DIA EDGE

DVAS TRISTAR DRILL SERIES

A NEW STANDARD FOR FAST, RELIABLE & ACCURATE DRILLING

ABOUT OUR BRAND

Your manufacturing success is our success.

It's simple. We want to provide high-quality cutting tool products that help deliver unparalleled performance and control for you to manufacture precisely perfect products every day.

Our long heritage of building partnerships through cutting tool solutions to metal working manufacturers, like yours, has given Mitsubishi Materials USA a solid reputation as an industry leader. We understand the importance of getting it right the first time by delivering high-quality cutting tool product brands to help overcome machining challenges to improve machining processes.

Your success is our success and is the driving force behind our innovative products. Our product brands, DIAEDGE and MOLDINO, are trusted globally in the metal manufacturing and die & mold industries for delivering expertly-designed manufactured tools of the trade for highly specialized industries like yours.

With the acquisition of MOLDINO Tool Engineering, Ltd, our traditional Mitsubishi Materials USA cutting tool product line is now sold under the DIAEDGE product brand name.

Brands you can trust:

MITSUBISHI MATERIALS U.S.A.

TRUSTED PRODUCT BRANDS

DIAEDGE MOLDINO

Mitsubishi Materials New Drill Series

TRISTAR Drill Series

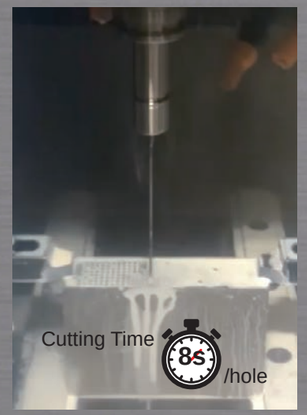
High Efficiency - Long Tool Life - High Precision

TRISTAR, a new generation drill series from Mitsubishi Materials provides 3 strong advantages.

The first of the TRISTAR series is a small diameter drill with "Five New Technologies" features for FAST, RELIABLE and ACCURATE drilling.

FAST

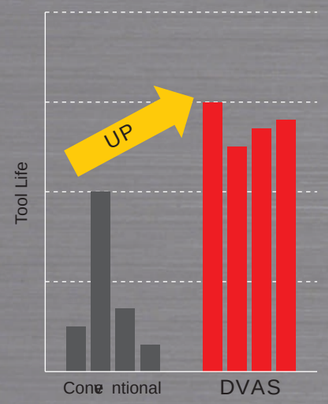
"Deep hole drilling is usually a slow process."



Deep holes can be drilled quickly and efficiently.

RELIABLE

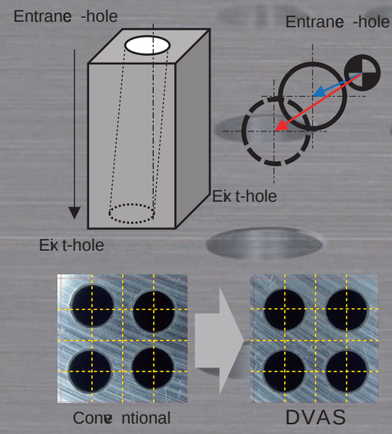
"Breakages, short tool life and lack of coolant can be common."



Tool life exceeds all normal expectations

ACCURATE

"Holes can wander considerably and have poor positioning."



Straighter holes and improved dimensional accuracy.

Solid Carbide Drill

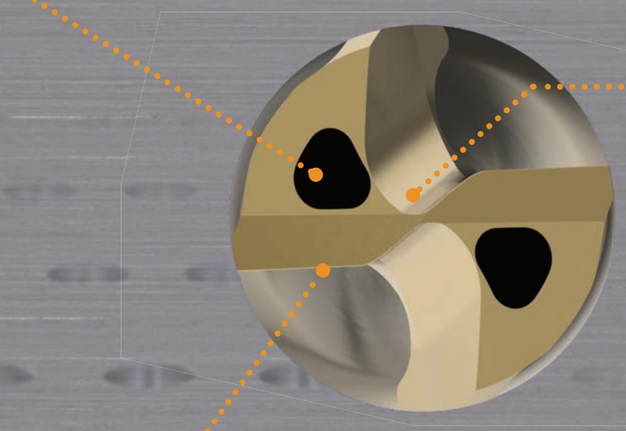
TRISTAR Drill Series

DVAS

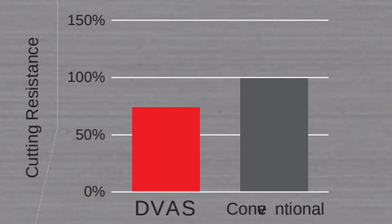
Mini Size 1.0mm – 2.9mm (.0394” – .1142”)
L/D = 2 – 50

FAST, RELIABLE and ACCURATE.
New standards enabled by the "Five New Technologies"

Advanced Coolant Hole



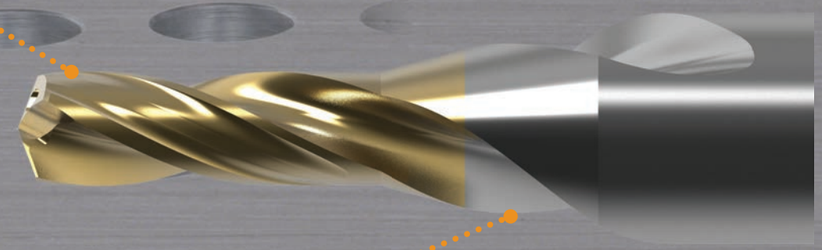
New XR Point Thinning



<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0394 inch , L/D= 0
Cutting Speed : vc= 230 SFM
Feed per Rev. : fr= .0016 IPR

Tough and Sharp Cutting Edge Design

New Coated Grade DP1120

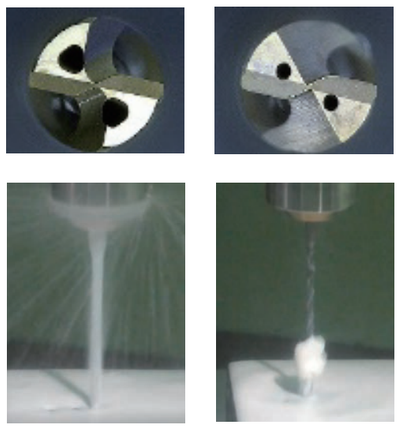


Unique Rigid Form

*By CG image

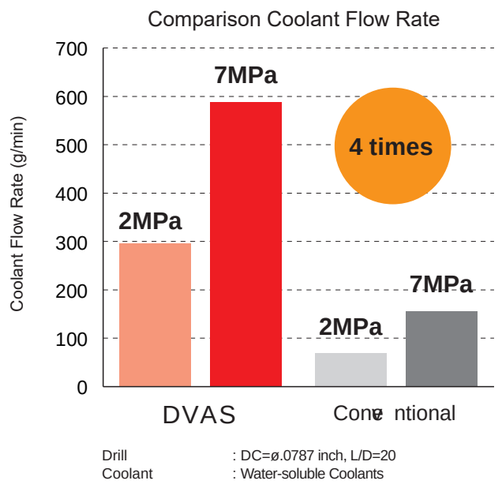
Mitsubishi Materials unique coolant holes with TRI-Cooling Technology.

TRI-Cooling is optimal for small all-diameter drills and can achieve more than double the conventional coolant discharge volume. This can dramatically improve chip discharge and heat dissipation, contributing greatly to tool life stability.



DVAS

Conventional

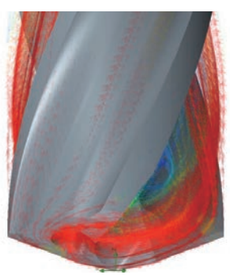


Drill : DC=ø.0787 inch, L/D=20
Coolant : Water-soluble Coolants

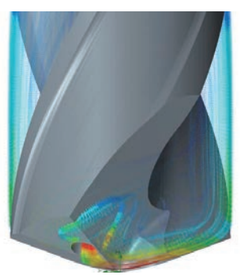
Large coolant holes reduce tool damage due to the improved cooling effect thereby greatly improving tool life.

Increased coolant flow provides effective cooling even in difficult applications or when using an oil based cutting fluid.

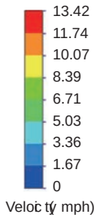
Coolant Flow Speed Simulation



DVAS



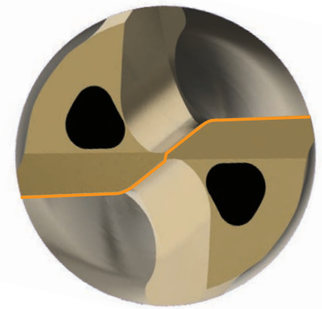
Conventional

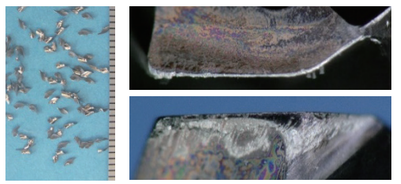


YouTube

Tough, sharp, cutting-edge design.

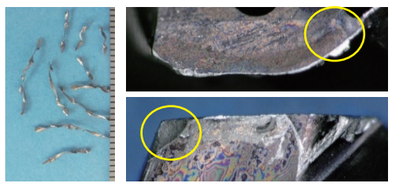
The straight cutting edge and thinned point are connected with a smoothly curved geometry that significantly improves fracture resistance. The geometry of the rake angles and lands also improves wear and chip disposal.





