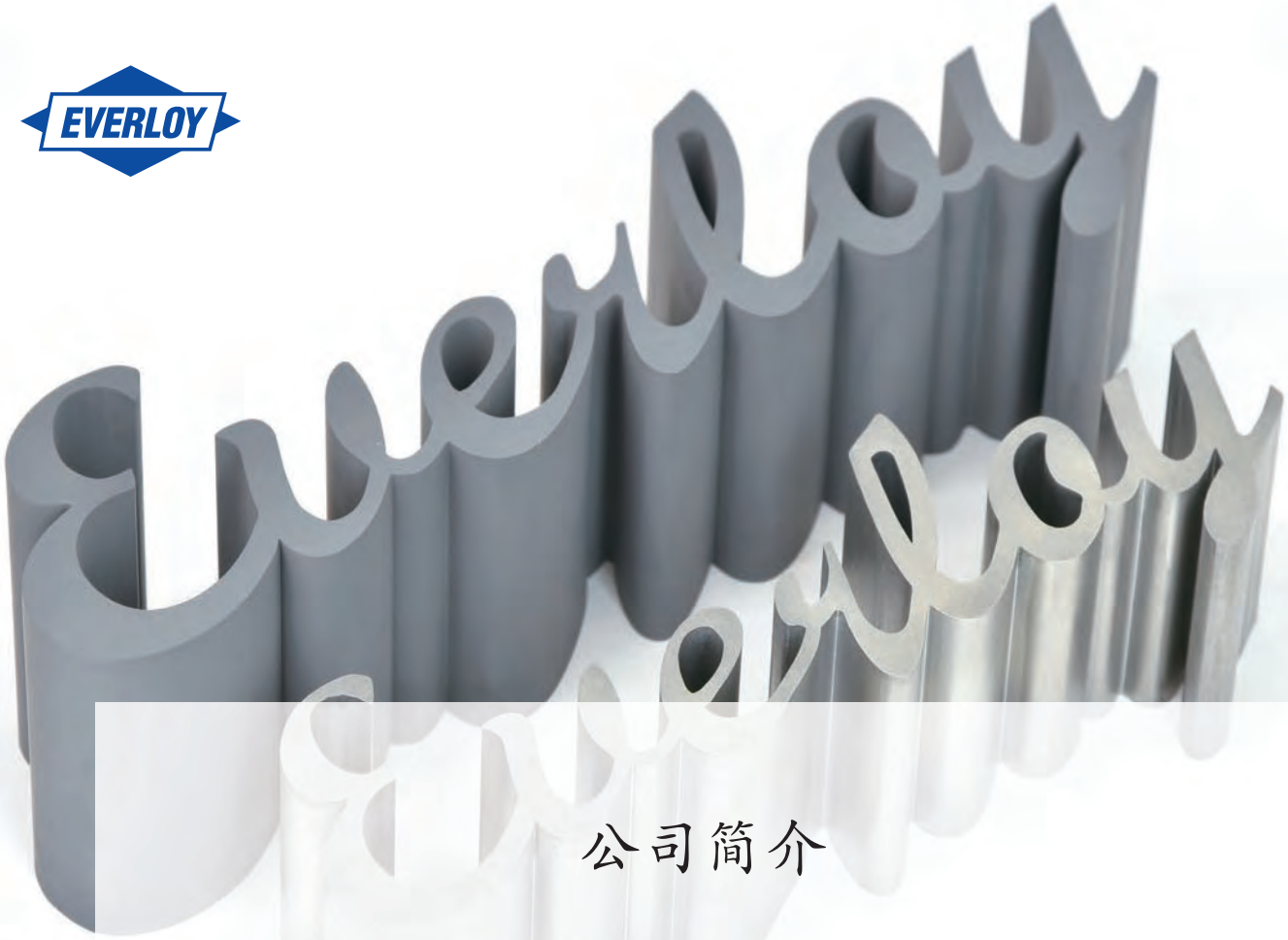
EVERLOY
CEMENTED CARBIDE TOOLS

超硬合金工具

General Catalog

株式会社 共立合金製作所
KYORITSU GOKIN CO., LTD.
https://www.everloy.co.jp



公司简介

株式会社共立合金制作所自昭和13年(1938年)创立以来，一直专注各种超硬质合金的研究和制造。作为拥有超过70年经验的超硬质合金专业厂家，EVERLOY品牌已成为业界家喻户晓的产品。在此，我们十分感谢各位一直的支持。

身处竞争激烈的技术领域，我们紧随时代发展而不断成长和发展，将积极运用其独家领先的技术以满足客户新的需求。衷心希望各位继续给予惠顾与指导。

INTRODUCTION

The company has been engaged in the manufacturing of cemented carbide tools and spray nozzles since its inauguration in 1938, and they have been enjoying the patronage of customers under trade name "EVERLOY". We hereby express our deepest thanks for your support and patronage.

