
DSAS

SOLID CARBIDE DRILLS FOR HRSA MATERIALS



DSAS

APPLICATION

Successful drilling in aerospace applications where HRSA materials are related to the following important criteria:

- **Reliability**
- **Stable processing**
- **Hole quality**
- **Dimensional stability**

DSAS carbide drills are able to meet customer requirements, to reach high quality holes in HRSA materials such as Cobalt Chrome, Inconel, Nickel & Titanium alloys.

DSAS drills can be used for drilling jet engine, gas turbine, rocket, aircraft and furnace parts.



FEATURES

DP9020 GRADE FOR MACHINING HEAT RESISTANT ALLOYS

Tough carbide grade provides high wear and fracture resistance, resulting in extended tool life.

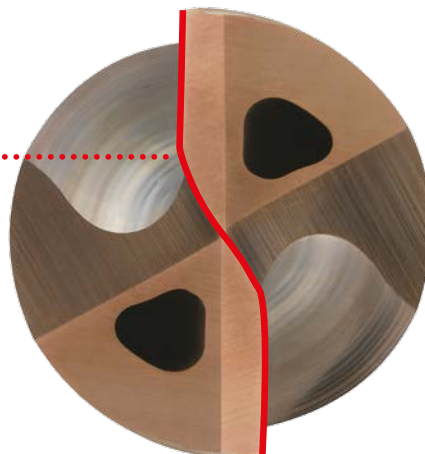


..... **SPECIAL MARGIN**

The thin margin reduces the contact area and avoids the generation of work hardened layers when machining heat resistant alloys.

..... **STRAIGHT CUTTING EDGE WITH DEDICATED HONING**

The tough straight cutting edge with a dedicated honing provides stable chip formation and prevents chipping at the cutting edge.



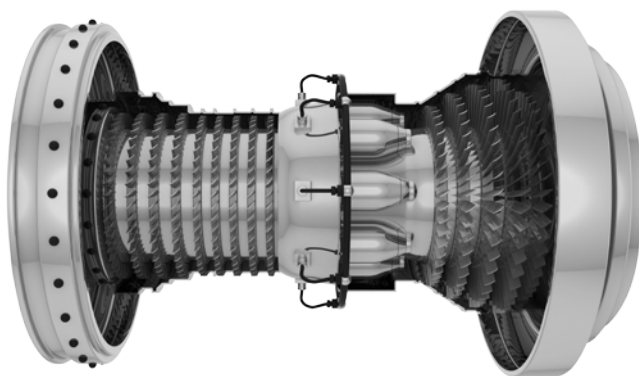
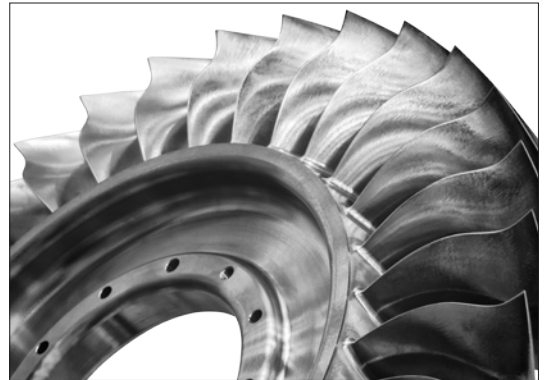
ADVANTAGES