DVAS

Large crater wear and fracture of the outer edge.



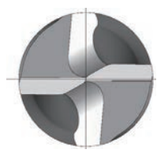
Conventional

<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0787 inch, L/D=20
Cutting Speed : vc 165 SFM
Feed per Rev. : fn .0024 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa

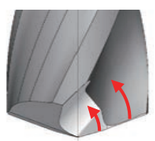
New XR point thinning, reduces cutting load and optimises chip flow.

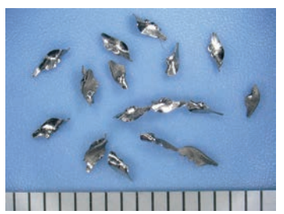
The new point thinning breaks chips into the optimum shape for streamlined flow and achieves a much lower cutting resistance.

DVAS

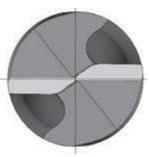


The R-shaped part created by the point thinning forms compact chips that aids chip flow.

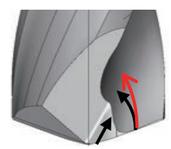


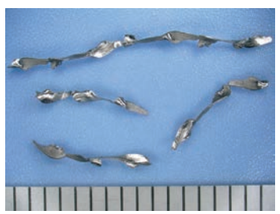


Conventional



Creates larger chips that creates a lower rate of chip flow and causes chip clogging.



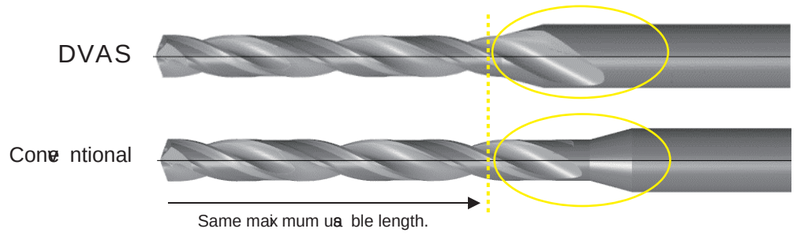


<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0787 inch, L/D=20
Cutting Speed : vc 165 SFM
Feed per Rev. : fn .0024 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa

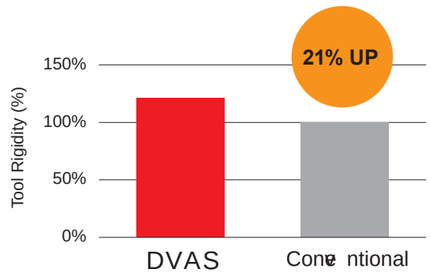
Unique form that is Tough and Rigid

Applies to L/D=2, 7, 12

The short drill is designed for high rigidity and good chip evacuation by minimizing the neck length. A chip discharge area is provided over the taper part, increasing the tool rigidity by 20% more than the conventional model as well as improving the hole position accuracy.

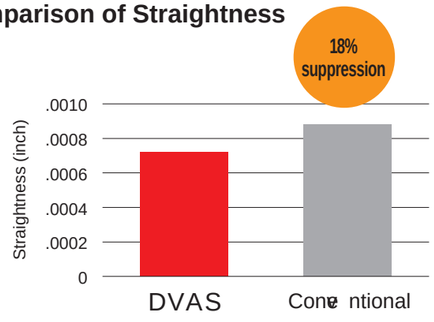


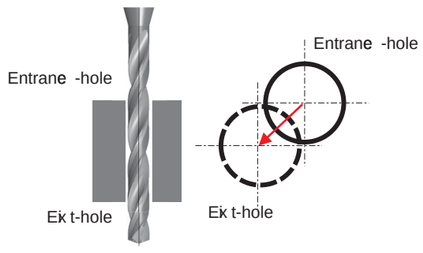
Comparison of Tool Rigidity



<Analysis Conditions>
Analysis Model : DC=ø.0787 inch, L/D=7
Overall Length : 2.362 inch
Constrained : Shank tip range of 0-1.181 inch
Load : Distributed load of 140N in Z axis direction.

Comparison of Straightness

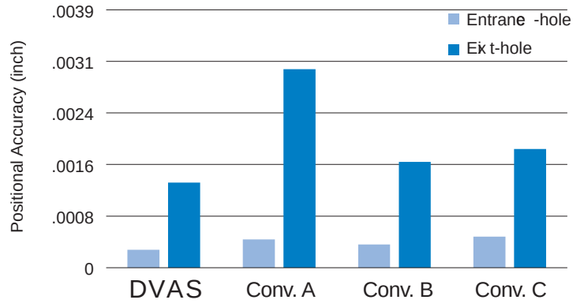


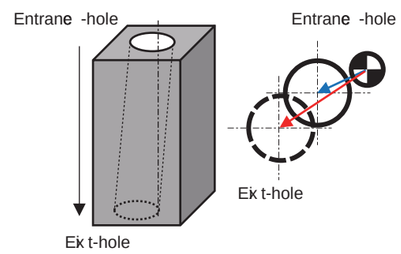


<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : DC=ø.0787 inch, L/D=7
Cutting Speed : vc 230 SFM
Feed per Rev. : fr= .0031 inch
Hole Depth : .394 inch
Cutting Mode : Wet Cutting, Water-soluble Coolants, 5MPa
Hydro Chuck
Number of Holes : 100 holes

Deep Hole Machining Example

For deep holes, a DVAS pilot drill is recommended to improve precision of hole entry and control deviation of exit hole.



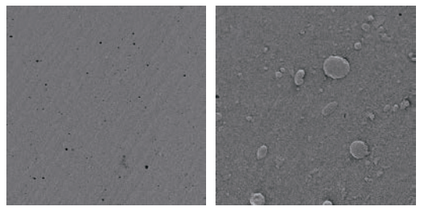


<Cutting Conditions>
Workpiece Material : AISI 4140
Tool : Pilot Drill DC=ø.0787 inch, L/D=2
Long Drill DC=ø.0787 inch, L/D=20
Cutting Speed : vc 230 SFM
Feed per Rev. : fr= .0028 IPR
Cutting Mode : Wet Cutting, Water-soluble Coolants, 2MPa
Number of Holes : 100 holes

New Coated Grade DP1120

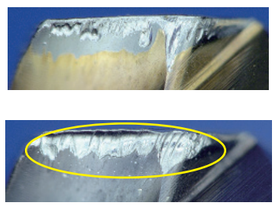
DP1120 grade combines an ultra-multilayer PVD coating specifically developed for drills combined with a micro-grain, ultra-hard substrate to provide outstanding smoothness that ensures superior chipping and prevents fracture. Additionally, excellent abrasion resistance and fracture resistance helps in maintaining cutting edge sharpness for long periods of time, extending the tool life.

Enlarged view of the flute surface.



DVAS Conventional

DVAS



Conventional Large crater wear

<Cutting Conditions>
Tool : DC=ø.0787 inch, L/D=20
Cutting Speed : vc 165 SFM
Feed per Rev. : fr= .0024 inch
Cutting Mode : Wet Cutting,
Water-soluble Coolants, 2MPa
Number of Holes : 500 holes

DRILL SELECTION CHART

Applications	Product Code	Size Range	Size	Item	Hole Depth (L/D)	Workpiece Material P Steel	M Stainless Steel	K Cast Iron	N Non-ferrous Metal	S Heat Resistant Alloy	Shape
For Small Diameter	DVAS…X02	ϕ.0394" –ϕ.1142"	.0039"	20	2	◎	◎	○	○	◎	Pilot drill etc
	DVAS…X07	ϕ.0394" –ϕ.1142"	.0039"	20	7	◎	◎	○	○	◎	
	DVASX. 12	ϕ.0394" –ϕ.1142"	.0039"	20	12	◎	◎	○	○	◎	
	DVAS…X20	ϕ.0394" –ϕ.1142"	.0039"	20	20	◎	◎	○	○	◎	
	DVAS…X25	ϕ.0394" –ϕ.1142"	.0039"	20	25	◎	◎	○	○	◎	
	DVAS…X30	ϕ.0394" –ϕ.1142"	.0039"	20	30	◎	◎	○	○	◎	
	DVAS…X40	ϕ.0394" –ϕ.1142"	.0039"	20	40	◎	◎	○	○	◎	
	DVAS…X50	ϕ.0394" –ϕ.0984"	.0197"	6	50	◎	◎	○	○	◎	

IDENTIFICATION

DVA S 0100 X50 S040

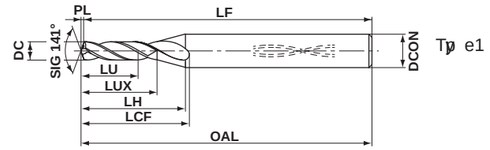
Applications	Coolant	Diameter	L/D	Type of Shank
DVA : General-purpose	S : Internal Coolant	0100 → ϕ.0394" 0290 → ϕ.1142"	X50 : L/D=50 X02 : L/D=2	S040 : Shank Diameter .158"