In the midst of such drastic changes in technical innovation, all company members will actively deal with new demands by our customers by exploiting our originality. We sincerely hope that you will continue, more than ever, to give your valuable instruction and advice to us.

注意事项 REQUESTS TO OUR CUSTOMERS

硬质合金材料使用注意事项

•硬质合金的特性是非常硬，但易碎。撞击或过分用力压缩硬质合金时可能会引起破损。

•硬质合金的密度非常大，在大型工件或者数量过多时的大重量情况，请小心处理。

•硬质合金的热膨胀系数与其它金属不同，如果工作温度明显高于（或低于）原来的设计， 收缩和膨胀可能引起工件开裂。

•磨削液和润滑液或其它液体可能腐蚀硬质合金，从而导致强度降低，请小心存放。

硬质合金加工注意事项

•由于表面状态的因素，硬质合金的强度可能下降，请在最后精加工时使用金刚石砂轮。

•在硬质合金的磨削过程中，其粉尘可能会变成空中浮尘。如果你吸入大量的粉尘，将会危害你的健康。请安装排气系统和带防护器，如防护口罩、防护眼镜等。另外，如果粉尘粘附在你的皮肤或进入你的眼睛，请马上用水冲洗。

•当磨削硬质合金或钎焊制品时，因为废液中含有重金属成分。所以请正确地处理液态废料。

•当同一硬质合金重新磨削时，请在重新磨削后检查是否有裂纹。

•由于使用激光或电笔在硬质合金材料或完成的工件上做标记时，有可能会产生裂纹。请小心别在应力的部位做标记。

•当硬质合金材料进行放电加工时，表面可能产生残余裂纹，导致强度降低，请根据需要彻底地磨削掉裂纹。

•在钎焊硬质合金时，如果比钎料的溶化温度高或者低太多，有可能导致硬质合金材料脱落或者开裂。

Notabilia for handling of hard tool materials

- The characteristic of cemented carbide is extremely hard but it is also brittle. It may damage the cemented carbide by impact or forced constriction.
- The density of cemented carbide is extremely large. Please handle with care as a heavy load when the product size is large or excessive in quantity.
- The thermal expansion coefficient of cemented carbide is different from other metals. In the case of a higher (lower) operating temperature than the eminent design temperature, the shrinkage fit or cooling fit products may cause fractures.
- The corrosion from grinding liquid, lubrication fluid or other liquids may cause strength degradation of cemented carbide. Please take care the custody condition.

Notabilia when processing of cemented carbide tools

- The strength of cemented carbides may decrease as a result of the surface condition. Please use diamond wheels during final processing.
- During grinding of cemented carbides, powder dust may become airborne. If you draw in a great deal of the dust, your health will be at risk. Please utilize the exhaust system and wear protective equipment, such as protective mask, etc. In addition, if the dust adheres to your skin or enters your eyes, immediately wash with water.
- When grinding cemented carbides or braze materials, heavy metal elements are present in waste liquid. Therefore, please practice proper waste liquid treatment.
- When identical cemented carbide is re-grinded, please check for any fractures.
- Fractures may occur on cemented carbide materials or products due to marking by laser, electrical pen, etc. Please take care not to mark on stress areas.
- When electric discharge machining of cemented carbide materials, residual cracks may occur on the surface and incur strength degradation. Please spin off the cracks by grinding exactly according to need.
- In the case of blazing cemented carbide, if the temperature of brazing filler metal is higher or lower than the suitable temperature, defluxions or fractures may occur on cemented carbide materials.

备注 ・日文注意事项从日本硬质合金刀具协会*规格（CIS）手册中引用。*现：日本机械刀具工业协会
・英文注意事项没有从日本硬质合金刀具协会（JCTMA）中引用。

Remark ・ Notabilias are quoted matters of Cemented Carbide Tool Industrial* Standard (CIS) handbook (1998). *Japan Cutting & Wear-resistant Tool Association at present
・ English sentences have not gained approval from Japan Cemented Carbide Tool Manufacturer's Association (JCTMA).