CONSTANT HOLE QUALITY


HIGH REPEATABILITY

PROCESS SECURITY

DRILLING ACCURACY



PRODUCT RANGE

DRILL	DC	L/D	SHANK GEOMETRY	S	
DSAS	Ø 3 mm – 12 mm	3	DIN6535HA	©	✓

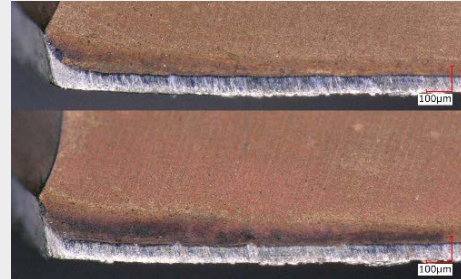
1. Inch diameters are available



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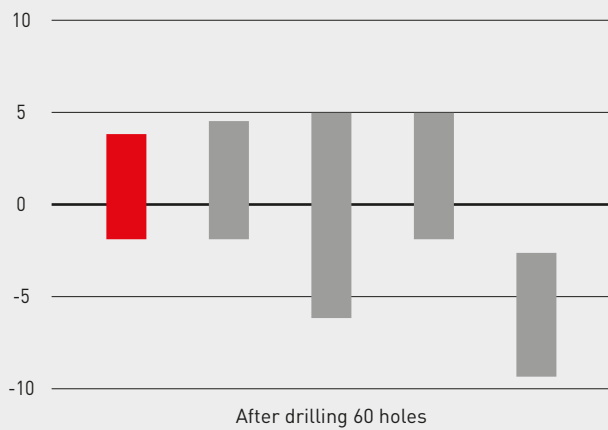
PERFORMANCE COMPARISON

Material	Inconel718
Tool	DSAS0700X03S080
ap (mm)	12
Cutting speed Vc (m/min)	15
Feed rate fr (mm/rev)	0.10
Coolant	Emulsion (10%), Internal coolant
Machine	Vertical MC

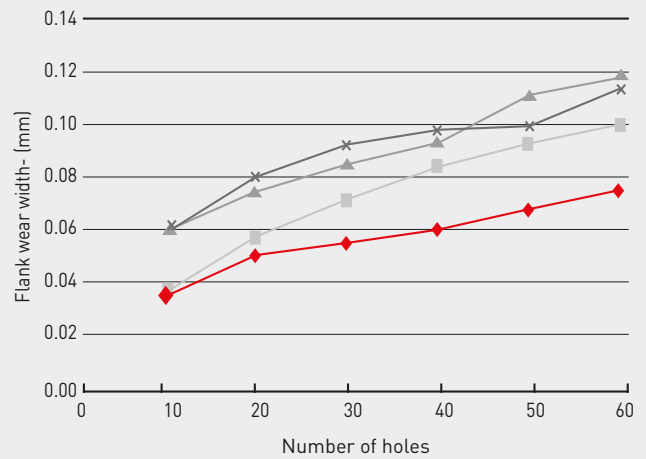


Flank wear width after drilling 60 holes

Ø HOLE OVERSIZE (µm)

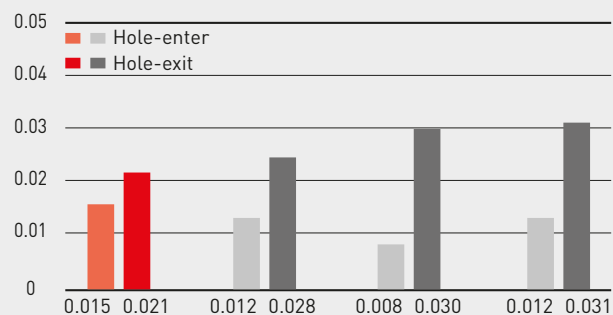


TOOL LIFE

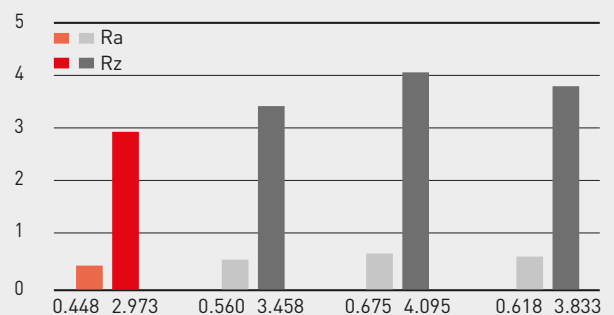


Material	Inconel718
Tool	DSAS0700X03S080
ap (mm)	10
Cutting speed Vc (m/min)	15
Feed rate fr (mm/rev)	0.10
Coolant	Emulsion (10%), Internal coolant
Machine	Vertical MC