DVAS Mini Size NEW

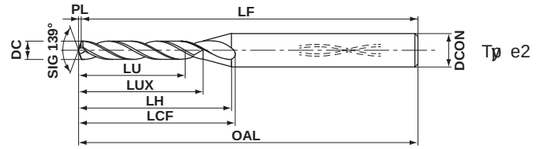
TRISTAR Drills

P M K N S H

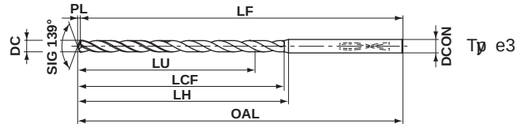
Internal Coolant



Type e1



Type e2



Type e3

L/D=2	L/D>2
.00024 – .00016	0 – .00039
DCON=4	
0 – .00031	

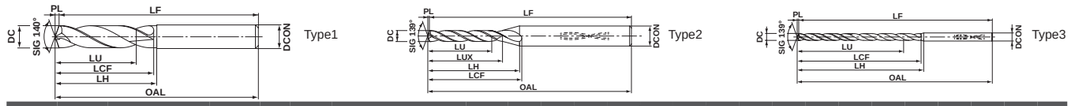
DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	DC Wire / Letter	DC Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.0	.0394				2	int.	DVAS0100X02S040	●	2.2	.087	3.2	.126	8.6	.339	8.8	.346	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0100X07S040	●	7.2	.283	8.2	.323	13.6	.535	13.8	.543	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0100X12S040	●	12.2	.480	13.2	.520	18.6	.732	18.8	.740	58	2.283	57.8	2.276	0.2	.008	4	.157	2
					20	int.	DVAS0100X20S040	●	20.2	.795	–	–	23.2	.913	28.8	1.134	67	2.638	66.8	2.630	0.2	.008	4	.157	3
					25	int.	DVAS0100X25S040	●	25.2	.992	–	–	28.2	1.110	33.8	1.331	73	2.874	72.8	2.866	0.2	.008	4	.157	3
					30	int.	DVAS0100X30S040	●	30.2	1.189	–	–	33.2	1.307	38.8	1.528	79	3.110	78.8	3.102	0.2	.008	4	.157	3
					40	int.	DVAS0100X40S040	●	40.2	1.583	–	–	43.2	1.701	48.8	1.921	90	3.543	89.8	3.535	0.2	.008	4	.157	3
					50	int.	DVAS0100X50S040	●	50.2	1.976	–	–	53.2	2.094	58.8	2.315	102	4.016	101.8	4.008	0.2	.008	4	.157	3
1.1	.0433				2	int.	DVAS0110X02S040	●	2.4	.094	3.5	.138	9	.354	8.9	.350	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0110X07S040	●	7.9	.311	9.1	.358	14.5	.571	14.4	.567	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0110X12S040	●	13.4	.528	14.6	.575	20	.787	19.9	.783	58	2.283	57.8	2.276	0.2	.008	4	.157	2
					20	int.	DVAS0110X20S040	●	22.2	.874	–	–	25.5	1.004	30.9	1.217	67	2.638	66.8	2.630	0.2	.008	4	.157	3
					25	int.	DVAS0110X25S040	●	27.7	1.091	–	–	31	1.220	36.4	1.433	73	2.874	72.8	2.866	0.2	.008	4	.157	3
					30	int.	DVAS0110X30S040	●	33.2	1.307	–	–	36.5	1.437	41.9	1.650	79	3.110	78.8	3.102	0.2	.008	4	.157	3
					40	int.	DVAS0110X40S040	●	44.2	1.740	–	–	47.5	1.870	52.9	2.083	90	3.543	89.8	3.535	0.2	.008	4	.157	3
1.2	.0472				2	int.	DVAS0120X02S040	●	2.6	.102	3.9	.154	9.4	.370	9	.354	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0120X07S040	●	8.6	.339	9.9	.390	15.4	.606	15	.591	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0120X12S040	●	14.6	.575	15.9	.626	21.4	.843	21	.827	60	2.362	59.8	2.354	0.2	.008	4	.157	2
					20	int.	DVAS0120X20S040	●	24.2	.953	–	–	27.8	1.094	33	1.299	71	2.795	70.8	2.787	0.2	.008	4	.157	3
					25	int.	DVAS0120X25S040	●	30.2	1.189	–	–	33.8	1.331	39	1.535	77	3.031	76.8	3.024	0.2	.008	4	.157	3
					30	int.	DVAS0120X30S040	●	36.2	1.425	–	–	39.8	1.567	45	1.772	84	3.307	83.8	3.299	0.2	.008	4	.157	3
					40	int.	DVAS0120X40S040	●	48.2	1.898	–	–	51.8	2.039	57	2.244	97	3.819	96.8	3.811	0.2	.008	4	.157	3
					50	int.	DVAS0120X50S040	●	60.2	2.370	–	–	63.8	2.512	69	2.717	110	4.331	109.8	4.323	0.2	.008	4	.157	3

DC = Cutting Diameter
LU = Usable Length
LUX = Max Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

