

# NEW PRODUCT NEWS



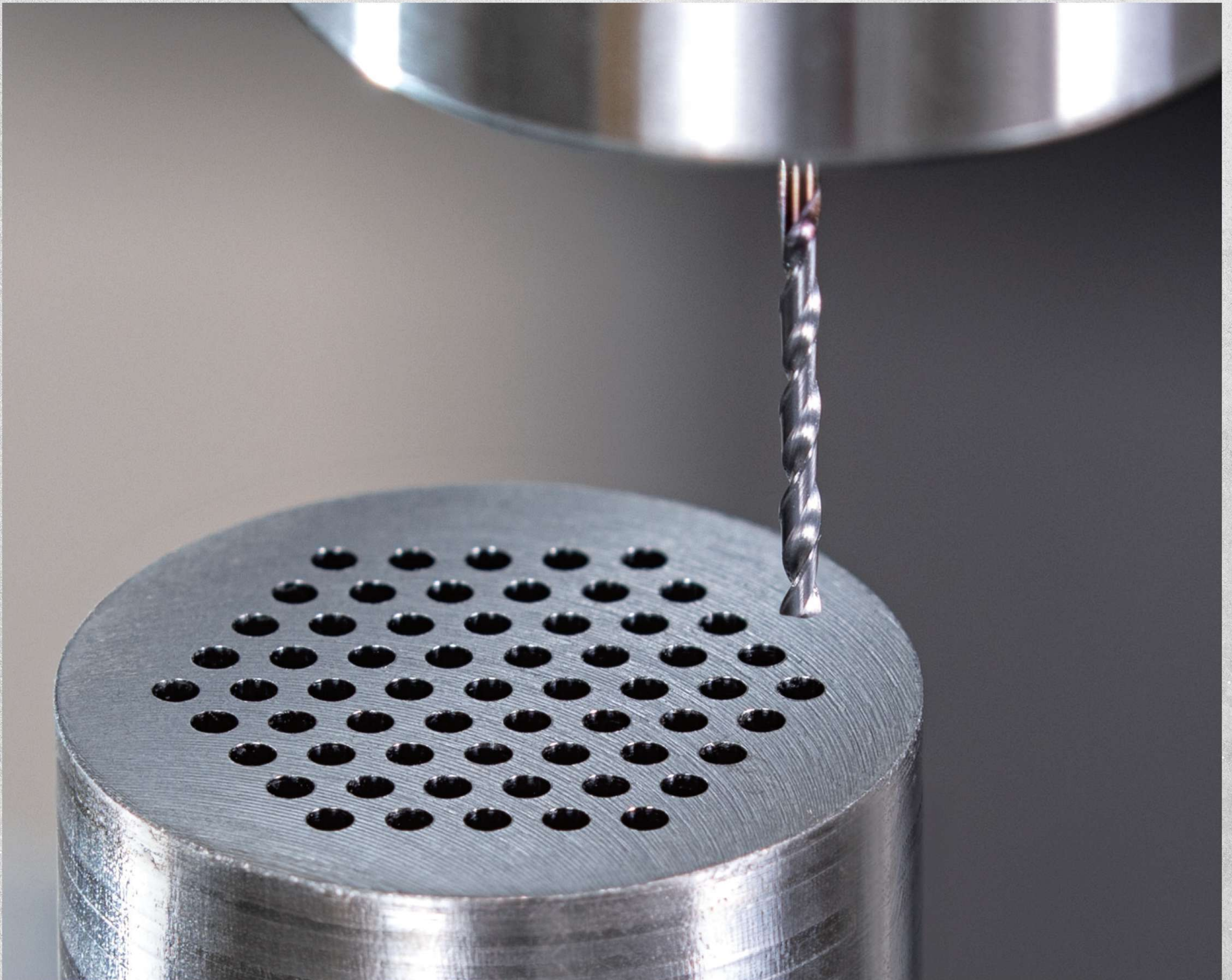
Tungaloy Report No. 558-G

Micro solid drill

## GIGAMINIDRILL

**SOLID CARBIDE MICRO DRILLS**

**FOR SUPERIOR PRECISION, RELIABILITY, AND LONGEVITY**



# NEW PRODUCT NEWS



Tungaloy Report No. 558-G



## GIGAMINIDRILL



Micro drills boasting exceptional reliability

## GIGAMINIDRILL

Outstanding micro-precision and deep-hole drilling performance especially in carbon steel and stainless steel

### ■ Extensive offering of micro drills

Diameters available from 0.1 mm to 3 mm

- In 0.01 mm increments
- All drills have 3 mm diameter shank

### ■ Deep hole drilling up to 15xD

Drilling lengths start from 5xD



### ■ Extremely high precision hole repeatability

The web of the drills in 0.3 mm or greater diameters is thinned so as to promote better drill engagement in the material for better hole repeatability.