ROUNDNESS



WALL SURFACE ROUGHNESS (µm)



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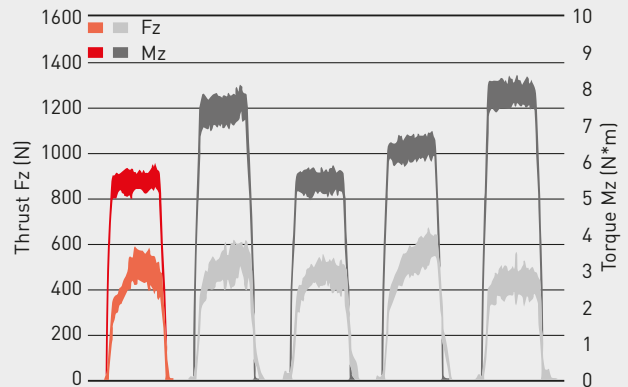
CUTTING FORCE COMPARISON

SHARP CUTTING EDGES, LOW THRUST FORCE

Due to the sharper cutting edges the DSAS drill had lower thrust force when drilling titanium when compared to conventional products.

Material	Titanium alloy (Ti-6Al-4V)
Tool	DSAS0700X03S080
ap (mm)	10
Cutting speed Vc (m/min)	40
Feed rate fr (mm/rev)	0.15
Coolant	Emulsion (10%), Internal coolant
Machine	Vertical MC

Fz = Thrust force
Mz = Thorque Moment

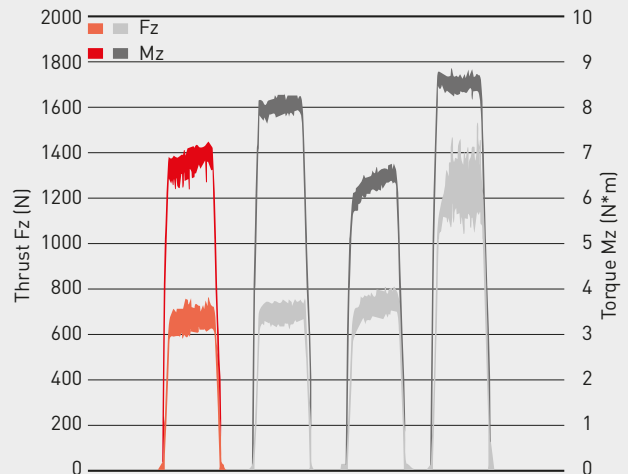


LOW CUTTING FORCE, HIGH QUALITY

The cutting resistance companion was carried out when machining RENE 41. Compared to conventional products, DSAS maintained the lowest cutting force.

Material	RENE41
Tool	DSAS0700X03S080
ap (mm)	10
Cutting speed Vc (m/min)	15
Feed rate fr (mm/rev)	0.10
Coolant	Emulsion (10%), Internal coolant
Machine	Vertical MC

Fz = Thrust force
Mz = Thorque Moment



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SOLID CARBIDE DRILL WITH INTERNAL COOLANT

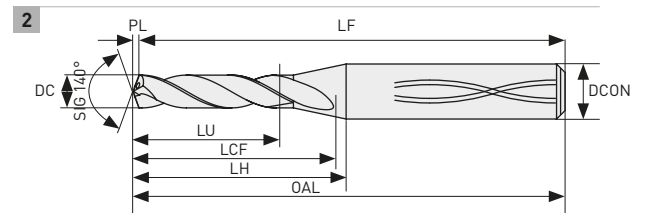
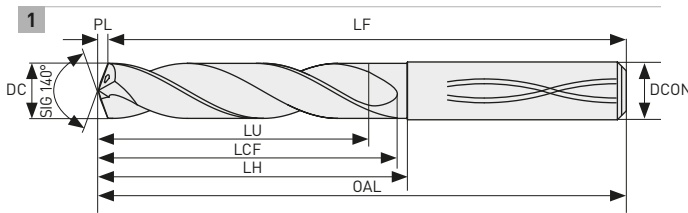
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DC=3	3<DC≤6	6<DC≤10	10<DC≤12
0	0	0	0
-0.018	-0.018	-0.022	-0.027



