umicore
Cobalt & Specialty Materials

Diamond Tools

POWDER SPIRIT

Within Cobalt & Specialty Materials (CSM), Tool Materials is the Business Line specialized in the metal powders production

We propose a wide range of cobalt, pre-alloyed and tungsten-based powders for various applications.

Tool Materials in a nutshell:

- 70 years of experience in powder metallurgy
- More than a supplier, a listening partner
- Innovative powders as a result of long-term R&D investments
- A unique global and comprehensive offer
- Outstanding consistent quality, batch to batch
- Service and technical support
- Dust free granulated powders
- Fully compliant with REACH and CLP regulations worldwide

800 customers worldwide

4 plants worldwide

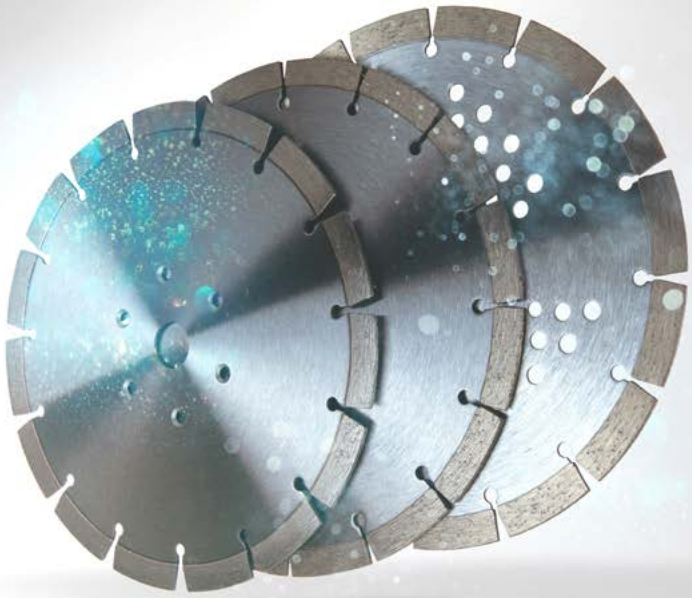
250 collaborators

30 sales agents

5000 tons production capacity

200 products

Deliveries in 75 countries



DIAMOND TOOLS
HARD METALS
REFRACTORY MATERIALS

ONE GLOBAL OFFER

We offer the most comprehensive range of metallic binders from pre-alloyed powders to cobalt and additive powders (bronze, iron, tungsten based materials...). This unique position makes Umicore your preferred supplier.

QUALITY & CONSISTENCY

Producing high-quality and consistent powders is a daily commitment taken by the whole Umicore team.

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INNOVATIVE POWDERS

15 highly skilled engineers and technicians continuously improve processes and design new products. Developing innovative and differentiated products is our cornerstone and positions our company as the reference in the diamond tools industry.

LISTENING PARTNER

More than a supplier, a partner. Driven by your success, the whole Umicore team provides recommendations, brings technical assistance and supports your developments and projects.

8 REASONS
TO TRUST UMICORE

GRANULATED POWDERS

With an annual granulation capacity of 300 tons, we are the only company to offer industrial quantities of granulated powders. As a real pioneer, we invested very early in a high-tech granulation chain producing homogeneous, consistent and transport-proof granules.

70 YEARS OF EXPERIENCE

70 years of energy and passion, 70 years of listening, 70 years of technological know-how, 70 years of innovation in the diamond tools industry, built a reputation of premium supplier.

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FLEXIBILITY & REACTIVITY

In a constantly moving business environment and with rather limited visibility, you can rely on a flexible, reactive and efficient supplier. We are organized to serve you at best.

ETHICS

Our activity is driven by a code of ethics regarding raw material sourcing and general business behavior.

PRODUCT OFFER

PRE-ALLOYED, COBALT, ADDITIVE POWDERS

Your need

- The material to process
- The tool you produce
- Your sintering process
- Your expected performances
- Your own requirements

One solution

To meet your needs, we supply all types of binders from the most comprehensive product range in the diamond tools sector: **pre-alloyed, cobalt and additive powders.**

Umicore revolutionizes the diamond tools industry with innovative pre-alloyed powder ranges, continuously extended

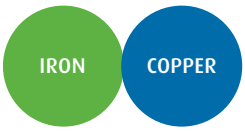
Cobalite® — NEXT® — Keen® — STEP®

The pre-alloyed powders are high-tech substitutes to traditional cobalt powders and cover all the diamond tools applications. They can be processed through hot pressing or free sintering.

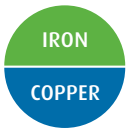
Main technical and economical advantages

- Cost improvement and stability
- Excellent metal distribution on a fine scale and great homogeneity
- High protrusion and strong diamond retention with enhanced tool life and performance

In pre-alloyed powders, each grain of each batch is made of the base metals components.