Drill	GIGAMINIDRILL	Competitor
Hole positions at drill entries (µm)		

### M SUS304 / X5CrNi18-9

Drill :  $\varnothing 0.3$  mm  
 Cutting speed :  $V_c = 10$  m/min  
 Feed :  $f = 0.003$  mm/rev  
 Pecking depth : 0.03 mm /peck  
 Hole depth : 3.5 mm thru holes  
 Hole counts : 20 holes  
 Machine : Vertical M/C  
 Coolant : Wet

GigaMiniDrill offers better centering capability, providing higher hole position repeatability over the competitor.

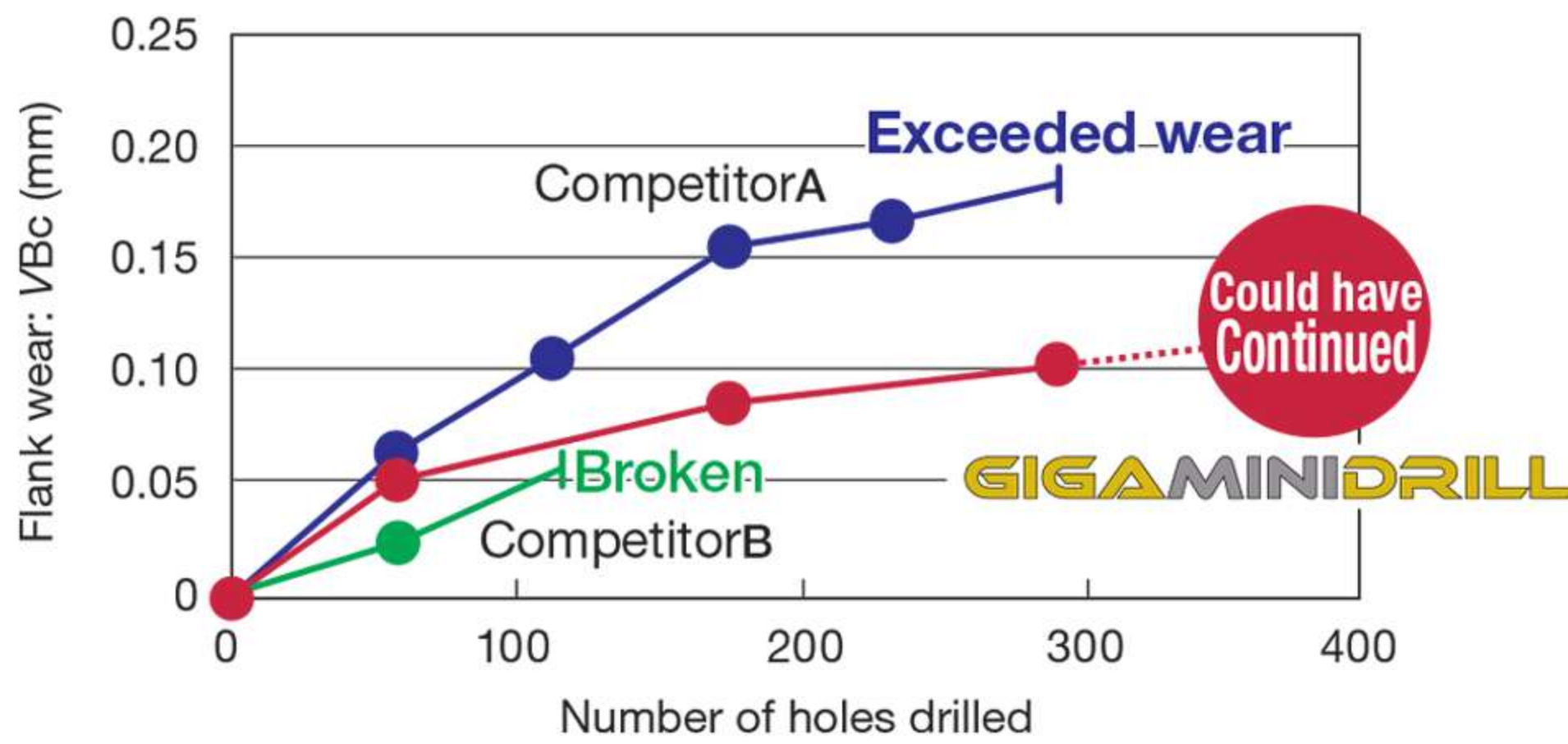
### High reliability

Tough sub-micro grain carbide drills with durable design offer good fracture resistance and process security