目次 CONTENTS

超硬合金
CEMENTED CARBIDE

加工品
MACHINING

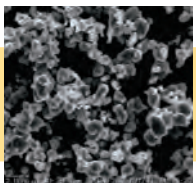
喷雾喷嘴
SPRAY NOZZLES

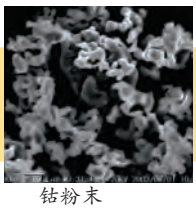
制造工程

MANUFACTURING PROCESS

碳化钨 Tungsten carbide
钴 Cobalt
碳化钽 Tantalum carbide
碳化钛 Titanium carbide
碳化铬 Chromium carbide

粉体合成 Powder preparation


碳化钨粉末
Tungsten carbide powder


钴粉末
Cobalt powder

混合 Blending

压粉成形 Compacting

预备烧结 Pre-sintering

成形 Forming

烧结 Sintering

HIP处理 Hot Isostatic Pressing

EVERLOY预成型件 EVERLOY Tips

检查设备

MAJOR INSPECTION EQUIPMENT


万能试验机
Universal testing machine


金属显微镜
Metallurgical microscope


Rockwll 硬度计
Rockwell hardness tester

主要设备
MAJOR EQUIPMENT

混合机
Crusher (Attritor)

油压冲压机
Hydraulic press machine

真空烧结炉
Vacuum sintering furnace

干式CIP
Dry Cold Isostatic Pressing (CIP) device

真空加压烧结炉
Vacuum pressurization sintering furnace

多轴钻床
Multiple spindle drilling machine

HIP处理装置
Hot Isostatic Pressing (HIP) device

NC钻床
NC drilling machine

NC车床
NC lathe machine

切削机
Cutting machine

大型切削机
Large cutting machine

电子天秤
Electronic balance

炭素分析装置
Carbon analyzer

磁性测定器
Magnetic measuring equipment

材料类型与特性(代表数据)

GRADES AND PHYSICAL PROPERTIES (Typical figures)

分类 Division	本公司产品代号 Our grade	TAS分类代号 TAS classification	WC粒子径 WC grain size [μm]	钴含量 Co Cobalt content [%]	密度 Density [×10³ kg/m³] {g/cm³}	硬度 Hardness HRA	硬度 Hardness HV	抗弯强度 Transverse rupture strength [GPa]
耐磨损 耐冲击 模具用 For wear-resistance and impact-resistance tools	H1	VM-10	0.5-1.5	6	14.8	93.0	1900	1.9
	G1	VM-20	0.5-2.0	6	14.9	92.0	1750	2.0
	G2	VM-30	1.0-3.0	6	15.0	91.0	1610	2.5
	G3	VM-40	1.0-3.0	8	14.8	90.0	1480	2.7
	G4	VC-40	1.0-8.0	10	14.6	89.0	1360	2.9
	G5	VC-50	1.0-8.0	13	14.3	88.0	1250	3.2
	TB6	VU-60	2.0-8.0	15	13.9	86.5	1060	3.1
	TB7	VU-70	2.0-8.0	21	13.3	84.5	950	3.0
	G8	VU-80	2.0-8.0	22	13.3	82.5	860	2.6
微粒子合金 Fine grain Cemented Carbide	KD05	VF-20	0.5-1.5	8	14.7	92.0	1750	3.2
	KD10	VF-30	0.5-1.5	10	14.5	91.0	1610	3.4
	KD20	VF-40	0.5-1.5	13	14.2	90.0	1480	3.7
	KD30	VF-40	0.5-1.5	16	13.9	89.0	1360	3.7
	KD40	VF-50	0.5-1.5	19	13.6	88.0	1250	3.7
	KD50	VF-70	0.5-1.5	28	12.9	84.5	950	3.0
超微粒子合金 Ultrafine grain Cemented Carbide	EF01	VF-10	0.5-0.8	8	14.5	94.0 (*3)	2000	3.7
	EF05	VF-10	0.5-0.8	10	14.3	93.0	1900	3.7
	EF10	VF-20	0.5-0.8	13	14.0	92.0	1750	4.0
	EF20	VF-40	0.5-0.8	18	13.6	90.0	1480	4.0
高硬度・高韧性 耐腐蚀 High-hardness, high-toughness and corrosion-resistance Cemented Carbide	EW10	VM-30	1.0-5.0	7	14.8	91.0	1610	3.5
	EW25	VM-40	1.0-5.0	11	14.3	89.5	1420	3.5
	EW40	VM-50	1.0-5.0	15	13.9	88.0	1250	3.5
不锈钢加工用 For stainless steel	KX01	VF-20	0.5-0.8	13 (*1)	14.0	92.5	1820	4.0
软质金属用 For stamping of pure iron and copper	MC20	VC-40	0.5-5.0	6	14.9	90.0	1480	2.8
耐腐蚀・放电加工用 Corrosion-resistance /for EDM	ME40	VC-50	0.5-5.0	12	14.1	88.0	1250	3.2
放电加工用 For EDM 抗龟裂 Crack-resistance	A10W	VM-30	0.5-5.0	9	14.5	91.0	1610	3.7
放电加工用 For EDM 耐腐蚀 Anti-corrosive	WD20	VF-40	0.5-1.5	13 (*1)	14.1	90.5	1540	3.7
非磁性・耐腐蚀合金 Non-magnetic and Anti-corrosive Cemented Carbide	KN20	NF-40	0.5-1.5	12 (*2)	14.2	90.0	1480	3.2
高耐磨损用 For high wear-resistant	SS13	VF-10	0.5-1.5	1	14.2	–	2450	1.0
	SS15	VF-10	0.5-1.5	4	14.6	–	2100	2.0
切削用 For cutting tools	KW3	VM-30	1.0-5.0	6.5	14.6	91.0	1610	2.5