DVAS Mini Size NEW

TRISTAR Drills



DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
1.3	.0512				2	int.	DVAS0130X02S040	●	2.8	.110	4.2	.165	9.9	.390	9.2	.362	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0130X07S040	●	9.3	.366	10.7	.421	16.4	.646	15.7	.618	55	2.165	54.8	2.157	0.2	.008	4	.157	2
					12	int.	DVAS0130X12S040	●	15.8	.622	17.2	.677	22.9	.902	22.2	.874	60	2.362	59.8	2.354	0.2	.008	4	.157	2
					20	int.	DVAS0130X20S040	●	26.2	1.031	–	–	30.1	1.185	35.2	1.386	71	2.795	70.8	2.787	0.2	.008	4	.157	3
					25	int.	DVAS0130X25S040	●	32.7	1.287	–	–	36.6	1.441	41.7	1.642	77	3.031	76.8	3.024	0.2	.008	4	.157	3
					30	int.	DVAS0130X30S040	●	39.2	1.543	–	–	43.1	1.697	48.2	1.898	84	3.307	83.8	3.299	0.2	.008	4	.157	3
					40	int.	DVAS0130X40S040	●	52.2	2.055	–	–	56.1	2.209	61.2	2.409	97	3.819	96.8	3.811	0.2	.008	4	.157	3
					50	int.	DVAS0130X50S040	●	65.2	2.567	–	–	69.1	2.720	74.2	2.921	110	4.331	109.8	4.323	0.2	.008	4	.157	3
1.4	.0551				2	int.	DVAS0140X02S040	●	3	.118	4.5	.177	10.3	.406	9.3	.366	50	1.969	49.8	1.961	0.2	.008	4	.157	1
					7	int.	DVAS0140X07S040	●	10.1	.398	11.5	.453	17.3	.681	16.3	.642	55	2.165	54.7	2.154	0.3	.012	4	.157	2
					12	int.	DVAS0140X12S040	●	17.1	.673	18.5	.728	24.3	.957	23.3	.917	63	2.480	62.7	2.469	0.3	.012	4	.157	2
					20	int.	DVAS0140X20S040	●	28.3	1.114	–	–	32.5	1.280	37.3	1.469	75	2.953	74.7	2.941	0.3	.012	4	.157	3
					25	int.	DVAS0140X25S040	●	35.3	1.390	–	–	39.5	1.555	44.3	1.744	82	3.228	81.7	3.217	0.3	.012	4	.157	3
					30	int.	DVAS0140X30S040	●	42.3	1.665	–	–	46.5	1.831	51.3	2.020	90	3.543	89.7	3.531	0.3	.012	4	.157	3
					40	int.	DVAS0140X40S040	●	56.3	2.217	–	–	60.5	2.382	65.3	2.571	105	4.134	104.7	4.122	0.3	.012	4	.157	3
1.5	.0591			#1-64	2	int.	DVAS0150X02S040	●	3.3	.130	4.8	.189	10.7	.421	9.4	.370	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0150X07S040	●	10.8	.425	12.3	.484	18.2	.717	16.9	.665	55	2.165	54.7	2.154	0.3	.012	4	.157	2
					12	int.	DVAS0150X12S040	●	18.3	.720	19.8	.780	25.7	1.012	24.4	.961	63	2.480	62.7	2.469	0.3	.012	4	.157	2
					20	int.	DVAS0150X20S040	●	30.3	1.193	–	–	34.8	1.370	39.4	1.551	75	2.953	74.7	2.941	0.3	.012	4	.157	3
					25	int.	DVAS0150X25S040	●	37.8	1.488	–	–	42.3	1.665	46.9	1.846	82	3.228	81.7	3.217	0.3	.012	4	.157	3
					30	int.	DVAS0150X30S040	●	45.3	1.783	–	–	49.8	1.961	54.4	2.142	90	3.543	89.7	3.531	0.3	.012	4	.157	3
					40	int.	DVAS0150X40S040	●	60.3	2.374	–	–	64.8	2.551	69.4	2.732	105	4.134	104.7	4.122	0.3	.012	4	.157	3
					50	int.	DVAS0150X50S040	●	75.3	2.965	–	–	79.8	3.142	84.4	3.323	120	4.724	119.7	4.713	0.3	.012	4	.157	3
1.6	.0630				2	int.	DVAS0160X02S040	●	3.5	.138	5.1	.201	11.1	.437	9.6	.378	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0160X07S040	●	11.5	.453	13.1	.516	19.2	.756	17.6	.693	57	2.244	56.7	2.232	0.3	.012	4	.157	2
					12	int.	DVAS0160X12S040	●	19.5	.768	21.1	.831	27.2	1.071	25.6	1.008	66	2.598	65.7	2.587	0.3	.012	4	.157	2
					20	int.	DVAS0160X20S040	●	32.3	1.272	–	–	37.1	1.461	41.6	1.638	79	3.110	78.7	3.098	0.3	.012	4	.157	3
					25	int.	DVAS0160X25S040	●	40.3	1.587	–	–	45.1	1.776	49.6	1.953	88	3.465	87.7	3.453	0.3	.012	4	.157	3
					30	int.	DVAS0160X30S040	●	48.3	1.902	–	–	53.1	2.091	57.6	2.268	99	3.898	98.7	3.886	0.3	.012	4	.157	3
					40	int.	DVAS0160X40S040	●	64.3	2.531	–	–	69.1	2.720	73.6	2.898	113	4.449	112.7	4.437	0.3	.012	4	.157	3
1.7	.0669				2	int.	DVAS0170X02S040	●	3.7	.146	5.5	.217	11.6	.457	9.7	.382	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0170X07S040	●	12.2	.480	14	.551	20.1	.791	18.2	.717	57	2.244	56.7	2.232	0.3	.012	4	.157	2
					12	int.	DVAS0170X12S040	●	20.7	.815	22.5	.886	28.6	1.126	26.7	1.051	66	2.598	65.7	2.587	0.3	.012	4	.157	2
					20	int.	DVAS0170X20S040	●	34.3	1.350	–	–	39.4	1.551	43.7	1.720	79	3.110	78.7	3.098	0.3	.012	4	.157	3
					25	int.	DVAS0170X25S040	●	42.8	1.685	–	–	47.9	1.886	52.2	2.055	88	3.465	87.7	3.453	0.3	.012	4	.157	3
					30	int.	DVAS0170X30S040	●	51.3	2.020	–	–	56.4	2.220	60.7	2.390	99	3.898	98.7	3.886	0.3	.012	4	.157	3
					40	int.	DVAS0170X40S040	●	68.3	2.689	–	–	73.4	2.890	77.7	3.059	113	4.449	112.7	4.437	0.3	.012	4	.157	3
1.8	.0709				2	int.	DVAS0180X02S040	●	3.9	.154	5.8	.228	12	.472	9.8	.386	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0180X07S040	●	12.9	.508	14.8	.583	21	.827	18.8	.740	59	2.323	58.7	2.311	0.3	.012	4	.157	2
					12	int.	DVAS0180X12S040	●	21.9	.862	23.8	.937	30	1.181	27.8	1.094	69	2.717	68.7	2.705	0.3	.012	4	.157	2
					20	int.	DVAS0180X20S040	●	36.3	1.429	–	–	41.7	1.642	45.8	1.803	84	3.307	83.7	3.295	0.3	.012	4	.157	3
					25	int.	DVAS0180X25S040	●	45.3	1.783	–	–	50.7	1.996	54.8	2.157	94	3.701	93.7	3.689	0.3	.012	4	.157	3
					30	int.	DVAS0180X30S040	●	54.3	2.138	–	–	59.7	2.350	63.8	2.512	104	4.094	103.7	4.083	0.3	.012	4	.157	3
					40	int.	DVAS0180X40S040	●	72.3	2.846	–	–	77.7	3.059	81.8	3.220	123	4.843	122.7	4.831	0.3	.012	4	.157	3
1.9	.0748				2	int.	DVAS0190X02S040	●	4.1	.161	6.1	.240	12.4	.488	10	.394	50	1.969	49.7	1.957	0.3	.012	4	.157	1
					7	int.	DVAS0190X07S040	●	13.7	.539	15.6	.614	21.9	.862	19.5	.768	59	2.323	58.6	2.307	0.4	.016	4	.157	2
					12	int.	DVAS0190X12S040	●	23.2	.913	25.1	.988	31.4	1.236	29	1.142	69	2.717	68.6	2.701	0.4	.016	4	.157	2
					20	int.	DVAS0190X20S040	●	38.4	1.512	–	–	44.1	1.736	48	1.890	84	3.307	83.6	3.291	0.4	.016	4	.157	3
					25	int.	DVAS0190X25S040	●	47.9	1.886	–	–	53.6	2.110	57.5	2.264	94	3.701	93.6	3.685	0.4	.016	4	.157	3
					30	int.	DVAS0190X30S040	●	57.4	2.260	–	–	63.1	2.484	67	2.638	104	4.094	103.6	4.079	0.4	.016	4	.157	3
					40	int.	DVAS0190X40S040	●	76.4	3.008	–	–	82.1	3.232	86	3.386	123	4.843	122.6	4.827	0.4	.016	4	.157	3
2.0	.0787			#3-48	2	int.	DVAS0200X02S040	●	4.4	.173	6.4	.252	12.9	.508	10.1	.398	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0200X07S040	●	14.4	.567	16.4	.646	22.9	.902	20.1	.791	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0200X12S040	●	24.4	.961	26.4	1.039	32.9	1.295	30.1	1.185	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0200X20S040	●	40.4	1.591	–	–	46.4	1.827	50.1	1.972	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0200X25S040	●	50.4	1.984	–	–	56.4	2.220	60.1	2.366	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0200X30S040	●	60.4	2.378	–	–	66.4	2.614	70.1	2.760	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0200X40S040	●	80.4	3.165	–	–	86.4	3.402	90.1	3.547	136	5.354	135.6	5.339	0.4	.016	4	.157	3
					50	int.	DVAS0200X50S040	●	100.4	3.953	–	–	106.4	4.189	110.1	4.335	158	6.220	157.6	6.205	0.4	.016	4	.157	3
2.1	.0827				2	int.	DVAS0210X02S040	●	4.6	.181	6.7	.264	13.3	.524	10.2	.402	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0210X07S040	●	15.1	.594	17.2	.677	23.8	.937	20.7	.815	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0210X12S040	●	25.6	1.008	27.7	1.091	34.3	1.350	31.2	1.228	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0210X20S040	●	42.4	1.669	–	–	48.7	1.917	52.2	2.055	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0210X25S040	●	52.9	2.083	–	–	59.2	2.331	62.7	2.469	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0210X30S040	●	63.4	2.496	–	–	69.7	2.744	73.2	2.882	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0210X40S040	●	84.4	3.323	–	–	90.7	3.571	94.2	3.709	136	5.354	135.6	5.339	0.4	.016	4	.157	3
2.2	.0866				2	int.	DVAS0220X02S040	●	4.8	.189	7	.276	13.7	.539	10.3	.406	50	1.969	49.6	1.953	0.4	.016	4	.157	1
					7	int.	DVAS0220X07S040	●	15.8	.622	18.1	.713	24.7	.972	21.4	.843	62	2.441	61.6	2.425	0.4	.016	4	.157	2
					12	int.	DVAS0220X12S040	●	26.8	1.055	29.1	1.146	35.7	1.406	32.4	1.276	73	2.874	72.6	2.858	0.4	.016	4	.157	2
					20	int.	DVAS0220X20S040	●	44.4	1.748	–	–	51	2.008	54.4	2.142	91	3.583	90.6	3.567	0.4	.016	4	.157	3
					25	int.	DVAS0220X25S040	●	55.4	2.181	–	–	62	2.441	65.4	2.575	102	4.016	101.6	4.000	0.4	.016	4	.157	3
					30	int.	DVAS0220X30S040	●	66.4	2.614	–	–	73	2.874	76.4	3.008	113	4.449	112.6	4.433	0.4	.016	4	.157	3
					40	int.	DVAS0220X40S040	●	88.4	3.480	–	–	95	3.740	98.4	3.874	136	5.354	135.6	5.339	0.4	.016	4	.157	3
2.3	.0906				2	int.	DVAS0230X02S040	●	5	.197	7.4	.291	14.1	.555	10.5	.413	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0230X07S040	●	16.5	.650	18.9	.744	25.7	1.012	22	.866	65	2.559	64.6	2.543	0.4	.016	4	.157	2
					12	int.	DVAS0230X12S040	●	28	1.102	30.4	1.197	37.2	1.465	33.5	1.319	78	3.071	77.6	3.055	0.4	.016	4	.157	2
					20	int.	DVAS0230X20S040	●	46.4	1.827	–	–	53.3	2.098	56.5	2.224	98	3.858	97.6	3.843	0.4	.016	4	.157	3
					25	int.	DVAS0230X25S040	●	57.9	2.280	–	–	64.8	2.551	68	2.677	111	4.370	110.6	4.354	0.4	.016	4	.157	3
					30	int.	DVAS0230X30S040	●	69.4	2.732	–	–	76.3	3.004	79.5	3.130	124	4.882	123.6	4.866	0.4	.016	4	.157	3
					40	int.	DVAS0230X40S040	●	92.4	3.638	–	–	99.3	3.909	102.5	4.035	150	5.906	149.6	5.890	0.4	.016	4	.157	3
2.4	.0945				2	int.	DVAS0240X02S040	●	5.2	.205	7.7	.303	14.6	.575	10.6	.417	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0240X07S040	●	17.2	.677	19.7	.776	26.6	1.047	22.6	.890	65	2.559	64.6	2.543	0.4	.016	4	.157	2
					12	int.	DVAS0240X12S040	●	29.2	1.150	31.7	1.248	38.6	1.520	34.6	1.362	78	3.071	77.6	3.055	0.4	.016	4	.157	2
					20	int.	DVAS0240X20S040	●	48.4	1.906	–	–	55.6	2.189	58.6	2.307	98	3.858	97.6	3.843	0.4	.016	4	.157	3
					25	int.	DVAS0240X25S040	●	60.4	2.378	–	–	67.6	2.661	70.6	2.780	111	4.370	110.6	4.354	0.4	.016	4	.157	3
					30	int.	DVAS0240X30S040	●	72.4	2.850	–	–	79.6	3.134	82.6	3.252	124	4.882	123.6	4.866	0.4	.016	4	.157	3
					40	int.	DVAS0240X40S040	●	96.4	3.795	–	–	103.6	4.079	106.6	4.197	150	5.906	149.6	5.890	0.4	.016	4	.157	3
2.5	.0984				2	int.	DVAS0250X02S040	●	5.5	.217	8	.315	15	.591	10.7	.421	55	2.165	54.6	2.150	0.4	.016	4	.157	1
					7	int.	DVAS0250X07S040	●	18	.709	20.5	.807	27.5	1.083	23.3	.917	65	2.559	64.5	2.539	0.5	.020	4	.157	2
					12	int.	DVAS0250X12S040	●	30.5	1.201	33	1.299	40	1.575	35.8	1.409	78	3.071	77.5	3.051	0.5	.020	4	.157	2
					20	int.	DVAS0250X20S040	●	50.5	1.988	–	–	58	2.283	60.8	2.394	98	3.858	97.5	3.839	0.5	.020	4	.157	3
					25	int.	DVAS0250X25S040	●	63	2.480	–	–	70.5	2.776	73.3	2.886	111	4.370	110.5	4.350	0.5	.020	4	.157	3
					30	int.	DVAS0250X30S040	●	75.5	2.972	–	–	83	3.268	85.8	3.378	124	4.882	123.5	4.862	0.5	.020	4	.157	3
					40	int.	DVAS0250X40S040	●	100.5	3.957	–	–	108	4.252	110.8	4.362	150	5.906	149.5	5.886	0.5	.020	4	.157	3
					50	int.	DVAS0250X50S040	●	125.5	4.941	–	–	133	5.236	135.8	5.346	176	6.929	175.5	6.909	0.5	.020	4	.157	3