### Dedicated coating

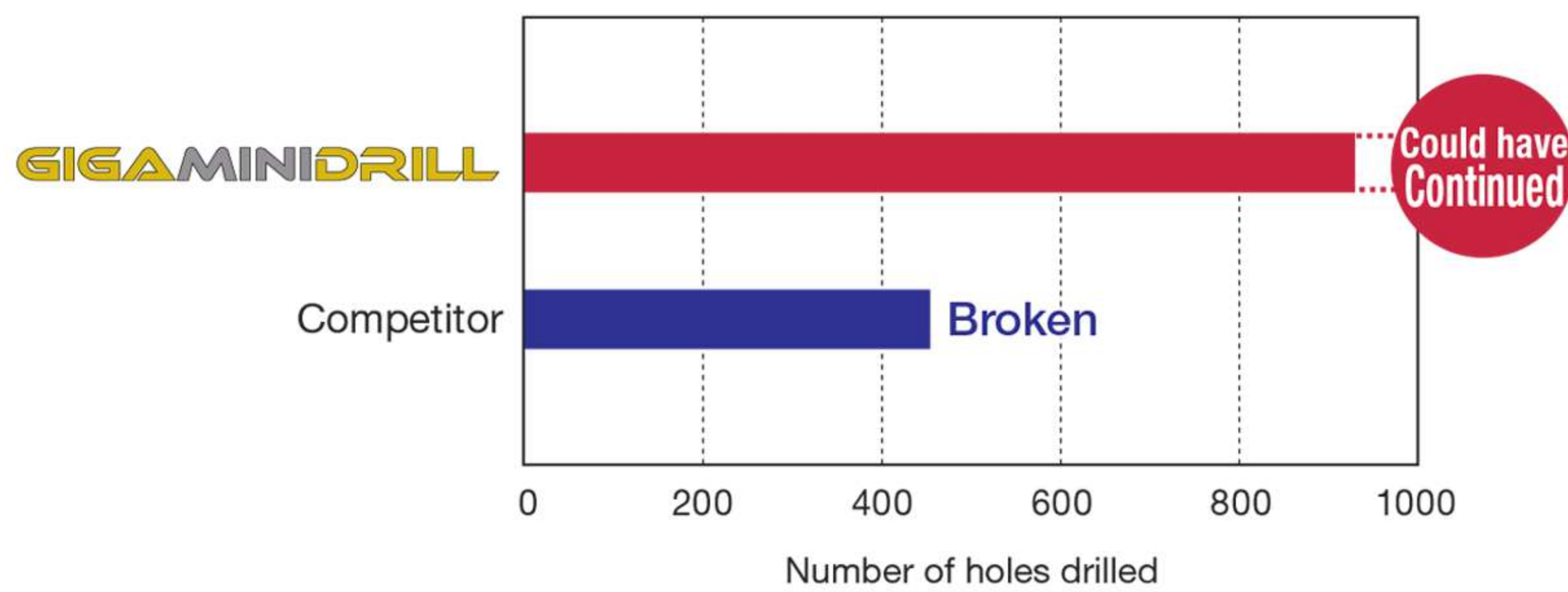
A coating technology developed specifically for micro drills provides long tool life

#### P S45C / C45



Drill :  $\varnothing 3$  mm  
 Cutting speed :  $V_c = 52$  m/min  
 Feed :  $f = 0.06$  mm/rev  
 Pecking depth : 0.75 mm /peck  
 Hole depth : 15 mm blind holes  
 Machine : Vertical M/C  
 Coolant : Wet