IRON COPPER (50:50)
MIX POWDER



IRON COPPER (50:50)
PRE-ALLOYED POWDER

Combining the strengths of the "pre-alloyed" concept and the free sintering technology, **free sintering pre-alloyed powders** offer several advantages :

ENHANCED COMPETITIVENESS

HIGHER PRODUCTIVITY

FLEXIBILITY OF PART SHAPE

Each pre-alloyed powder range is divided into

BASE POWDERS	**PREMIXED** POWDERS	**GRANULATED** POWDERS
Base powders to be mixed with additives to optimize tool performances	Ready to use powders	Ready to use granules

Whatever your need, Umicore supplies the cobalt powder you expect...

14 grades of pure or premixed cobalt powders, specially designed for the diamond tools industry

Pure cobalt powders:

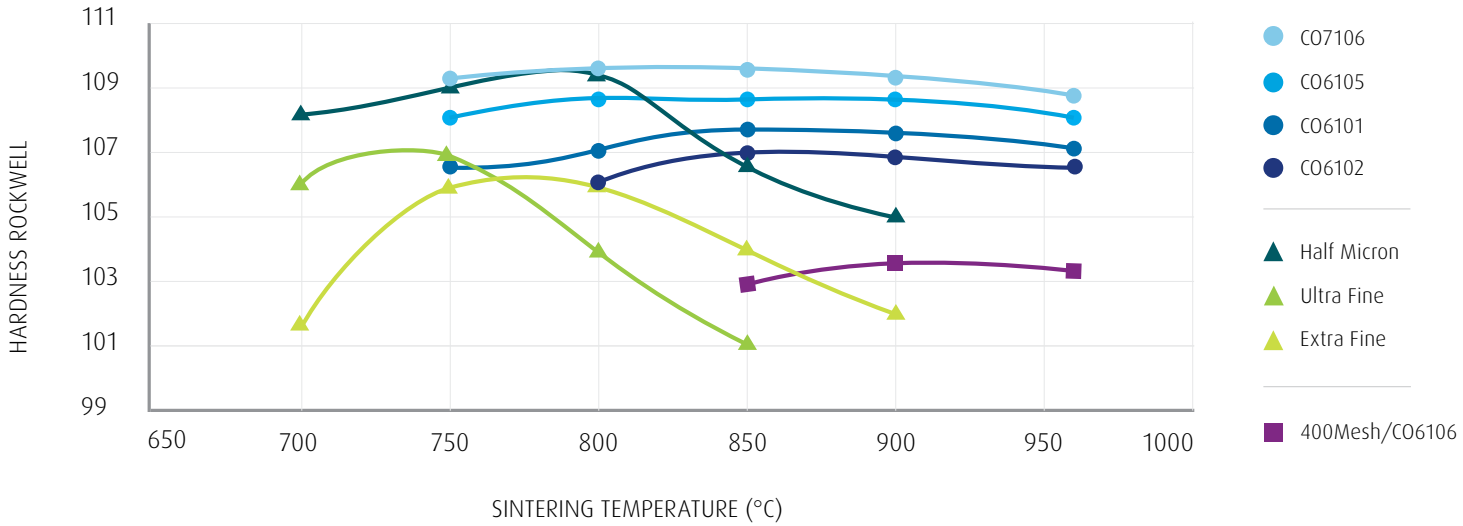
High sintering activity	Half Micron 0.7µm
	Ultra Fine 0.9µm
	Extra Fine 1.45µm
• **Stability of hardness on a wide range of sintering temperatures** • **Very low reactivity with diamond** • **High elastic limit and little plasticity**	COUF CO7106 0.9µm
	COF CO6105 1.25µm
	COC CO6101 1.6µm
	COD CO6102 1.8µm
Coarse grain	COH CO6106 3.5µm
	400 Mesh 3.5µm

Premixed Co-WC powders:

Representative values	ME1108	ME1107	ME1106	ME1105	ME1101
WC (wt%)	**10**	**20**	**30**	**40**	**75**
Co (wt%)	**90**	**80**	**70**	**60**	**25**

The standard components are Cobalt powder COF (CO6105) and Tungsten Carbide powder WC 3µm (CW5522).

...with unique and unequalled technical properties



Improved mechanical properties

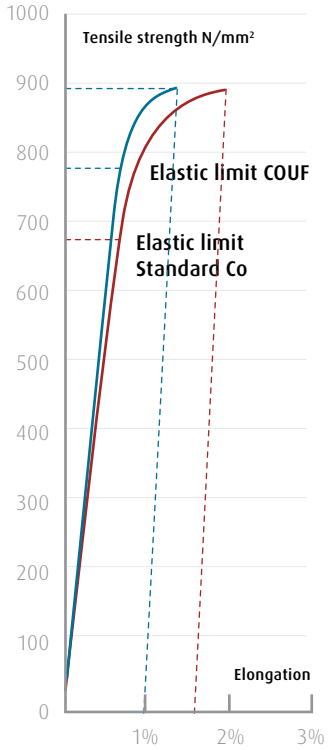
High elastic limit and little plasticity which ensure an excellent diamond retention.