● : USA Stock

DC = Cutting Diameter
LU = Usable Length
LUX = Max Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

DVAS Mini Size NEW

TRISTAR Drills

DC Metric (mm)	DC Decimal (inch)	DC Fraction (inch)	Wire / Letter	Thread Size	L/D	Coolant (Int./Ext.)	Order Number	Stock DP1120	LU mm	LU inch	LUX mm	LUX inch	LCF mm	LCF inch	LH mm	LH inch	OAL mm	OAL inch	LF mm	LF inch	PL mm	PL inch	DCON mm	DCON inch	Type
2.6	.1024				2	int.	DVAS0260X02S040	●	5.7	.224	8.3	.327	15.4	.606	10.9	.429	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0260X07S040	●	18.7	.736	21.3	.839	28.4	1.118	23.9	.941	65	2.559	64.5	2.539	0.5	.020	4	.157	2
					12	int.	DVAS0260X12S040	●	31.7	1.248	34.3	1.350	41.4	1.630	36.9	1.453	78	3.071	77.5	3.051	0.5	.020	4	.157	2
					20	int.	DVAS0260X20S040	●	52.5	2.067	—	—	60.3	2.374	62.9	2.476	98	3.858	97.5	3.839	0.5	.020	4	.157	3
					25	int.	DVAS0260X25S040	●	65.5	2.579	—	—	73.3	2.886	75.9	2.988	111	4.370	110.5	4.350	0.5	.020	4	.157	3
					30	int.	DVAS0260X30S040	●	78.5	3.091	—	—	86.3	3.398	88.9	3.500	124	4.882	123.5	4.862	0.5	.020	4	.157	3
					40	int.	DVAS0260X40S040	●	104.5	4.114	—	—	112.3	4.421	114.9	4.524	150	5.906	149.5	5.886	0.5	.020	4	.157	3
2.7	.1063		36	#6-32	2	int.	DVAS0270X02S040	●	5.9	.232	8.6	.339	15.8	.622	11	.433	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0270X07S040	●	19.4	.764	22.2	.874	29.4	1.157	24.5	.965	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0270X12S040	●	32.9	1.295	35.7	1.406	42.9	1.689	38	1.496	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0270X20S040	●	54.5	2.146	—	—	62.6	2.465	65	2.559	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0270X25S040	●	68	2.677	—	—	76.1	2.996	78.5	3.091	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0270X30S040	●	81.5	3.209	—	—	89.6	3.528	92	3.622	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0270X40S040	●	108.5	4.272	—	—	116.6	4.591	119	4.685	167	6.575	166.5	6.555	0.5	.020	4	.157	3
2.8	.1102		35		2	int.	DVAS0280X02S040	●	6.1	.240	8.9	.350	16.3	.642	11.1	.437	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0280X07S040	●	20.1	.791	23	.906	30.3	1.193	25.2	.992	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0280X12S040	●	34.1	1.343	37	1.457	44.3	1.744	39.2	1.543	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0280X20S040	●	56.5	2.224	—	—	64.9	2.555	67.2	2.646	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0280X25S040	●	70.5	2.776	—	—	78.9	3.106	81.2	3.197	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0280X30S040	●	84.5	3.327	—	—	92.9	3.657	95.2	3.748	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0280X40S040	●	112.5	4.429	—	—	120.9	4.760	123.2	4.850	167	6.575	166.5	6.555	0.5	.020	4	.157	3
2.9	.1142				2	int.	DVAS0290X02S040	●	6.3	.248	9.3	.366	16.7	.657	11.3	.445	55	2.165	54.5	2.146	0.5	.020	4	.157	1
					7	int.	DVAS0290X07S040	●	20.8	.819	23.8	.937	31.2	1.228	25.8	1.016	68	2.677	67.5	2.657	0.5	.020	4	.157	2
					12	int.	DVAS0290X12S040	●	35.3	1.390	38.3	1.508	45.7	1.799	40.3	1.587	83	3.268	82.5	3.248	0.5	.020	4	.157	2
					20	int.	DVAS0290X20S040	●	58.5	2.303	—	—	67.2	2.646	69.3	2.728	107	4.213	106.5	4.193	0.5	.020	4	.157	3
					25	int.	DVAS0290X25S040	●	73	2.874	—	—	81.7	3.217	83.8	3.299	122	4.803	121.5	4.783	0.5	.020	4	.157	3
					30	int.	DVAS0290X30S040	●	87.5	3.445	—	—	96.2	3.787	98.3	3.870	137	5.394	136.5	5.374	0.5	.020	4	.157	3
					40	int.	DVAS0290X40S040	●	116.5	4.587	—	—	125.2	4.929	127.3	5.012	167	6.575	166.5	6.555	0.5	.020	4	.157	3

DC = Cutting Diameter
LU = Usable Length
LUX = Max Usable Length
LCF = Length Chip Flute
LH = Neck Length
OAL = Overall Length
LF = Functional Length
PL = Point Length
DCON = Connection Diameter

● : USA Stock

Recommended Cutting Conditions

(inch)

Work piece Material	DC mm	DC inch	Hole Depth L/D	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)
				Mild Steels Carbon Steels, Alloy Steels AISI 1010, 1045, 4140 etc		Austenitic Stainless Steels, Ferritic Stainless Steels Ferritic and Martensitic Stainless Steels Precipitation Hardening Stainless Steels AISI 304, 316, 410 etc.	
	1.0	.0394	2–30	210(100—330)	.0014(.0008—.0020)	195(65—330)	.0010(.0004—.0016)
	1.0	.0394	40, 50	210(100—330)	.0012(.0008—.0016)	195(65—330)	.0008(.0004—.0012)
	1.5	.0591	2–30	210(100—330)	.0021(.0012—.0030)	195(65—330)	.0015(.0006—.0024)
	1.5	.0591	40, 50	210(100—330)	.0018(.0012—.0024)	195(65—330)	.0012(.0006—.0018)
	2.0	.0787	2–30	230(130—330)	.0028(.0016—.0039)	195(65—330)	.0020(.0008—.0031)
	2.0	.0787	40, 50	230(130—330)	.0024(.0016—.0031)	195(65—330)	.0016(.0008—.0024)
	2.5	.0984	2–30	230(130—330)	.0035(.0020—.0049)	195(65—330)	.0025(.0010—.0039)
	2.5	.0984	40, 50	230(130—330)	.0030(.0020—.0039)	195(65—330)	.0020(.0010—.0030)
	2.9	.1142	2–30	230(130—330)	.0040(.0023—.0057)	195(65—330)	.0029(.0011—.0046)
	2.9	.1142	40, 50	230(130—330)	.0034(.0023—.0046)	195(65—330)	.0023(.0011—.0034)