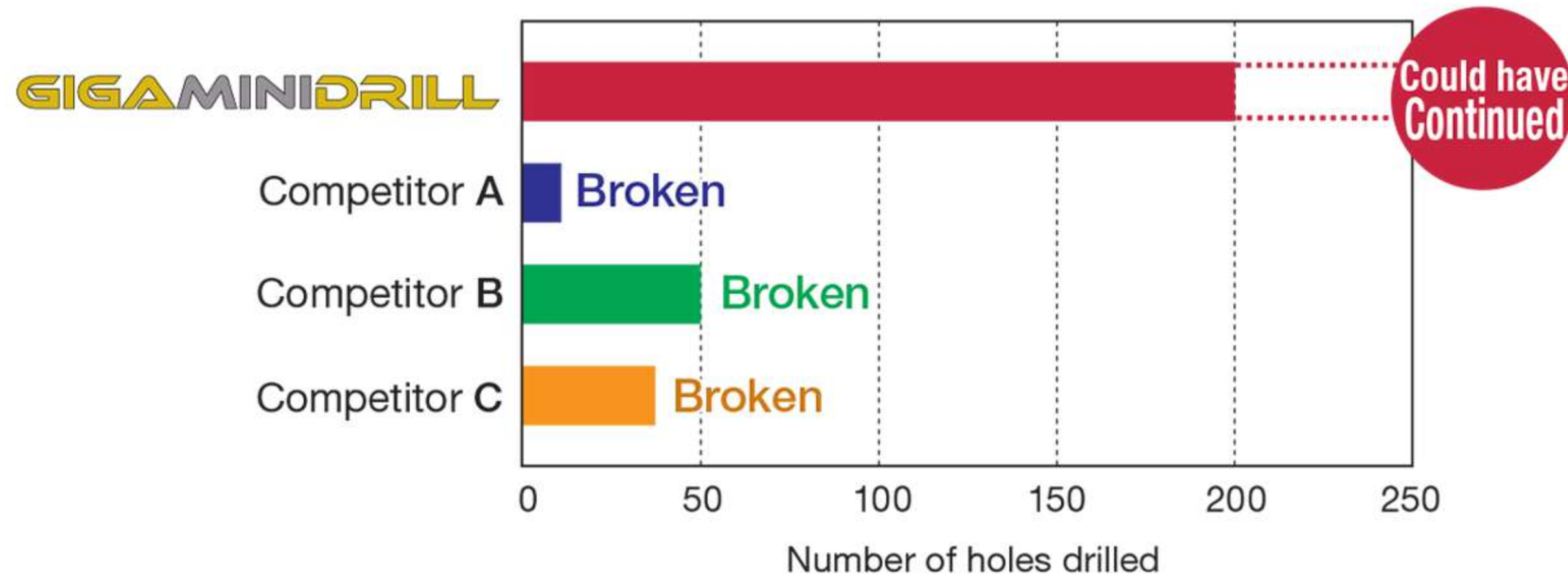
**GigaMiniDrill demonstrated less wear, able to continue machining**



Drill :  $\varnothing 0.5$  mm  
 Cutting speed :  $V_c = 24$  m/min  
 Feed :  $f = 0.007$  mm/rev  
 Pecking depth : 0.1 mm /peck  
 Hole depth : 1.5 mm blind holes  
 Machine : Vertical M/C  
 Coolant : Wet

**Extremely fracture resistant, GMD provided over double tool life.**

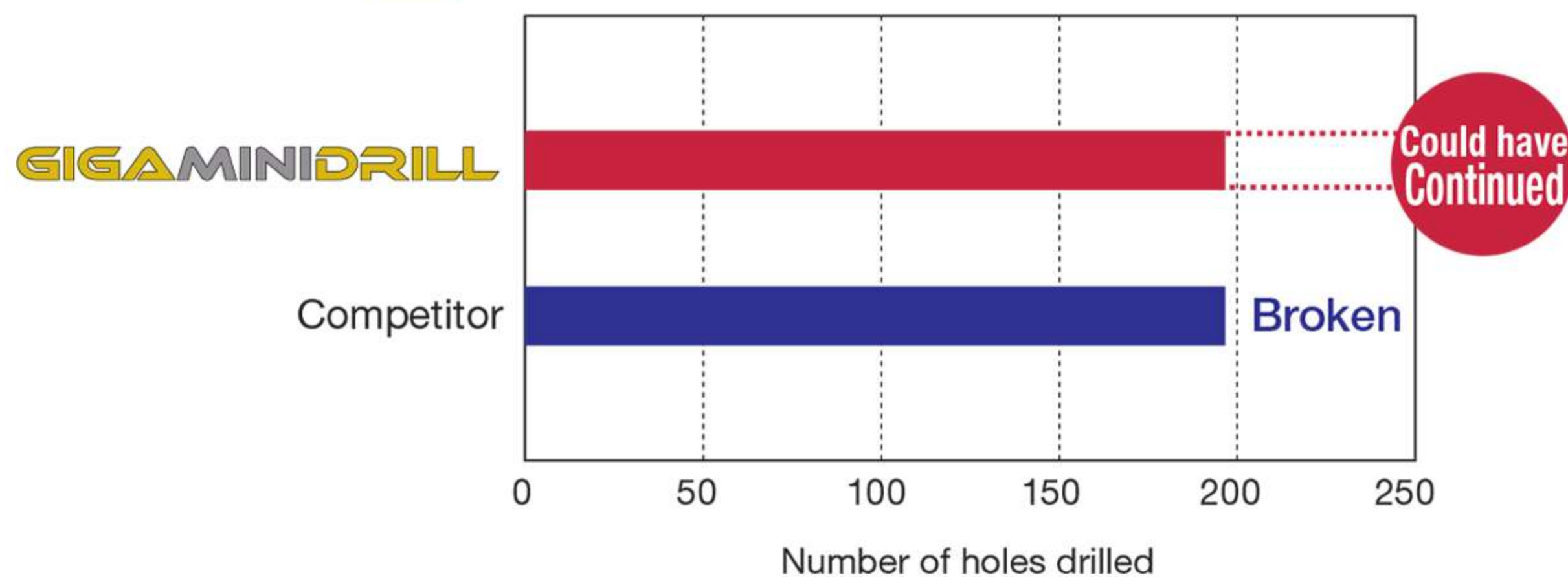
#### M SUS304 / X5CrNi18-9



Drill :  $\varnothing 0.3$  mm  
 Cutting speed :  $V_c = 5$  m/min  
 Feed :  $f = 0.003$  mm/rev  
 Pecking depth : 0.09 mm /peck  
 Hole depth : 4 mm thru holes  
 Machine : Vertical M/C  
 Coolant : Wet