COUF
Elastic limit: 767 N/mm²
Elongation: 0.96%

No plastic deformation

Typical results Standard Co
Elastic limit: 663 N/mm²
Elongation : 1.55%

Plastic deformation

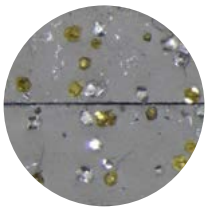


No graphitization of diamonds

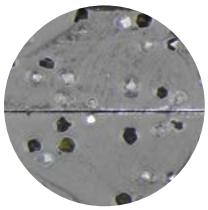
Segments 100% COF powder:

Segments 100% standard Co powder:

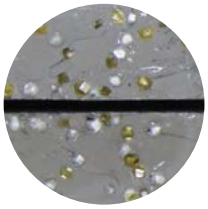
Sintered at 800°C



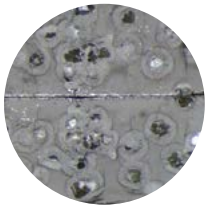
Sintered at 800°C



Sintered at 950°C

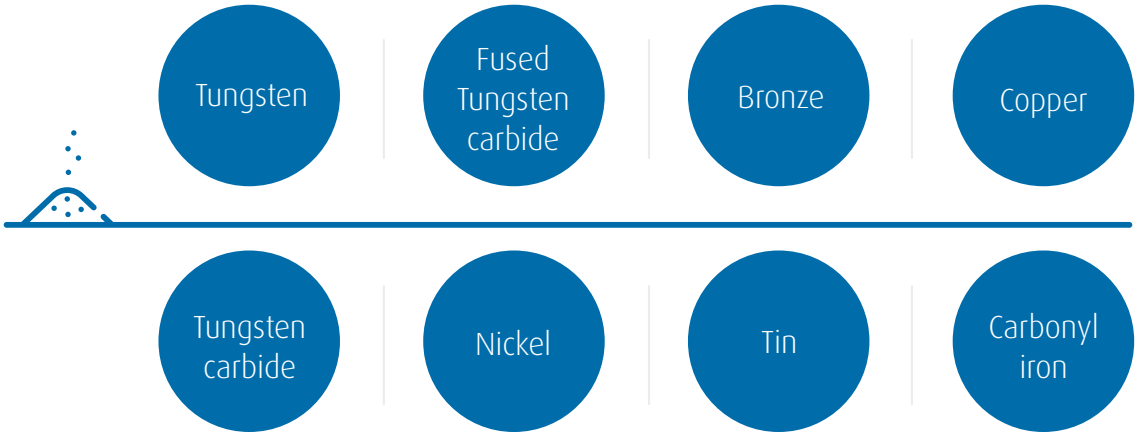


Sintered at 950°C



With Umicore, make the choice of a large additive powders offer

To complete our range of powders for diamond tools and better meet your expectations, we provide a wide range of additive powders, offering various benefits.



Effects of additives on a pre-alloyed basis

	MECHANICAL PROPERTIES			EFFECTS ON DIAMOND TOOLS BEHAVIOUR	
	Hardness	Impact strength	Abrasion resistance	Free cutting	Tool life
Iron	-	+	+	-	+
Nickel	+	+	-	+	-
Copper	-	+	-	+	-
Tin	+	-	-	+	-
Bronze	-	-	-	+	-
Tungsten	+	-	+	-	+
Tungsten carbide	+	-	+	-	+
Fused carbide	+	-	++	-	++

Cobalt and pre-alloyed powders are also available under granulated form

For 15 years, we have been producing granulated powders and we guarantee our customers controlled granules size, transport-proof ability and quality consistency.

Some pure **cobalt powders, premixed cobalt powders, pre-alloyed powders or premixed pre-alloyed powders** are available as granules of 63/450µm or 250/630µm.

Main granules advantages:

- Very low generation of dust while handling and processing
- Good flowability
- Higher apparent density
- Easy debinding
- Increased cold pressing ability
- Same properties as non-granulated powders (after sintering)

THE TOOLBOX

The toolbox is your guide to identify the product solution adapted to your requirements.

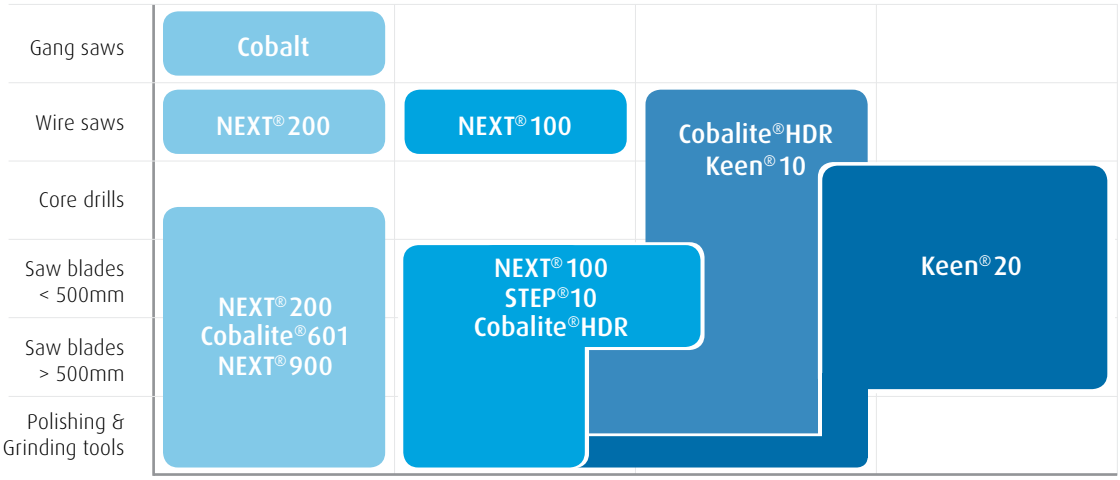
Then refer to further detailed recommendations chart by tool.