Work piece Material	DC mm	DC inch	Hole Depth L/D	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)
				Cast Irons Ductile Cast Irons AISI No 45B, 60-60-8 etc		Aluminum Alloys ASTM 6061, 7075 etc.	
	1.0	.0394	2–30	230(130—330)	.0014(.0008—.0020)	460(330—590)	.0016(.0008—.0024)
	1.0	.0394	40, 50	230(130—330)	.0012(.0008—.0016)	460(330—590)	.0014(.0008—.0020)
	1.5	.0591	2–30	230(130—330)	.0021(.0012—.0030)	460(330—590)	.0024(.0012—.0035)
	1.5	.0591	40, 50	230(130—330)	.0018(.0012—.0024)	460(330—590)	.0021(.0012—.0030)
	2.0	.0787	2–30	230(130—330)	.0028(.0016—.0039)	460(330—590)	.0031(.0016—.0047)
	2.0	.0787	40, 50	230(130—330)	.0024(.0016—.0031)	460(330—590)	.0028(.0016—.0039)
	2.5	.0984	2–30	230(130—330)	.0035(.0020—.0049)	460(330—590)	.0039(.0020—.0059)
	2.5	.0984	40, 50	230(130—330)	.0030(.0020—.0039)	460(330—590)	.0035(.0020—.0049)
	2.9	.1142	2–30	230(130—330)	.0040(.0023—.0057)	460(330—590)	.0046(.0023—.0069)
	2.9	.1142	40, 50	230(130—330)	.0034(.0023—.0046)	460(330—590)	.0040(.0023—.0057)

Work piece Material	DC mm	DC inch	Hole Depth L/D	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)
				Heat Resistant Alloys Inconel718 etc		Titanium Alloys Ti-6Al-4V etc.	
	1.0	.0394	2–30	100(30—165)	.0006(.0004—.0008)	100(65—130)	.0008(.0004—.0012)
	1.0	.0394	40, 50	100(30—165)	.0006(.0004—.0008)	100(65—130)	.0008(.0004—.0012)
	1.5	.0591	2–30	100(30—165)	.0009(.0006—.0012)	100(65—130)	.0012(.0006—.0018)
	1.5	.0591	40, 50	100(30—165)	.0009(.0006—.0012)	100(65—130)	.0012(.0006—.0018)
	2.0	.0787	2–30	100(30—165)	.0012(.0008—.0016)	100(65—130)	.0016(.0008—.0024)
	2.0	.0787	40, 50	100(30—165)	.0012(.0008—.0016)	100(65—130)	.0016(.0008—.0024)
	2.5	.0984	2–30	100(30—165)	.0015(.0010—.0020)	100(65—130)	.0020(.0010—.0030)
	2.5	.0984	40, 50	100(30—165)	.0015(.0010—.0020)	100(65—130)	.0020(.0010—.0030)
	2.9	.1142	2–30	100(30—165)	.0017(.0011—.0023)	100(65—130)	.0023(.0011—.0034)
	2.9	.1142	40, 50	100(30—165)	.0017(.0011—.0023)	100(65—130)	.0023(.0011—.0034)

Work piece Material	DC mm	DC inch	Hole Depth L/D	Cutting Speed vc (Min.—Max.) (SFM)	Feed fr (Min.—Max.) (IPR)
				Cobalt Chrome Alloys ASTM F1537, F799 etc	
	1.0	.0394	2–30	195(100—295)	.0008(.0004—.0012)
	1.0	.0394	40, 50	195(100—295)	.0008(.0004—.0012)
	1.5	.0591	2–30	195(100—295)	.0012(.0006—.0018)
	1.5	.0591	40, 50	195(100—295)	.0012(.0006—.0018)
	2.0	.0787	2–30	195(100—295)	.0016(.0008—.0024)
	2.0	.0787	40, 50	195(100—295)	.0016(.0008—.0024)
	2.5	.0984	2–30	195(100—295)	.0020(.0010—.0030)
	2.5	.0984	40, 50	195(100—295)	.0020(.0010—.0030)
	2.9	.1142	2–30	195(100—295)	.0023(.0011—.0034)
	2.9	.1142	40, 50	195(100—295)	.0023(.0011—.0034)

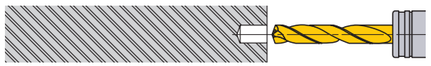
Note 1) This recommended condition is only when using internal coolant.
Note 2) Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
Note 3) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 4) Machining depths exceeding flute length (LU) are not recommend.
Note 5) Clamp the drill so that the drill runout is within .00012 inch.
Note 6) Do not clamp the flute part of the drill.

Operational Guidance

■ Operational Guidance for the DVAS L/D=2–40

Flat Face Drilling ●Drilling a Blind Hole

1. Drilling a Pilot Hole

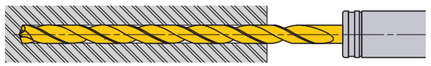


①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
A DVAS drill with L/D = 2 can be machined up to L/D = 3 when drilling pilot holes
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×3.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial Cutting with the Long Type Drill

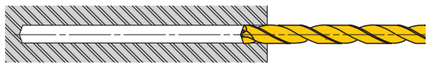
①Penetrate the guide hole at low revolution. (Revolution 500—1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill .039- .118 inch short of the guide hole bottom.

3. Drill the Deep Hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) type.

4. Drill Retraction



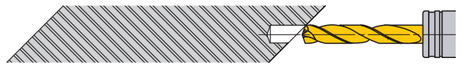
①After drilling, lower the cutting revolution about 0.5—1mm short of the hole end. (Revolution of around 500—1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.
③Finally, clear the hole at a cutting speed of 65 - 100 SFM and feed rate of .0079 - .0118 IPR.

Interruped Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

1. Spot Facing

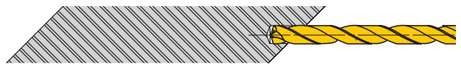
①Machine a flat or the irregular face by using an end mill or slot drill capable of pilot facing. Make the pilot face diameter the same size as the required deep hole diameter.

2. Drilling a Pilot Hole



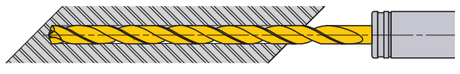
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×2.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial Cutting with the Long Type Drill



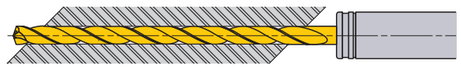
①Penetrate the guide hole at a low revolution. (Revolution 500—1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill .0197 - .0394 inch short of the guide hole bottom.

4. Drill the Deep Hole



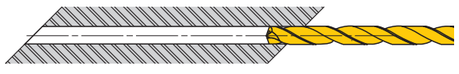
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) type.

5. Breaking Through



①When breaking through, the cutting edge can be damaged.
②Lower the feed rate when penetrating.

6. Drill Retraction

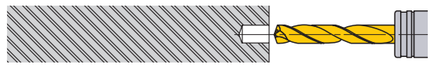


①Finally clear the hole at a feed rate of .0079 - .0118 IPR. (Revolution of around 500—1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.

■ Operational Guidance for the DVAS L/D=50

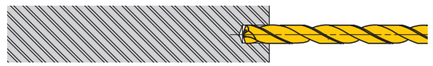
Flat Face Drilling ●Drilling a Blind Hole

1. Drilling a Pilot Hole



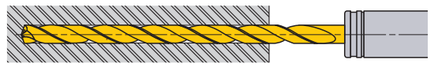
①Use a drill with a larger (flatter) point angle than the super long type. Use a DVAS drill with L/D = 7.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial Cutting with the Long Type Drill



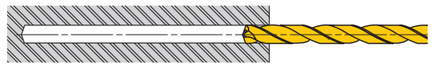
①Penetrate the guide hole at low revolution. (Revolution 500—1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill 1—3mm short of the guide hole bottom.

3. Drill the Deep Hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) type.

4. Drill Retraction



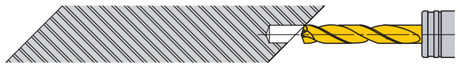
①After drilling, lower the cutting revolution about .0197 - .0394 inch short of the hole end. (Revolution of around 500—1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.
③Finally, clear the hole at a cutting speed of 65 - 100 SFM and feed rate of .0079 - .0118 IPR.

Interruped Drilling ●Drilling and Breaking Through on Irregular Faces or Angles

1. Spot Facing

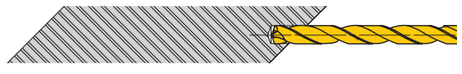
①Machine a flat or the irregular face by using an end mill or slot drill capable of pilot facing. Make the pilot face diameter the same size as the required deep hole diameter.

2. Drilling a Pilot Hole



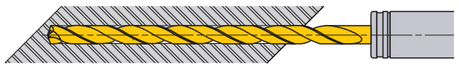
①Use a drill with a larger (flatter) point angle than the super long type. Use a DVAS drill with L/D = 7.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial Cutting with the Long Type Drill



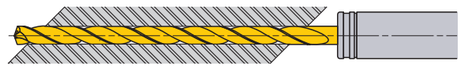
①Penetrate the guide hole at a low revolution. (Revolution 500—1000min^{-1}, feed rate 39.37 - 78.74 IPM)
②Stop the long type drill 0.5—1mm short of the guide hole bottom.

