High Performance Drill Selection Chart

Our industry leading high performance drill with the same high quality that helped set the standard.

Multipurpose high quality drill for most drilling applications adding stability, hole quality, tool life, and finish (excludes some work hardening materials).

An economical choice perfect for job shop and batch production work requiring a high performance drill option.

Series	LU	Size Range Inch	Size Range mm	Margin	DC Tol.	DCONMS Tol.	Helix	SIG	Coolant Fed	DIN	Coating	Application Recommendations							
												TEMA* Sizes	Steel	Hardened Steel	Stainless Steel	PH Stainless Steel	Cast Iron	Titanium	High Temp Alloys
CXDSS	3x	#31-3/4	3.0-20.0	Double	m7	h6	30°	140°	N	6537K	ALtima® Plus	X	1st	2nd	2nd	2nd	1st	2nd	2nd
CXDSR	5x	#31-5/8	3.0-16.0	Double	m7	h6	30°	140°	N	6537L	ALtima® Plus	X	1st	2nd	2nd	2nd	1st	2nd	2nd
CXDCS	3x	#31-5/8	3.0-16.0	Double	m7	h6	30°	140°	Y	6537K	ALtima® Plus	X	1st	2nd	1st	2nd	1st	1st	2nd
CXDCR	5x	#31-3/4	3.0-20.0	Double	m7	h6	30°	140°	Y	6537L	ALtima® Plus	X	1st	2nd	1st	2nd	1st	1st	2nd
CXDCL	8x	#31-5/8	3.0-16.0	Double	m7	h6	30°	140°	Y		ALtima® Plus	X	1st	2nd	1st	2nd	1st	1st	2nd
CXDCE	15x	#31-15/32	3.0-12.0	Double	h7	h6	30°	140°	Y		ALtima® Plus		1st	2nd	1st	2nd	1st	1st	2nd
2XDSS	3x	#31-3/4	2.5-20.0	Single	h7	h6	30°	142°	N		ALtima®	X	2nd	1st	1st	1st	2nd	1st	1st
2XDSR	5x	1/64-5/8	0.5-16.0	Single	h7	h6	30°	142°	N		ALtima®	X	2nd	1st	1st	1st	2nd	1st	1st
2XDCS	3x	#31-5/8	3.0-16.0	Single	h7	h6	30°	142°	Y	6537K	ALtima®	X	2nd	1st	2nd	1st	2nd	2nd	1st
2XDCR	5x	#31-3/4	3.0-20.0	Single	h7	h6	30°	142°	Y		ALtima®	X	2nd	1st	2nd	1st	2nd	2nd	1st
2XDCL	7+x	#31-1/2	3.0-12.0	Single	h7	h6	30°	142°	Y		ALtima®	X	2nd	1st	2nd	1st	2nd	2nd	1st
2XDCE	12-17x**	1/4 - 1/2	5.0-12.0	Double	h7	h6	30°	142°	Y		ALtima®		2nd	1st	2nd	1st	2nd	2nd	1st
HPDSS	3x	#31-5/8	3.0-16.0	Single	h7	h6	30°	140°	Y	6537K	ALtima®		3rd	3rd	3rd	3rd	3rd	3rd	3rd
HPDSR	5x	#31-5/8	3.0-16.0	Single	h7	h6	30°	140°	N	6537L	ALtima®		3rd	3rd	3rd	3rd	3rd	3rd	3rd
HPDCS	3x	#31-5/8	3.0-16.0	Single	h7	h6	30°	140°	Y	6537K	ALtima®		3rd	3rd	3rd	3rd	3rd	3rd	3rd
HPDCR	5x	#31-5/8	3.0-16.0	Single	h7	h6	30°	140°	Y	6537L	ALtima®		3rd	3rd	3rd	3rd	3rd	3rd	3rd

Note: For drilling applications involving cross holes and/or optimal hole finishes, use the CXD style drill.
*TEMA - Tubular Exchange Manufacturer's Association
**Length varies depending on size.