This information is indicative.
For detailed recommendation, please contact us.

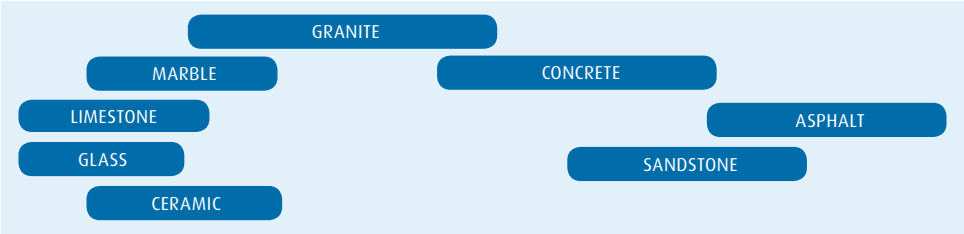
	Pre-alloyed powders ranges	
	Base pre-alloyed powders	Premixed pre-alloyed powders
HOT PRESSING	NEXT®100	MX1180
		MX1480
		MX1660
		MX1760
	NEXT®200	MX2480
	NEXT®300	MX3480
	NEXT®900	
	Keen®10	KX1180
		KX1290
	Keen®20	KX2250
		KX2920
	STEP®10	
	Cobalite®HDR	
	Cobalite®601	
FREE SINTERING	NEXT®400	MX4885
		MX4380
		MX4590
		MX4940
		MXB370
		MXB380
	Cobalite®CNF	