4. Drill the Deep Hole



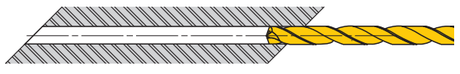
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) type.

5. Breaking Through



①When breaking through, the cutting edge can be damaged.
②Lower the feed rate when penetrating.

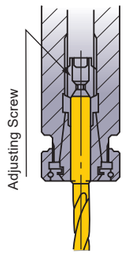
6. Drill Retraction



①Finally clear the hole at a feed rate of .0079 - .0118 IPR. (Revolution of around 500—1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 39.37 - 78.74 IPM.

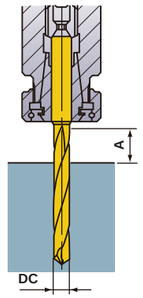
■ Operational Guidance

Drill Holding



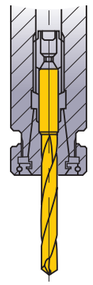
Thrust bearing type collet chuck holds the drill securely.

Drill Length



A ≥ DC x 2

Drill Installation



NG

Do not clamp on the flutes.

Coolant Pressure

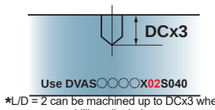
Adjust the coolant pressure according to the type and concentration of coolant.

Drill Dia. **DC**	Water-soluble	Water-insoluble
DC<.0787"	≥ 3MPa	≥ 7MPa
DC<.1181"	≥ 2MPa	≥ 5MPa

Pilot Drill

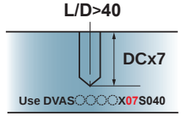
For deep hole drilling, refer to the figure below.

L/D≤40



*L/D = 2 can be machined up to DCx3 when drilling pilot holes.

L/D>40

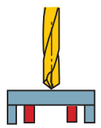


Coolant Handling

Small particles of swarf will jam in the oil hole of small diameter drills.
Always use a fine mesh filter as a preventive measure.

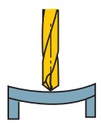
Drill Dia. **DC**	Fine Mesh Filter
DC<.0787"	≤ .394 μ-inch
DC<.1181"	≤ .787 μ-inch

Thin Workpiece



Support the Workpiece

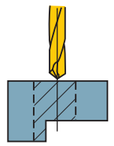
OK



If Bending Occurs

NG

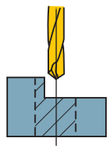
Interrupted Cutting



One Process

OK

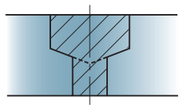
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

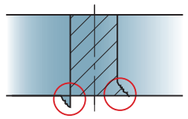
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
*A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

Tips for drilling a deep hole exceeding L/D = 40

Workpiece rotation method: small lathes, automatic lathes, etc.

(1) Face countersink (DLE drill is recommended)

(2) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)

(3) Drill the deep hole using DVAS○○○○X50S040.

Tool rotation method: Machining centres, composite machines, etc.

(1) Drill the guide hole to a depth of approx. 3D (DVAS drill is recommended)

(2) Drill the guide hole deeper to a approx. 7D
If more stability is required, drill a guide hole deeper than 7D.

(3) Drill the deep hole using DVAS○○○○X50S040.

Cutting Example

Comparison of Drilling Efficiency on Automatic Lathe

Drilling efficiency is 10 times higher compared to gun drills.
It provides highly efficient and stable machining even with alloy steels and stainless steels.

Drilling for AISI 4135

General Cutting Conditions for Gun Drills

<Cutting Conditions>
Tool : DC=ø.0787 inch , L/D=50
Cutting Speed : vc = 165 SFM
Feed per Rev. : fr= .0003 IPR
Hole Depth : 3.937 inch
Cutting Mode : Wet Cutting, Oil, 15MPa

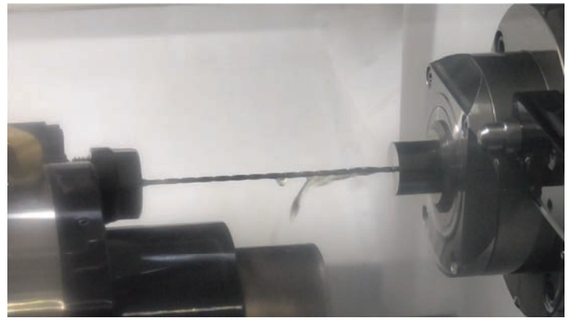
Cutting Time 107.8 sec./hole

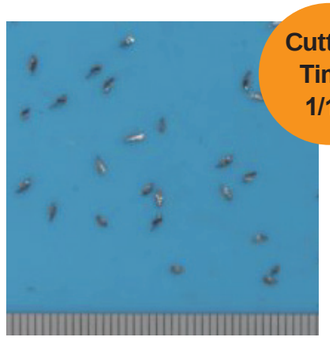
DVAS Cutting Conditions

<Cutting Conditions>
Tool : DC=ø.0787 inch , L/D=50
Cutting Speed : vc 165 SFM
Feed per Rev. : fr= .0028 IPR
Hole Depth : 3.937 inch
Cutting Mode : Wet Cutting, Oil, 15MPa

Cutting Time 10.8 sec./hole

DVAS Drill Turning Video





YouTube

Drilling for AISI 304

General Cutting Conditions for Gun Drills

<Cutting Conditions>
Tool : DC=ø.0787 inch , L/D=50
Cutting Speed : vc 130 SFM
Feed per Rev. : fr= .0002 IPR
Hole Depth : 3.937 inch
Cutting Mode : Wet Cutting, Oil, 15MPa

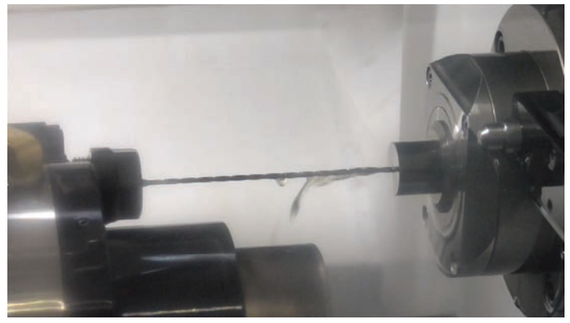
Cutting Time 188.4 sec./hole

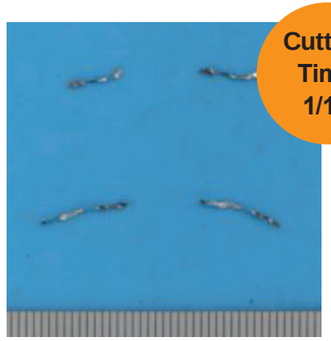
DVAS Cutting Conditions

<Cutting Conditions>
Tool : DC=ø.0787 inch , L/D=50
Cutting Speed : vc 130 SFM
Feed per Rev. : fr= .0020 IPR
Hole Depth : 3.937 inch
Cutting Mode : Wet Cutting, Oil, 15MPa

Cutting Time 18.8 sec./hole

DVAS Drill Turning Video





YouTube

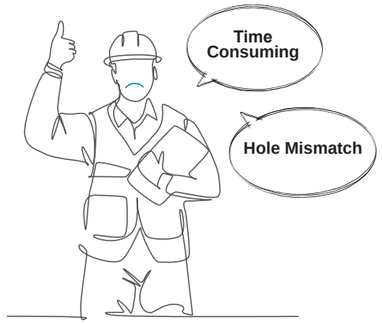
Example of Improved Drilling Efficiency on Automatic Lathe

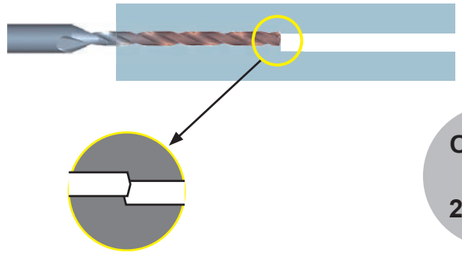
DVAS significantly reduces cycle times and ensures consistent drilling.

Drilling process of Both ends machining

First step: One side drilled with blind hole.

Second step: Workpiece is inverted for a through hole.





Hole mismatch is likely to occur.

Cutting Time 20 min.

Drilling Process with DVAS drill

First step: Drilling a through hole from one side at a time.