**GMD provided better tool life in stainless steel, being able to open over 200 holes and still able to continue drilling.**

#### S KOVAR



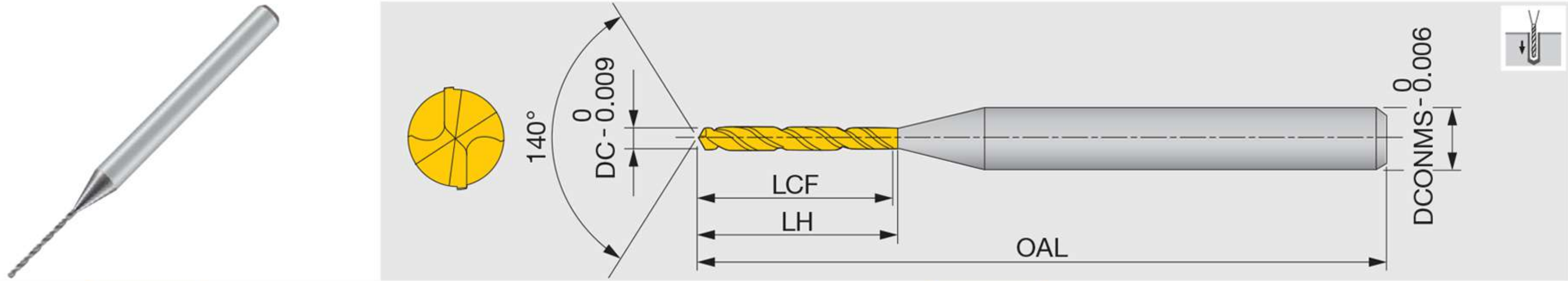
Drill :  $\varnothing 0.5$  mm  
 Cutting speed :  $V_c = 20$  m/min  
 Feed :  $f = 0.007$  mm/rev  
 Pecking depth : 0.1 mm /peck  
 Hole depth : 2 mm blind holes  
 Machine : Vertical M/C  
 Coolant : Wet