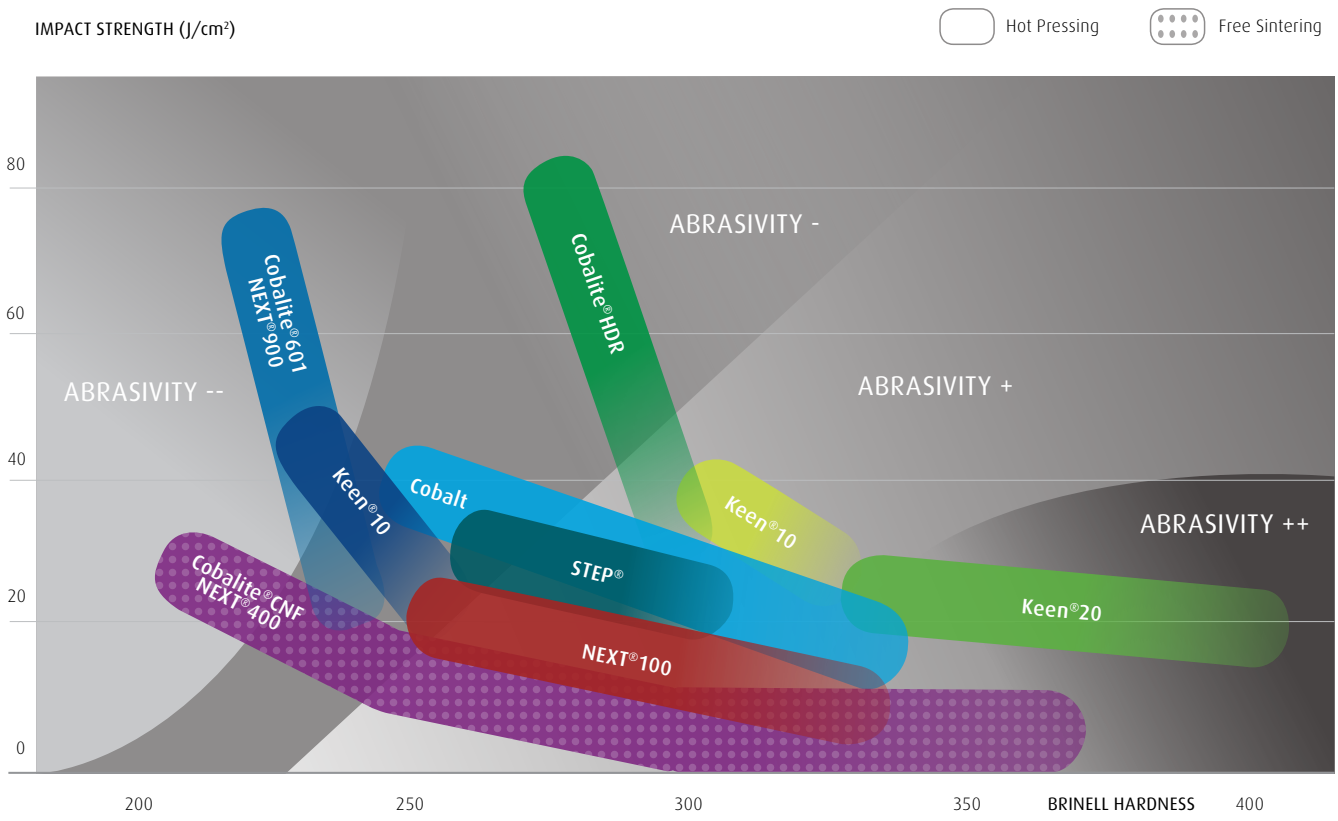
Hot pressing

TOOLS



MATERIALS



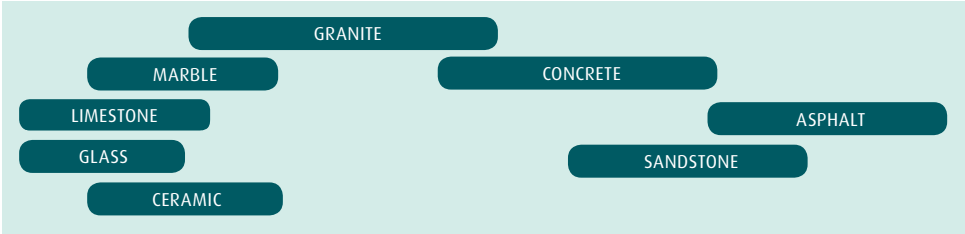


Free sintering

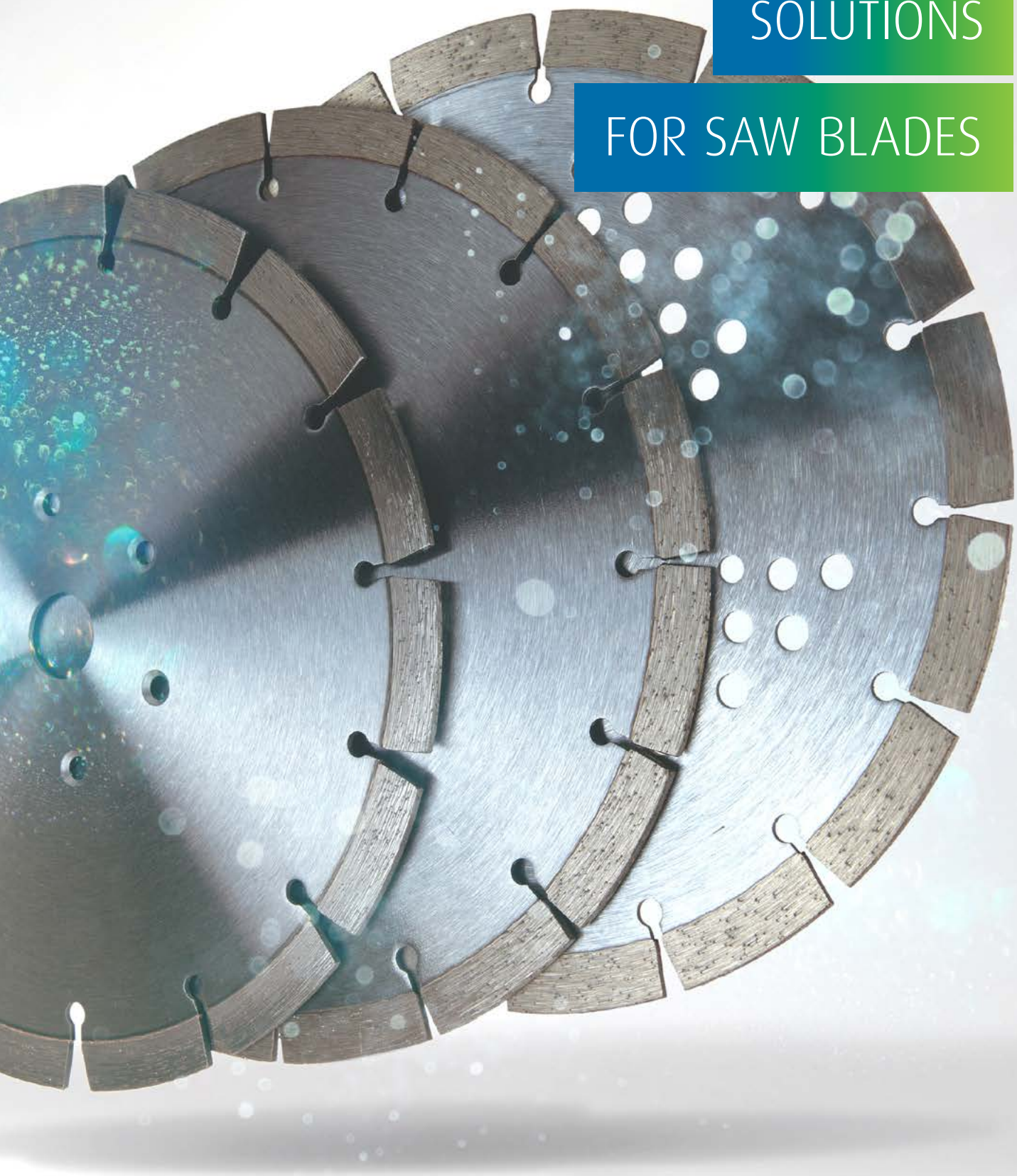
TOOLS

Gang saws	Cobalt			
Wire saws	NEXT® 400 Cobalite® CNF	MX4885 / MX4380 / MXB370 / MXB380		
Core drills			MX4885 / MX4380	MX4940 / MX4590
Saw blades < 500mm	NEXT® 400 Cobalite® CNF	MX4885 / MX4380		
Saw blades > 500mm				
Polishing & Grinding tools		MX4885 / MX4940 / MX4590		