Inch	
DC	Tolerance (m7)
.0000 - .1181	+.00008/+.00047
.1182 - .2362	+.00016/+.00063
.2363 - .3937	+.00024/+.00083
.3938 - .7087	+.00027/+.00098
.7088 - .7500	+.00031/+.00114

Inch	
DC	Tolerance (h7)
.0000 - .1181	+0/-.00039
.1182 - .2362	+0/-.00047
.2363 - .3937	+0/-.00059
.3938 - .7087	+0/-.00071
.7088 - .7500	+0/-.00083

Inch	
DCONMS	Tolerance (h6)
.0000 - .1181	+0/-.00024
.1182 - .2362	+0/-.00031
.2363 - .3937	+0/-.00035
.3938 - .7087	+0/-.00043
.7088 - .7500	+0/-.00051

Metric (mm)	
DC	Tolerance (m7)
0 - 3.0	+.002/+.012
3.01 - 6.0	+.004/+.016
6.01 - 10.0	+.006/+.021
10.01 - 18.0	+.007/+.025
18.01 - 20.0	+.008/+.029

Metric (mm)	
DC	Tolerance (h7)
0 - 3.0	+0/-.010
3.01 - 6.0	+0/-.012
6.01 - 10.0	+0/-.015
10.01 - 18.0	+0/-.018
18.01 - 20.0	+0/-.021

Metric (mm)	
DCONMS	Tolerance (h6)
0 - 3.0	+0/-.006
3.01 - 6.0	+0/-.008
6.01 - 10.0	+0/-.009
10.01 - 18.0	+0/-.011
18.01 - 20.0	+0/-.013

M.A. Ford® Coating	Microhardness (HV)
ALtima®	3100
ALtima® Plus	3200

Maximum Service Temp.	Friction Coefficient
1100° C / 2012° F	0.42
1100° C / 2012° F	0.25

Twister® Drill Icon Glossary


Solid


Coolant Fed

Drill Length

Drill Point Angle

Helix Angle

Coatings

DIN Specs

Workpiece Material Group

Steels

Stainless Steels

Cast Iron

Special Alloys

Hardened Steels (35-65Rc)

Non-Ferrous

Cutting Calculations and Definitions			Metric	U.S.
ae	=	Width of cut, radial depth of cut	(mm)	(inch)
ap	=	Depth of cut, axial depth of cut	(mm)	(inch)
Dc	=	Cutter diameter	(mm)	(inch)
f	=	Feed per revolution	(mm/rev)	(IPR)
fz	=	Feed per tooth	(mm/tooth)	(IPT)
NOF	=	Number of teeth	Number	
n	=	RPM	(rev/min)	(rev/min)
Q	=	Metal removal rate	(cm^3/min)	(in^3/min)
vc	=	Cutting speed	(m/min)	(SFM)
vf	=	Feed speed	(mm/min)	(IPM)
Dw	=	Working diameter	(mm)	(inch)

Formulas

Inch
RPM (n) = SFM (vc) x 3.82/Tool Diam.
IPM (vf) = RPM (n) x IPR (f)

Conversion Inch to Metric
SFM (vc) to m/min (vc) = SFM (vc) x .3048
IPM (vf) to mm/min (vf) = IPM (vf) x 25.4

Metric
RPM (n) = m/min (vc) x 318.057/Tool Diam.
mm/min (vf) = RPM (n) x mm/Revolution (f).

Conversion Metric to Inch
m/min (vc) to SFM (vc) = (m/min)/.3048
mm/min (vf) to IPM (vf) = (mm/min)/25.4

Safety Note

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

Drill Troubleshooting

		Problem																													
		Tool Deterioration													Chip Formation			Tool Life	Workpiece								Process						
	Possible Solutions	Flank wear	Margin wear	Breakage	Flaking	Creater wear	Chisel edge wear	Corner chipping	Flute chipping	Cutting edge chipping	Cutting edge wear	Point center chipping	Rake face	Scoring on tool body	Long stringy	Varied chip form	Blue/brown chips	Tool Life	Undersized hole	Oversized hole	Poor alignment	Poor surface finish	Heavy burr breakout	Retract marks	Hole location	Hole straightness	Deflection	Point Deflection	Galling	Vibration	Abnormal noise	Chip packing	No drill penetration
Speed & Feed	Reduce feed or reduce at exit	x		x			x	x	x	x		x	x	x				x	x	x		x	x			x					x	
	Reduce feed at entrance			x															x			x			x		x					x	
	Consistent feed rate			x											x	x														x		x	
	Increase feed	x					x				x				x				x	x													
	Reduce speed	x	x			x		x			x							x	x										x		x	x	
	Increase speed																					x											
Coolant	Coolant mix		x	x	x					x				x				x	x			x	x								x	
	Coolant increase flow	x		x			x	x		x							x	x	x			x	x								x	
	Coolant filter	x		x	x					x								x	x			x	x								x	
Setup	Workpiece clamp rigid		x	x			x	x		x				x				x		x	x	x	x	x	x	x						x
	Collet accuracy			x						x										x					x	x				x			
	Tool holder fit .0008			x						x										x					x	x				x			
	Alignment			x						x										x												x	
	Peck drill			x																													
	Concentricity		x	x	x			x	x					x							x	x		x	x	x		x		x			
	Do not extract tool during peck							x																									

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.