**The competitor's drill broke during the machining of Kovar, while GMD continued drilling with stability.**

# GIGAMINIDRILL

### DSM

Micro solid drill, L/D = 5 - 15, without coolant hole



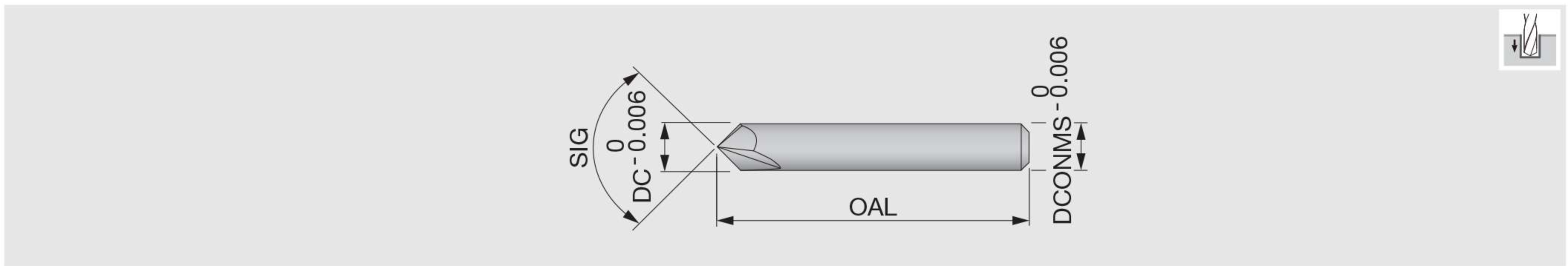
Designation	DC	Coated		DCONMS	LCF	LH	OAL	Designation	DC	Coated		DCONMS	LCF	LH	OAL
		YH170	YH180							YH170	YH180				
DSM0010G10	0.1	●		3	1.15	1.4	38	DSM0080G10	0.8	●		3	9.9	10.5	38
DSM0011G10	0.11	●		3	1.25	1.5	38	DSM0088G10	0.88	●		3	9.9	10.5	38
DSM0012G10	0.12	●		3	1.35	1.6	38	DSM0090G10	0.9	●		3	9.9	10.5	38
DSM0013G10	0.13	●		3	1.55	1.8	38	DSM0097G10	0.97	●		3	11	11.6	38
DSM0014G10	0.14	●		3	1.65	1.9	38	DSM0100G10	1	●		3	11.5	12.1	38
DSM0015G10	0.15	●		3	1.75	2	38	DSM0108G05	1.08	●		3	8	8.6	38
DSM0016G10	0.16	●		3	1.85	2.1	38	DSM0110G05	1.1	●		3	8	8.6	38
DSM0017G10	0.17	●		3	1.95	2.2	38	DSM0120G05	1.2	●		3	8.9	9.5	38
DSM0018G10	0.18	●		3	2.15	2.4	38	DSM0130G05	1.3	●		3	9.7	10.3	38
DSM0019G10	0.19	●		3	2.25	2.5	38	DSM0140G05	1.4	●		3	10.5	11.1	38
DSM0020G10	0.2	●		3	2.35	2.6	38	DSM0145G05	1.45	●		3	11.3	11.9	38
DSM0021G10	0.21	●		3	2.45	2.7	38	DSM0149G05	1.49	●		3	11.3	11.9	38
DSM0022G10	0.22	●		3	2.55	2.8	38	DSM0150G05	1.5	●		3	11.3	11.9	38
DSM0023G10	0.23	●		3	2.75	3	38	DSM0153G05	1.53	●		3	12.1	12.7	45
DSM0024G10	0.24	●		3	2.85	3.1	38	DSM0155G05	1.55	●		3	12.1	12.7	45
DSM0025G10	0.25	●		3	3	3.3	38	DSM0160G05	1.6	●		3	12.1	12.7	45
DSM0026G10	0.26	●		3	3.1	3.4	38	DSM0165G05	1.65	●		3	12.9	13.6	45
DSM0027G10	0.27	●		3	3.2	3.5	38	DSM0170G05	1.7	●		3	12.9	13.6	45
DSM0028G10	0.28	●		3	3.4	3.7	38	DSM0180G05	1.8	●		3	13.7	14.3	45
DSM0029G10	0.29	●		3	3.5	3.8	38	DSM0182G05	1.82	●		3	14.5	15.1	45
DSM0030G10	0.3	●		3	3.9	4.2	38	DSM0185G05	1.85	●		3	14.5	15.1	45
DSM0031G15	0.31	●		3	5.6	5.9	38	DSM0190G05	1.9	●		3	14.5	15.1	45
DSM0032G15	0.32	●		3	5.6	5.9	38	DSM0195G05	1.95	●		3	15.3	15.9	45
DSM0033G15	0.33	●		3	5.6	5.9	38	DSM0200G05	2		●	3	15.3	15.9	45
DSM0034G15	0.34	●		3	5.6	5.9	38	DSM0203G05	2.03		●	3	16.1	16.7	45
DSM0035G15	0.35	●		3	5.6	5.9	38	DSM0205G05	2.05		●	3	16.1	16.7	45
DSM0036G15	0.36	●		3	6.5	6.8	38	DSM0210G05	2.1		●	3	16.1	16.7	45
DSM0037G15	0.37	●		3	6.5	6.8	38	DSM0220G05	2.2		●	3	16.9	17.5	45
DSM0038G15	0.38	●		3	6.5	6.8	38	DSM0230G05	2.3		●	3	17.7	18.3	45
DSM0039G15	0.39	●		3	6.5	6.8	38	DSM0240G05	2.4		●	3	18.5	19.1	55
DSM0040G15	0.4	●		3	6.5	6.8	38	DSM0250G05	2.5		●	3	19.3	19.9	55
DSM0041G15	0.41	●		3	7.4	7.7	38	DSM0254G05	2.54		●	3	20.1	20.7	55
DSM0042G15	0.42	●		3	7.4	7.7	38	DSM0255G05	2.55		●	3	20.1	20.7	55
DSM0043G15	0.43	●		3	7.4	7.7	38	DSM0256G05	2.56		●	3	20.1	20.7	55
DSM0044G15	0.44	●		3	7.4	7.7	38	DSM0257G05	2.57		●	3	20.1	20.7	55
DSM0045G15	0.45	●		3	7.4	7.7	38	DSM0260G05	2.6		●	3	20.1	20.7	55
DSM0046G15	0.46	●		3	8.1	8.7	38	DSM0265G05	2.65		●	3	20.9	21.5	55
DSM0047G15	0.47	●		3	8.1	8.7	38	DSM0270G05	2.7		●	3	20.9	21.5	55
DSM0048G15	0.48	●		3	8.1	8.7	38	DSM0280G05	2.8		●	3	21.7	22.3	55
DSM0049G15	0.49	●		3	8.1	8.7	38	DSM0290G05	2.9		●	3	22.5	23.1	55
DSM0050G15	0.5	●		3	8.1	8.7	38	DSM0295G05	2.95		●	3	23.3	23.9	55
DSM0053G10	0.53	●		3	6.6	7.2	38	DSM0296G05	2.96		●	3	23.3	23.9	55
DSM0055G10	0.55	●		3	6.6	7.2	38	DSM0300G05	3		●	3	23.3	23.9	55
DSM0060G10	0.6	●		3	7.3	7.9	38								
DSM0061G10	0.61	●		3	7.9	8.5	38								
DSM0065G10	0.65	●		3	7.9	8.5	38								
DSM0070G10	0.7	●		3	8.6	9.2	38								
DSM0075G10	0.75	●		3	9.2	9.8	38								