DC=3	3<DC≤6	6<DC≤10	10<DC≤12
0	0	0	0
-0.008	-0.008	-0.009	-0.011



Order Number	Grade	DC	L/D	OAL	LU	LCF	LH	LF	PL	DCON	Stock	Type
DSAS0300X03S060	DP9020	3	3	70.5	9.5	21.5	23.5	70	0.5	6	●	1
DSAS0318X03S060	DP9020	3.18	3	70.6	10.1	21.6	23.6	70	0.6	6	●	1
DSAS0330X03S060	DP9020	3.3	3	70.6	10.5	21.6	23.6	70	0.6	6	●	1
DSAS0340X03S060	DP9020	3.4	3	70.6	10.8	21.6	23.6	70	0.6	6	●	1
DSAS0350X03S060	DP9020	3.5	3	70.6	11.1	21.6	23.6	70	0.6	6	●	1
DSAS0357X03S060	DP9020	3.57	3	70.7	11.4	22.7	23.7	70	0.7	6	●	1
DSAS0397X03S060	DP9020	3.97	3	70.7	12.6	22.7	23.7	70	0.7	6	●	1
DSAS0400X03S060	DP9020	4	3	70.7	12.7	22.7	23.7	70	0.7	6	●	1
DSAS0410X03S060	DP9020	4.1	3	73.7	13	24.7	26.7	73	0.7	6	●	1
DSAS0430X03S060	DP9020	4.3	3	73.8	13.7	24.8	26.8	73	0.8	6	●	1
DSAS0437X03S060	DP9020	4.37	3	73.8	13.9	24.8	26.8	73	0.8	6	●	1
DSAS0450X03S060	DP9020	4.5	3	73.8	14.3	24.8	26.8	73	0.8	6	●	1
DSAS0470X03S060	DP9020	4.7	3	75.9	15	25.9	28.9	75	0.9	6	●	2
DSAS0476X03S060	DP9020	4.76	3	75.9	15.2	25.9	28.9	75	0.9	6	●	2
DSAS0500X03S060	DP9020	5	3	81.9	15.9	28.9	29.9	81	0.9	6	●	2
DSAS0510X03S060	DP9020	5.1	3	81.9	16.2	28.9	29.9	81	0.9	6	●	2
DSAS0516X03S060	DP9020	5.16	3	82	16.5	29	30	81	1	6	●	2
DSAS0540X03S060	DP9020	5.4	3	82	17.2	29	30	81	1	6	●	2
DSAS0550X03S060	DP9020	5.5	3	82	17.5	29	30	81	1	6	●	2
DSAS0556X03S060	DP9020	5.56	3	82.1	17.8	31.1	31.1	81	1.1	6	●	2
DSAS0560X03S060	DP9020	5.6	3	82.1	17.9	31.1	31.1	81	1.1	6	●	2
DSAS0580X03S060	DP9020	5.8	3	82.1	18.5	31.1	31.1	81	1.1	6	●	2
DSAS0595X03S060	DP9020	5.95	3	82.1	19	31.1	31.1	81	1.1	6	●	2
DSAS0600X03S060	DP9020	6	3	82.1	19.1	31.1	31.1	81	1.1	6	●	2
DSAS0610X03S080	DP9020	6.1	3	87.2	19.5	34.2	37.2	86	1.2	8	●	2
DSAS0620X03S080	DP9020	6.2	3	87.2	19.8	34.2	37.2	86	1.2	8	●	2
DSAS0635X03S080	DP9020	6.35	3	87.2	20.3	34.2	37.2	86	1.2	8	●	2
DSAS0640X03S080	DP9020	6.4	3	87.2	20.4	34.2	37.2	86	1.2	8	●	2
DSAS0650X03S080	DP9020	6.5	3	87.2	20.7	34.2	37.2	86	1.2	8	●	2
DSAS0660X03S080	DP9020	6.6	3	91.3	21.1	36.3	38.3	90	1.3	8	●	2
DSAS0675X03S080	DP9020	6.75	3	91.3	21.5	36.3	38.3	90	1.3	8	●	2
DSAS0680X03S080	DP9020	6.8	3	91.3	21.7	36.3	38.3	90	1.3	8	●	2
DSAS0690X03S080	DP9020	6.9	3	91.3	22	36.3	38.3	90	1.3	8	●	2