MATERIALS



SOLUTIONS FOR SAW BLADES



Solutions for saw blades

Sintering technology	End-use application		Powder grade	Hardness[1] (HRB)	Comments	Family	Base[2]/ Ready to use	Available granulated	Free of
HOT PRESSING	MATRIX								
	Ceramic, Glass	- Abrasivity +	NEXT®900	89	Diameter < 500 mm	NEXT	Base		Ni
			NEXT®200	100		NEXT	Base	x	Ni
	Limestone		Cobalite®HDR	107		COBALITE	Base		Ni
	Marble		NEXT®200	100		NEXT	Base	x	Ni
	Granite		NEXT®200	100		NEXT	Base	x	Ni
			MX2480	101		NEXT	Ready to use		Ni
			NEXT®100	106		NEXT	Base	x	Ni
			MX1760	104	Free cutting	NEXT	Ready to use		Ni
			STEP®10	106		STEP	Base		Co,Ni
	Granite, Concrete		MX1480	104	Standard reference	NEXT	Ready to use	x	Ni
			MX1660	104	Abrasion resistance	NEXT	Ready to use		Ni
			Cobalite®HDR	108		COBALITE	Base		Ni
	Concrete		NEXT®900	89	Dry cutting < 500 mm	NEXT	Base		Ni
			Keen®10	104		KEEN	Base		Ni
	Abrasive Stone, Concrete, Asphalt		Keen®20	109		KEEN	Base		Ni
			KX2250	100	Optimized sintering temp.	KEEN	Base		
			KX2920	530HV10	Optimized sintering temp.	KEEN	Ready to use		
	BACKING FOR LASER WELDING								
	Standard sintering temp.		NEXT®300	99	From 775°C	NEXT	Ready to use		Ni
	Standard sintering temp.		MX3480	94	From 775°C	NEXT	Ready to use	x	Ni
	Low sintering temp.		Cobalite®HDR	107	From 750°C	COBALITE	Ready to use		Ni

FREE SINTERING	MATRIX								
	Marble	- Abrasivity +	Cobalite®CNF	80		COBALITE	Base		Co,Ni
			NEXT®400	90		NEXT FS	Base		Ni
	Granite		MX4885	98	Standard granite	NEXT FS	Ready to use	x	Ni
			MX4380	107	Abrasive granite	NEXT FS	Ready to use		
	Concrete, Abrasive Stone		MX4590	360 HV10	Optimized sintering temp.	NEXT FS	Base		
			MX4940	460 HV10	Optimized sintering temp.	NEXT FS	Ready to use		
	BACKING FOR LASER WELDING								
	Backing solutions upon request								

[1] Representative value at recommended sintering temperature
[2] Base = to be mixed with additives to optimize tool performances

SOLUTIONS FOR WIRE SAWS

Solutions for wire saws

Sintering technology	End-use application		Powder grade	Hardness[1] (HRB)	Comments	Family	Base[2]/ Ready to use	Available granulated	Free of
HOT PRESSING	Marble	+ Abrasivity -	NEXT®200	100	Single wire	NEXT	Base	x	Ni
			MX2480	101	Single wire	NEXT	Ready to use		Ni
	Granite		NEXT®100	106	Single wire	NEXT	Base	x	Ni
			MX1480	104	Multi-wires, Single wire	NEXT	Ready to use	x	Ni
			MX1660	104	Single wire	NEXT	Ready to use		Ni
			Cobalite®HDR	107	Single wire	COBALITE	Base		Ni
	Granite, Concrete		Keen®10	104	Single wire	KEEN	Base		Ni
			KX1290	106	Single wire	KEEN	Ready to use		
FREE SINTERING	Marble	+ Abrasivity -	Cobalite®CNF	80	Single wire	COBALITE	Base		Co,Ni
			NEXT®400	90	Single wire	NEXT FS	Base		Ni
	Marble, Granite		MX4885	98	Multi-wires, Single wire	NEXT FS	Ready to use	x	Ni
			MX4380	107	Multi-wires, Single wire	NEXT FS	Ready to use		
	Concrete, Abrasive stone		MX4590	360 HV10	Single wire	NEXT FS	Base		
			MX4940	460 HV10	Single wire	NEXT FS	Ready to use		
FREE SINTERING AND SELF-BRAZING	Granite	+ Abrasivity -	MXB370	101	Multi-wires, Single wire	NEXT FS	Ready to use	x	
	Granite, Abrasive stone		MXB380	107	Multi-wires, Single wire	NEXT FS	Ready to use		

[1] Representative value at recommended sintering temperature
[2] Base = to be mixed with additives to optimize tool performances