● : New  
● : Line up

## Tungaloy Report No. 558-G

### DSM-CP

Centering drill for DSM drill



Designation	DC	YH170	DCONMS	OAL	SIG
DSM-CP90	3	●	3	38.1	90°
DSM-CP140	3	●	3	38.1	140°

● : Line up

### STANDARD CUTTING CONDITIONS

#### DSM

ISO	Workpiece material	Hardness	Cutting speed: Vc (m/min)			Feed: f (mm/rev)				
			ø0.1 - ø0.3	ø0.31 - ø0.5	ø0.51 - ø3	ø0.1 - ø0.3	ø0.31 - ø0.5	ø0.51 - ø1	ø1.01 - ø2	ø2.01 - ø3
<b>P</b>	Carbon steels, Alloy steels	- 300 HB	5 - 20	15 - 30	25 - 60	0.001 - 0.004	0.002 - 0.01	0.005 - 0.05	0.03 - 0.09	0.05 - 0.1
<b>M</b>	Stainless steels	- 200 HB	2 - 12	6 - 18	10 - 20	0.0005 - 0.004	0.002 - 0.008	0.005 - 0.03	0.01 - 0.04	0.02 - 0.05
<b>K</b>	Grey cast irons	150 - 250 HB	5 - 15	10 - 25	20 - 50	0.0005 - 0.004	0.002 - 0.012	0.005 - 0.03	0.01 - 0.06	0.03 - 0.12
	Ductile cast irons	150 - 250 HB	5 - 15	10 - 25	20 - 50	0.001 - 0.003	0.002 - 0.01	0.005 - 0.02	0.01 - 0.05	0.03 - 0.1
<b>N</b>	Aluminium alloys	-	10 - 20	10 - 30	20 - 50	0.001 - 0.01	0.005 - 0.03	0.01 - 0.05	0.04 - 0.15	0.06 - 0.2
	Copper / Brass	-	10 - 20	10 - 30	20 - 50	0.001 - 0.01	0.005 - 0.03	0.01 - 0.05	0.04 - 0.15	0.06 - 0.2
<b>S</b>	Heat-resistant alloys	- 40 HRC	2 - 6	5 - 10	8 - 20	0.0005 - 0.003	0.002 - 0.004	0.002 - 0.004	0.002 - 0.004	※
<b>H</b>	High hardened steels	- 50 HRC	4 - 8	6 - 10	6 - 16	0.0005 - 0.002	0.001 - 0.005	0.005 - 0.02	0.01 - 0.03	0.02 - 0.06

※ Not recommended

Notes: - When the drilling depth is deeper than L/D = 5, use drill pecking every 10 to 50% of the drill diameter.

- The above cutting conditions are applied to when a water soluble cutting fluid is used. For drilling a hole smaller than ø0.3 mm, use of a starting drill is recommended.

- When setting the drill, the drill runout should be within 0.002 mm on the taper. (Especially for the drill diameter smaller than ø0.5 mm)