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SOLID CARBIDE DRILL WITH INTERNAL COOLANT

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Order Number	Grade	DC	L/D	OAL	LU	LCF	LH	LF	PL	DCON	Stock	Type
DSAS0700X03S080	DP9020	7	3	91.3	22.3	36.3	38.3	90	1.3	8	●	2
DSAS0710X03S080	DP9020	7.1	3	91.4	22.7	39.4	40.4	90	1.4	8	●	2
DSAS0714X03S080	DP9020	7.14	3	91.4	22.8	39.4	40.4	90	1.4	8	●	2
DSAS0720X03S080	DP9020	7.2	3	91.4	23	39.4	40.4	90	1.4	8	●	2
DSAS0740X03S080	DP9020	7.4	3	91.4	23.6	39.4	40.4	90	1.4	8	●	2
DSAS0750X03S080	DP9020	7.5	3	91.4	23.9	39.4	40.4	90	1.4	8	●	2
DSAS0754X03S080	DP9020	7.5	3	91.5	24.1	41.5	41.5	90	1.5	8	●	2
DSAS0780X03S080	DP9020	7.8	3	91.5	24.9	41.5	41.5	90	1.5	8	●	2
DSAS0790X03S080	DP9020	7.9	3	91.5	25.2	41.5	41.5	90	1.5	8	●	2
DSAS0794X03S080	DP9020	7.94	3	91.5	25.3	41.5	41.5	90	1.5	8	●	2
DSAS0800X03S080	DP9020	8	3	91.5	25.5	41.5	41.5	90	1.5	8	●	2
DSAS0810X03S100	DP9020	8.1	3	97.5	25.8	44.5	47.5	96	1.5	10	●	2
DSAS0820X03S100	DP9020	8.2	3	97.5	26.1	44.5	47.5	96	1.5	10	●	2
DSAS0833X03S100	DP9020	8.33	3	97.5	26.5	44.5	47.5	96	1.5	10	●	2
DSAS0840X03S100	DP9020	8.4	3	97.5	26.7	44.5	47.5	96	1.5	10	●	2
DSAS0850X03S100	DP9020	8.5	3	97.5	27	44.5	47.5	96	1.5	10	●	2
DSAS0860X03S100	DP9020	8.6	3	102.6	27.4	46.6	48.6	101	1.6	10	●	2
DSAS0870X03S100	DP9020	8.7	3	102.6	27.7	46.6	48.6	101	1.6	10	●	2
DSAS0873X03S100	DP9020	8.73	3	102.6	27.8	46.6	48.6	101	1.6	10	●	2
DSAS0880X03S100	DP9020	8.8	3	102.6	28	46.6	48.6	101	1.6	10	●	2
DSAS0900X03S100	DP9020	9	3	102.6	28.6	46.6	48.6	101	1.6	10	●	2
DSAS0950X03S100	DP9020	9.5	3	102.8	30.3	49.8	50.8	101	1.8	10	●	2
DSAS0953X03S100	DP9020	9.53	3	102.8	30.4	49.8	50.8	101	1.8	10	●	2
DSAS0992X03S100	DP9020	9.92	3	102.8	31.6	51.8	51.8	101	1.8	10	●	2
DSAS1000X03S100	DP9020	10	3	102.8	31.8	51.8	51.8	101	1.8	10	●	2
DSAS1032X03S120	DP9020	10.32	3	112.9	32.9	54.9	57.9	111	1.9	12	●	2
DSAS1050X03S120	DP9020	10.5	3	112.9	33.4	54.9	57.9	111	1.9	12	●	2
DSAS1072X03S120	DP9020	10.72	3	118	34.1	57	59	116	2	12	●	2
DSAS1100X03S120	DP9020	11	3	118	35	57	59	116	2	12	●	2
DSAS1150X03S120	DP9020	11.5	3	118.1	36.6	60.1	61.1	116	2.1	12	●	2
DSAS1200X03S120	DP9020	12	3	118.2	38.2	62.2	62.2	116	2.2	12	●	2