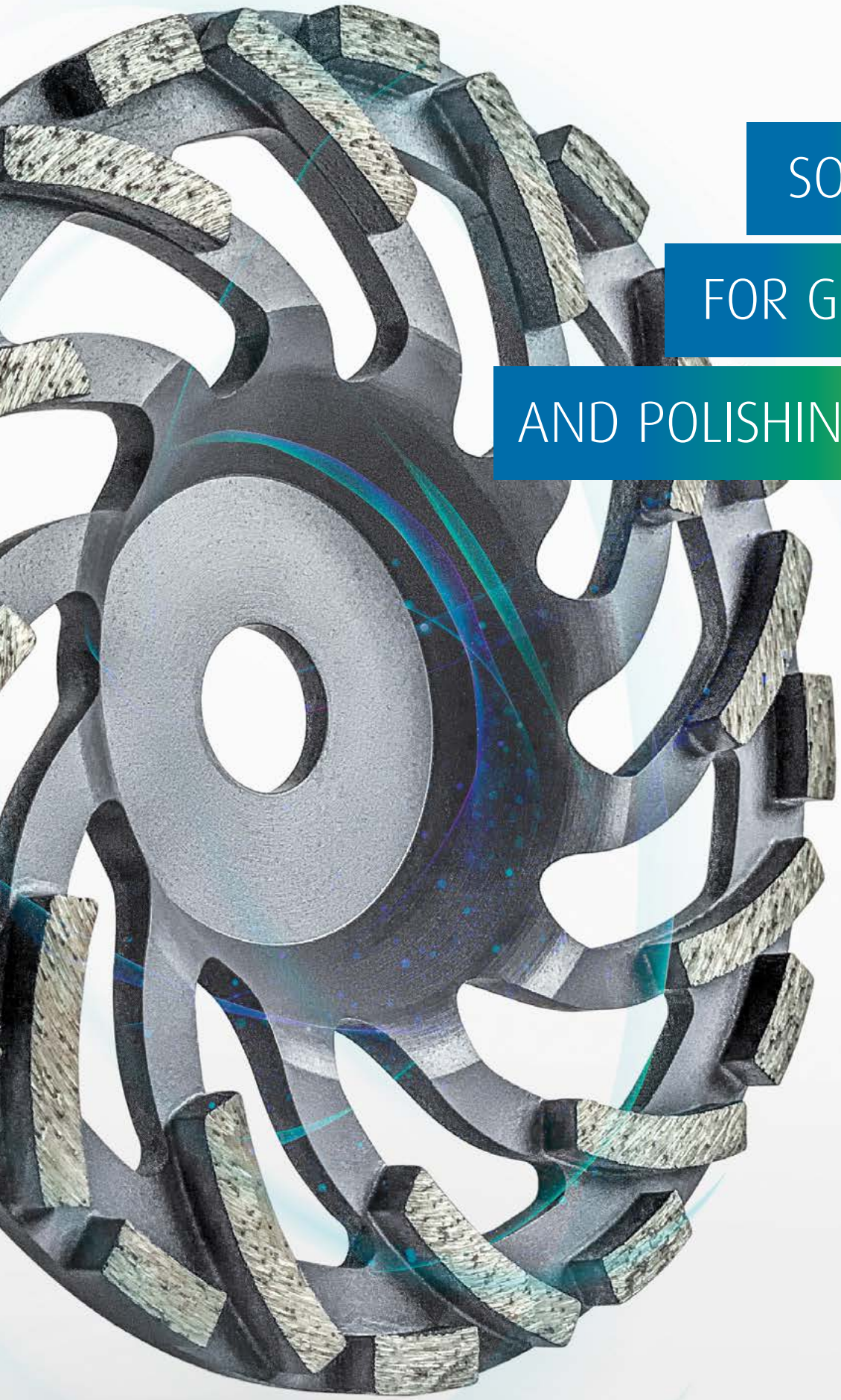
SOLUTIONS FOR CORE DRILLS

Solutions for core drills

Sintering technology	End-use application		Powder grade	Hardness[1] (HRB)	Comments	Family	Base[2]/ Ready to use	Available granulated	Free of
HOT PRESSING	MATRIX								
	Granite, Marble, Limestone	+ Abrasivity -	NEXT®200	100		NEXT	Base	x	Ni
	Granite		Keen®10	106		KEEN	Base		Ni
	Concrete		NEXT®200	100	Diameter < 100mm	NEXT	Base	x	Ni
			MX2480	101	Diameter < 100mm	NEXT	Ready to use		Ni
			STEP®10	106	Diameter > 100mm	STEP	Base		Co,Ni
			Keen®10	104	Diameter > 100mm	KEEN	Base		Ni
			KX1290	106	Diameter > 100mm	KEEN	Ready to use		
			Cobalite®HDR	107	Diameter > 100mm	COBALITE	Base		Ni
	Abrasive stone, Concrete, Asphalt		Keen®20	109		KEEN	Base		Ni
			KX2250	100	Optimized sintering temp.	KEEN	Base		
	BACKING FOR LASER WELDING								
	Standard sintering temp.		NEXT®300	99	From 775°C	NEXT	Ready to use		Ni
	Standard sintering temp.		MX3480	94	From 775°C	NEXT	Ready to use	x	Ni
	Low sintering temp.		Cobalite®HDR	107	From 750°C	COBALITE	Ready to use		Ni