#### DSM-CP

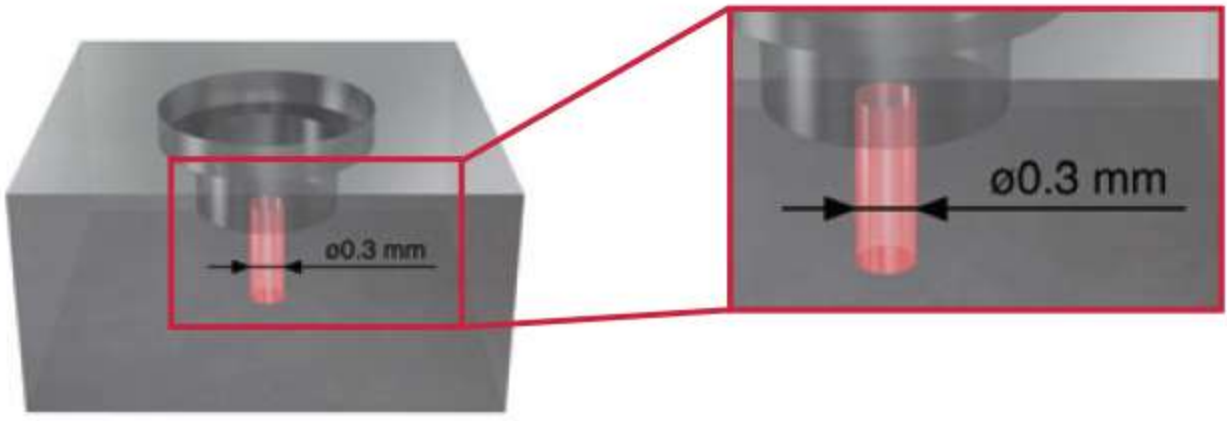
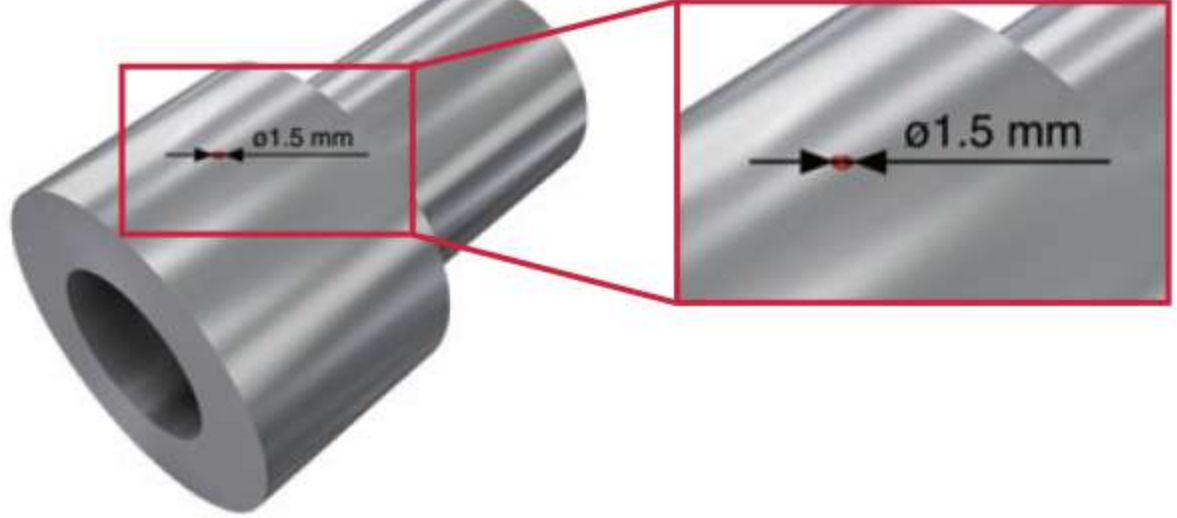


ISO	Workpiece material	Hardness	Cutting speed: Vc (m/min)	Feed: f (mm/rev)	
				DSM-CP90	DSM-CP140
<b>P</b>	Carbon, Mild and Alloy steels	- 300 HB	30 - 80	0.01 - 0.06	0.03 - 0.08
<b>M</b>	Stainless steels	- 200 HB	15 - 40	0.01 - 0.03	0.02 - 0.06
<b>K</b>	Grey and ductile cast irons	150 - 250 HB	30 - 80	0.02 - 0.06	0.05 - 0.1
<b>N</b>	Aluminium alloys	-	60 - 120	0.02 - 0.1	0.05 - 0.15
<b>H</b>	High hardened steels	- 45 HRC	10 - 40	※	0.01 - 0.05

※ Not recommended

Notes: - Use DSM-CP140 for drilling hard materials and stainless steel that have work-hardening characteristic.

- The above cutting conditions are designed when using water-soluble cutting fluid, in which case, set the cutting speed to the lower side of the range.

### ■ PRACTICAL EXAMPLES

Workpiece type		Machining part	Automotive part	
Drill body		DSM0030G10	DSM0150G05	
Grade		YH170	YH170	
		X5CrNi18-9	20CrS4	
Workpiece material				
Cutting conditions	Cutting speed : $V_c$ (m/min)	8.5	21	
	Feed : $f$ (mm/rev)	0.0017	0.011	
	Feed speed : $V_f$ (mm/min)	15	49	
	Drill diameter : $DC$ (mm)	0.3	1.5	
	Hole depth : $H$ (mm)	1.6	7	
	Coolant	Wet	Wet	
	Machine	Vertical M/C	CNC lathe (with live tool stations)	
Results	 <p><b>GIGAMINIDRILL</b> Competitor</p> <p>The competitor's micro drill frequently broke, while GigaMiniDrill offered exceptional reliability during machining, providing triple tool life over the competitor.</p>		 <p><b>GIGAMINIDRILL</b> Competitor</p> <p>Frequent breakages and edge chipping were issues with the competitor's micro drills. GigaMiniDrill had no such cases, while achieving double tool life with stability.</p>	



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