RECOMMENDED CUTTING CONDITIONS

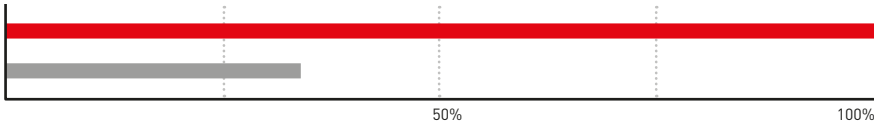
		S					
		Heat-resistant alloy (Inconel718)			Titanium alloy (Ti-6Al-4V)		
DC	L/D	Vc	N min ⁻¹	fr	Vc	N min ⁻¹	fr
3	≤3	10	1000	0.06 (0.04 – 0.1)	40	4200	0.08 (0.06 – 0.12)
4	≤3	10	790	0.06 (0.04 – 0.1)	40	3100	0.1 (0.08 – 0.16)
5	≤3	12	760	0.08 (0.06 – 0.12)	40	2500	0.12 (0.08 – 0.2)
6	≤3	15	790	0.1 (0.08 – 0.15)	40	2100	0.14 (0.1 – 0.2)
8	≤3	15	590	0.1 (0.08 – 0.15)	42	1600	0.18 (0.15 – 0.25)
10	≤3	18	570	0.1 (0.08 – 0.15)	42	1300	0.22 (0.18 – 0.28)
12	≤3	20	530	0.12 (0.08 – 0.15)	45	1100	0.24 (0.2 – 0.3)

1. Through spindle high pressure coolant is recommended.
2. Emulsion coolant is recommended.
3. Please reduce the cutting speed by 10 - 20% when using water-insoluble coolant.
4. When drilling a hole depth of 1D or more with the use of external coolant, peck drilling is recommended every 0.5D to encourage efficient chip breakage.

 External coolant is highly recommended.

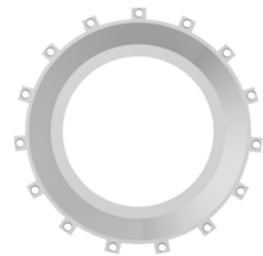
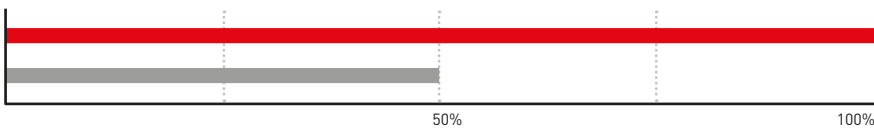
APPLICATION EXAMPLES

Tool	DSAS0800X03S080
Workpiece material	Jet engine casing – Inconel718
Cutting Speed Vc (m/min)	15
Feed rate fr (mm/rev)	0.10
ap (mm)	5
Coolant	Emulsion Internal
Result	12 holes (Continued drilling still possible)

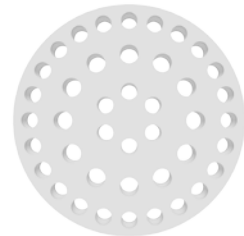
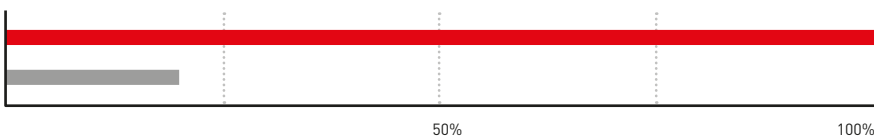


DSAS drill achieved more than 3 times longer tool life and displayed stable drilling with good hole accuracy.