FREE SINTERING	MATRIX								
	Glass, Marble, Limestone	+ Abrasivity -	Cobalite®CNF	80		COBALITE	Base		Co,Ni
			NEXT®400	90		NEXT FS	Base		Ni
	Granite, Concrete		MX4885	98	Free cutting	NEXT FS	Ready to use	x	Ni
			MX4380	107		NEXT FS	Ready to use		
	Abrasive stone, Concrete, Asphalt		MX4590	360 HV10	Optimized sintering temp.	NEXT FS	Base		
			MX4940	460 HV10	Optimized sintering temp.	NEXT FS	Ready to use		
	BACKING FOR LASER WELDING								
	Backing solutions upon request								

[1] Representative value at recommended sintering temperature
[2] Base = to be mixed with additives to optimize tool performances



SOLUTIONS FOR GRINDING AND POLISHING TOOLS

Solutions for grinding and polishing tools

Sintering technology	End-use application		Powder grade	Hardness[1] (HRB)	Comments	Family	Base[2]/ Ready to use	Available granulated	Free of
HOT PRESSING	Glass, Ceramic	+ Abrasivity -	NEXT®200	100		NEXT	Base	x	Ni
	Marble		NEXT®200	100	Frankfurt	NEXT	Base	x	Ni
			MX2480	101	Frankfurt	NEXT	Ready to use		Ni
	Granite		NEXT®100	106	Fickerts (medium position)	NEXT	Base	x	Ni
			MX1180	106	Fickerts (medium position)	NEXT	Ready to use		Ni
			Cobalite®HDR	107		COBALITE	Base		Ni
	Granite, Concrete		Keen®10	104	Granite fickerts, concrete floor dressing	KEEN	Base		Ni
			KX1180	106	Granite fickerts, concrete floor dressing	KEEN	Ready to use		Ni
			Keen®20	109	Granite calibrating rolls, granite fickerts, concrete floor dressing	KEEN	Base		Ni
			KX2250	100	Granite calibrating rolls, granite fickerts, concrete floor dressing	KEEN	Base		
			KX2920	530 HV10	Granite calibrating rolls	KEEN	Ready to use		
FREE SINTERING	Granite, Concrete	+ Abrasivity -	MX4590	360 HV10	Granite calibrating rolls, granite fickerts, concrete floor dressing	NEXT FS	Ready to use		
			MX4940	460 HV10	Granite calibrating rolls	NEXT FS	Ready to use		

[1] Representative value at recommended sintering temperature
[2] Base = to be mixed with additives to optimize tool performances

SOLUTIONS FOR OTHER TOOLS

Solutions for other tools

Sintering technology	End-use application		Powder grade	Hardness[1] (HRB)	Comments	Family	Base[2]/ Ready to use	Available granulated	Free of
GANG SAWS									
HOT PRESSING	Marble	+ Abrasivity -	CO6106	103	Diamond retention +	COBALT			Ni
			400 mesh	103	Diamond retention +	COBALT			Ni
			Co EF	106	Diamond retention ++	COBALT			Ni
			CO6102	106	Diamond retention ++	COBALT		x	Ni
			CO6101	107	Diamond retention +++	COBALT			Ni
			Co UF	107	Diamond retention +++	COBALT			Ni
			CO6105	108	Diamond retention ++++	COBALT			Ni
			CO7106	109	Diamond retention +++++	COBALT		x	Ni
			ME1108	340 HV10	Abrasive marble	COBALT			Ni
			MX1107	390 HV10	Abrasive marble	COBALT		x	Ni

CHAIN SAWS									
HOT PRESSING	Marble	+ Abrasivity -	NEXT®200	100	Quarry tool	NEXT	Base	x	Ni
			MX2480	101	Quarry tool	NEXT	Ready to use		Ni
	Granite, Concrete		CO6102	106	Hand tool	COBALT	Base	x	Ni
FREE SINTERING	Marble		Cobalite®CNF	80	Quarry tool	COBALITE	Base		Co,Ni
			NEXT®400	90	Quarry tool	NEXT FS	Base		Ni
			MX4885	98	Quarry tool	NEXT FS	Ready to use	x	Ni

PROFILING TOOLS									
HOT PRESSING	Ceramic	+ Abrasivity -	NEXT®900	89		NEXT	Base		Ni
			Cobalite®601	102		COBALITE	Base		Ni
	Marble		NEXT®200	100		NEXT	Base	x	Ni
			MX2480	101		NEXT	Ready to use		Ni
	Granite		NEXT®100	106		NEXT	Base	x	Ni
			MX1180	106		NEXT	Ready to use		Ni

[1] Representative value at recommended sintering temperature
[2] Base = to be mixed with additives to optimize tool performances

For inquiries and additional information please contact

Umicore SA

Rue du Marais 31
1000 Brussels
Belgium

toolmaterials@eu.umicore.com

csm.umicore.com

umicore
Cobalt & Specialty Materials