111421	271.5	356.5	60.0	32.0			
32.50 1.19/64 33.00 33.50	H85833.5 46111422	286.5	371.5	60.0	40.0			
34.00 1.1/32 34.50 1.3/8 35.00	H85835.0 46111423	301.5	396.5	70.0	40.0	H860N7 46111949	H861N6 46260354	
36.00 1.27/64 36.50	H85836.5 46111424	311.5	406.5	70.0	40.0			
37.00 1.15/32 37.50 38.00	H85838.0 46111425	326.5	421.5	70.0	40.0			
38.50 1.17/32 39.00 39.50	H85839.5 46111426	336.5	431.5	70.0	40.0			
40.00 1.9/16 41.00	H85841.0 46111427	351.5	451.5	70.0	40.0			
42.00 1.5/8	H85842.5 46111428	361.5	461.5	70.0	40.0			

Drilling Hints & Tips with the *Hydra Drill*

COOLANTS

For maximum chip evacuation and tool performance, coolant use is recommended.

Emulsion coolant concentration of 6 – 8% is recommended for most applications, at a coolant pressure of 20 bar or higher. For high strength steel, stainless steels and tougher drilling applications, use a higher concentration of 10-12%. In these applications, particularly in stainless steels, it is recommended to use the maximum coolant pressure on the machine.

The Hydra-drill coolant holes provide improved web strength and reduce heat at the cutting edges for increased productivity and longer tool life.

HOLDERS

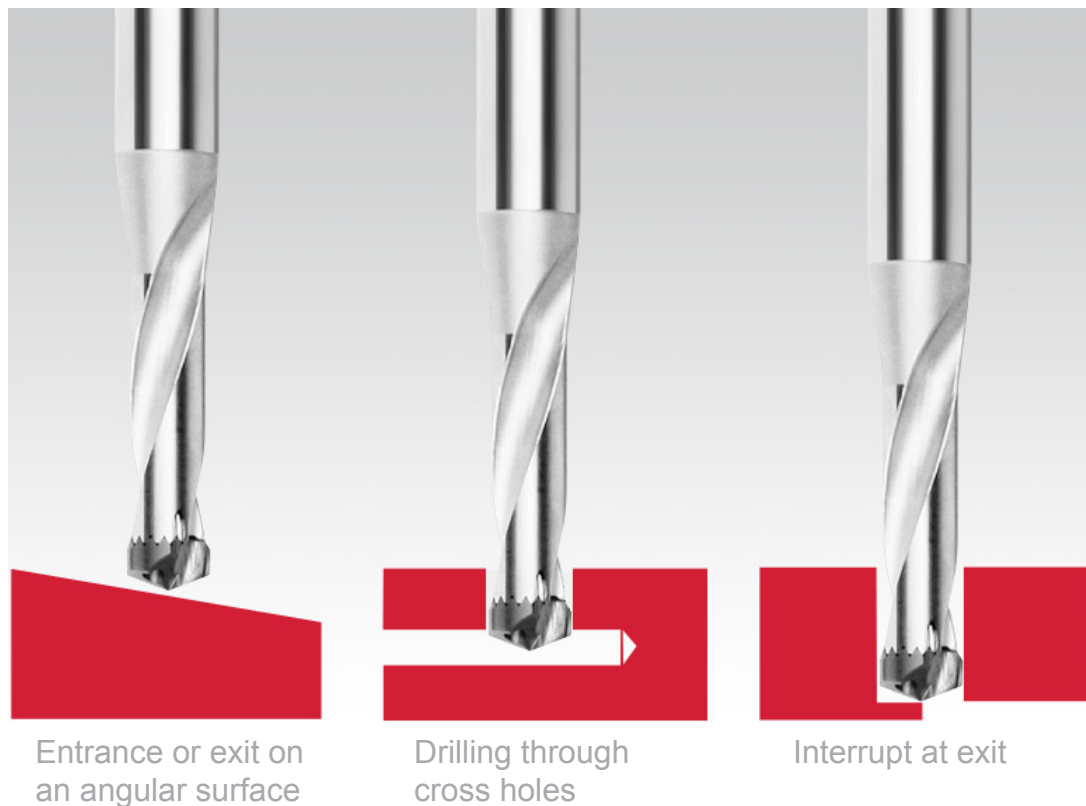
Always use tool holders and collets that provide good concentricity between the drill and the machine spindle. Use a positive stop to prevent the tool from backing up into the holder. Radial runout in the tool assembly must be accurately checked and maintained.

WORKPIECE

A secure and rigid workpiece will minimise deflection, and allow for better accuracy and true position of the hole.

FEEDS

It is important not to underfeed the drill which will cause it to dwell and dull. This is particularly true in work hardening materials. Feed rates should be high enough for proper chip formation.



In these drilling scenarios, reducing feed rate to 1/3 (33%) is generally recommended. Drilling into an entry angle of more than 10° is NOT recommended – surface should be milled flat first.



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