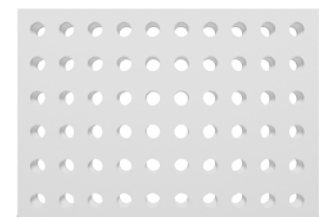
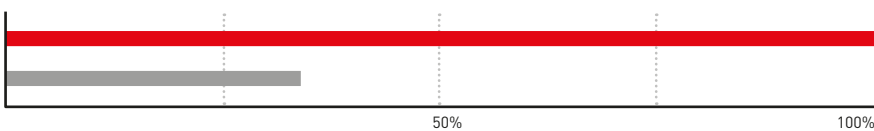
Tool	DSAS0560X03S060
Workpiece material	Inner Seal – HS188
Cutting speed Vc (m/min)	15
Feed rate fr (mm/rev)	0.035
ap (mm)	5
Coolant	Emulsion internal
Result	64 holes (Continued drilling still possible)



Tool	DSAS0800X03S080
Workpiece material	K-Monel
Cutting speed Vc (m/min)	26
Feed rate fr (mm/rev)	0.1
ap (mm)	32
Coolant	Emulsion internal
Result	50 holes



Tool	DSAS0580X03S060
Workpiece material	Rene41
Cutting speed Vc (m/min)	23.6
Feed rate fr (mm/rev)	0.05
ap (mm)	12
Coolant	Emulsion internal
Result	60 holes



Hole tolerance was maintained.

GERMANY

MMC HARTMETALL GMBH
Comeniusstr. 2 . 40670 Meerbusch
Phone +49 2159 91890 . Fax +49 2159 918966
Email admin@mmchg.de

U.K.

MMC HARDMETAL U.K. LTD.
Mitsubishi House . Galena Close . Tamworth . Staffs. B77 4AS
Phone +44 1827 312312 . Fax +44 1827 312314
Email sales@mitsubishicarbide.co.uk

SPAIN

MITSUBISHI MATERIALS ESPAÑA, S.A.
Calle Emperador 2 . 46136 Museros/Valencia
Phone +34 96 1441711 . Fax +34 96 1443786
Email comercial@mmevalencia.com

FRANCE

MMC METAL FRANCE S.A.R.L.
6, Rue Jacques Monod . 91400 Orsay
Phone +33 1 69 35 53 53 . Fax +33 1 69 35 53 50
Email mmfsales@mmc-metal-france.fr

POLAND

MMC HARDMETAL POLAND SP. Z O.O
Al. Armii Krajowej 61 . 50-541 Wrocław
Phone +48 71335 1620 . Fax +48 71335 1621
Email sales@mitsubishicarbide.com.pl

RUSSIA

MMC HARDMETAL RUSSIA OOO LTD.
Electrozavodskaya St. 24 . build. 3 . Moscow . 107023
Phone +7 495 725 58 85 . Fax +7 495 981 39 79
Email info@mmc-carbide.ru

ITALY

MMC ITALIA S.R.L.
Via Montefeltro 6/A . 20156 Milano
Phone +39 0293 77031 . Fax +39 0293 589093
Email info@mmc-italia.it

TURKEY

MMC HARTMETALL GMBH ALMANYA - İZMİR MERKEZ ŞUBESİ
Adalet Mahallesi Anadolu Caddesi No: 41-1 . 15001 35580 Bayraklı/İzmir
Phone +90 232 5015000 . Fax +90 232 5015007
Email info@mmchg.com.tr

www.mitsubishicarbide.com | www.mmc-hardmetal.com


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