Cutting Time is About 1 Minute

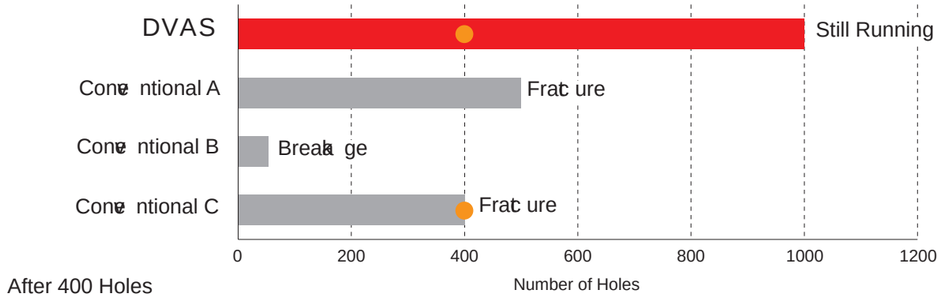
DVAS

<Cutting Conditions>
Workpiece Material : AISI 1045
Tool : .0984 inch , L/D=50
Cutting Speed : vc 230 SFM
Feed per Rev. : fr= .0035 - .0047 IPR
Hole Depth : 4.606 inch
Cutting Mode : Wet Cutting, Oil, 7MPa

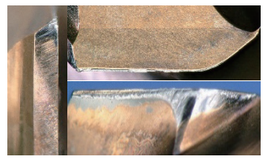
Cutting Performance

AISI 4140 Comparison of Fracture Resistance

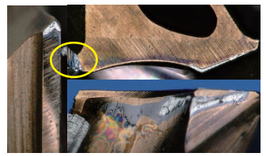
DVAS has excellent fracture resistance and double tool life compared to conventional products



After 400 Holes



DVAS

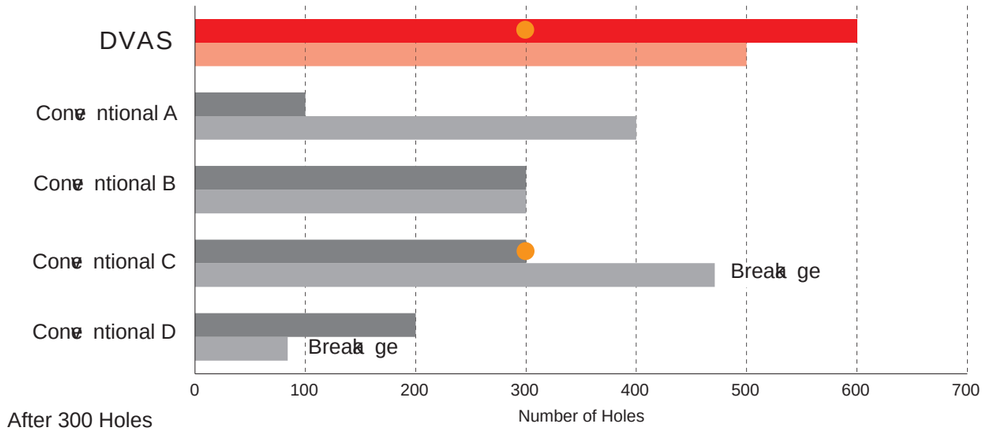


Conventional C

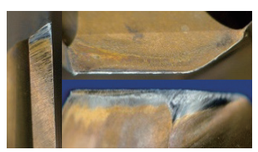
<Cutting Conditions>
Work piece Material : AISI 4140
Tool : DC=ø.0787 inch , L/D=20
Cutting Speed : vc 165 SFM
Feed per Rev. : fr= .0024 IPR
Hole Depth : 1.575 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa
Pilot Drills : DC=ø.0787 inch , L/D=2
Hole Depth .157 inch /holes

AISI 4140 Comparison of Fracture Resistance in High-efficiency Cutting

DVAS drill is highly stable even under high-efficiency cutting conditions.



After 300 Holes



DVAS

Conventional C

<Cutting Conditions>
Work piece Material : AISI 4140
Tool : DC=ø.0787 inch , L/D=20
Cutting Speed : vc 230 SFM
Feed per Rev. : fr= .0024 IPR
Hole Depth : 1.575 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants, 2MPa
Pilot Drills : DC=ø.0787 inch , L/D=2
Hole Depth .157 inch /holes

AISI 304 Comparison of Welding Resistance and Chip Disposal under High-efficiency Cutting

It achieves excellent welding resistance and chip control for drilling stainless steels.

After 1200 Holes

DVAS

Conventional A

Continuous Chips is Mix

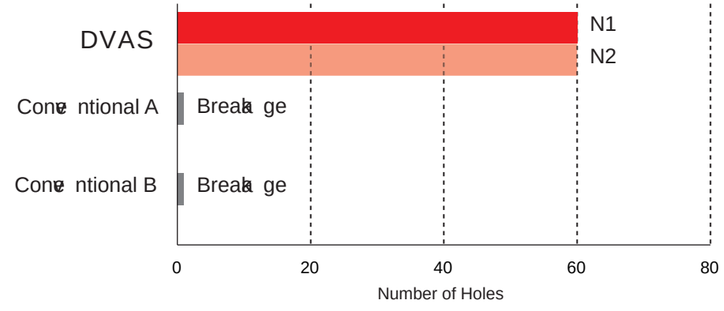
Conventional B

Continuous Chips

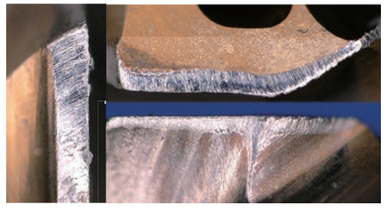
<Cutting Conditions>
Work piece Material : AISI 304
Tool : Pilot Drill
DC=ø.0787 inch , L/D=2
Hole Depth .157 inch
Long Drill
DC=ø.0787 inch , L/D=20
Hole Depth 1.575 inch
Cutting Speed : vc 165 SFM
Feed per Rev. : fr= .0024 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants
2MPa

Inconel718 Comparison of Breakage Resistance

Increased coolant discharge rate achieves stable machining of heat-resistant alloys as compared to conventional products



After 60 Holes



DVAS

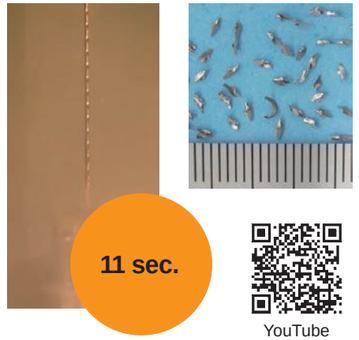
<Cutting Conditions>
Work piece Material : Inconel718
Tool : Pilot Drill
DC=ø.0787 inch , L/D=2
Hole Depth .157 inch
Long Drill
DC=ø.0787 inch , L/D=12
Hole Depth .787 inch
Cutting Speed : vc 100 SFM
Feed per Rev. : fr= .0012 IPR
Hole Depth : .787 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants
2MPa

Cutting Performance

AISI 304 L/D =50 High-efficiency Cutting Example

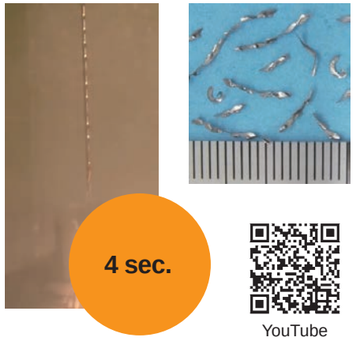
Achieves excellent chip disposal and high efficiency in deep hole drilling of stainless steels.

Cutting Speed : vc= 195 SFM
Feed per Rev. : fr= .0020 IPR



YouTube

Cutting Speed : vc= 330 SFM
Feed per Rev. : fr= .0031 IPR

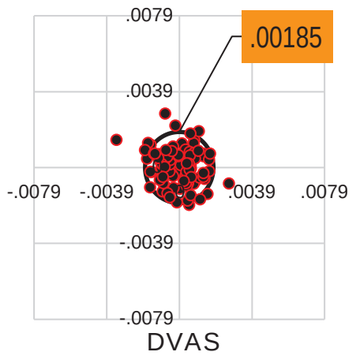


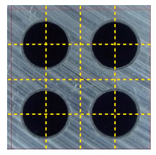
YouTube

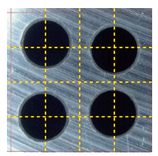
<Cutting Conditions>
Work piece Material : AISI 304
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .236 inch
Short Drill
DC=ø.0787 inch, L/D=7
Hole Depth .551 inch
Long Drill
DC=ø.0787 inch, L/D=12
Hole Depth 3.937 inch
Cutting Mode : Wet Cutting
Water-soluble Coolants
7Mpa

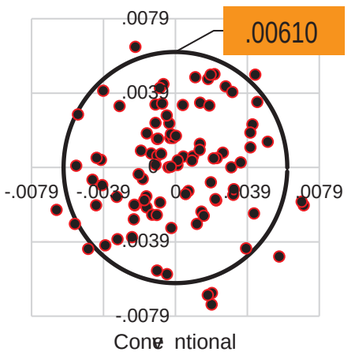
AISI 4140 L/D=40 Comparison of True Straightness

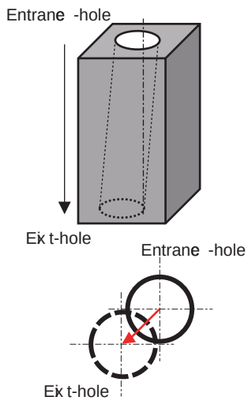
Hole wandering is greatly reduced when compared to conventional products.











<Cutting Conditions>
Work piece Material : AISI 4140
Tool : Pilot Drill
DC=ø.0787 inch, L/D=2
Hole Depth .236 inch
Long Drill
DC=ø.0787 inch, L/D= 40
Hole Depth 3.150 inch
Feed per Rev.: fr= .0028 IPR
Cutting Mode : Wet Cutting
Water-soluble Coolants, 7Mpa

Memo

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- **Basic Turning**
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- **Advanced End Milling**
- **Advanced Turning**
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- **Advanced Face Milling**
- **Basic Workpiece Materials**
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For Your Safety

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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B267A-US-2021.8