备注
・表中之数据为代表性数据，不是保证值。
・可能出现不可预告的变更

Remarks
・The above data represents typical figures, not guaranteed figures.
・It is likely to change without a previous notice.

注记
*1. 部分含有Ni
*2. 表示材质KN20之Ni量
*3. 表示HV硬度之换算量
*4. 破坏韧性值是依据JIS R1607的IF方法测定的值
*5. 抗张强度或更高的值是依据文档的参考值。
*6. 值高于G5的值

材料类型与特性(代表数据)

GRADES AND PHYSICAL PROPERTIES (Typical figures)

破坏韧性值 (*4) Fracture toughness value [MPa・m$^{1/2}$]	抗张强度 (*5) Tensile strength [GPa]	压缩强度 Compression strength [GPa]	杨氏模量 Young's modulus [GPa]	柏松比 Poisson's ratio	热膨胀系数 Thermal expansion coefficient [×10^{-6}/K]	热传导率 Thermal conductivity [W/ (m・K)]	耐冲击强度 Impact strength [kJ/m^2]
8.9	1.0	6.1	630	0.21	4.7	80	20
10	1.0	5.7	620	0.21	4.7	80	23
12	1.3	5.4	610	0.21	4.7	80	28
18	1.4	5.0	590	0.21	5.0	75	36
22	1.5	4.7	570	0.22	5.3	75	44
26	1.6	4.3	540	0.22	5.6	71	56
– (*6)	1.6	3.9	530	0.23	5.8	67	64
– (*6)	1.5	3.3	480	0.23	6.6	63	83
– (*6)	1.3	3.2	470	0.23	6.7	59	85
12	1.6	6.1	600	0.21	5.0	75	24
13	1.7	5.9	580	0.22	5.3	75	28
16	1.9	5.3	550	0.22	5.6	71	37
19	1.9	4.9	520	0.23	6.0	67	48
22	1.9	4.4	490	0.23	6.3	63	59
30	1.5	3.0	400	0.25	7.3	54	87
9.1	1.9	6.5	600	0.21	5.0	71	17
9.1	1.9	6.5	580	0.22	5.3	71	21
10	2.0	6.4	550	0.22	5.6	67	25
13	2.0	5.4	490	0.23	6.3	59	44
15	1.75	5.1	610	0.21	4.9	77	–
22	1.75	4.7	570	0.22	5.4	73	–
29	1.75	4.0	530	0.23	5.8	68	–
10	2.0	6.4	550	0.22	5.6	67	25
19	1.4	5.2	620	0.21	4.7	80	30
26	1.6	4.1	560	0.22	5.5	71	52
13	1.9	6.0	590	0.22	5.2	75	29
16	1.9	5.3	550	0.22	5.6	71	37
16	1.6	5.0	550	0.22	5.6	71	34
5.4	0.5	–	–	–	–	–	–
8.4	1.0	–	–	–	–	–	–
12	1.3	–	–	–	–	–	–

Notes

*1. Nickel is comprised partially.
*2. Value of grade KN20 indicates the amount of Nickel.
*3. The number shows the reduced value from HV.
*4. Fracture toughness value is the value measured by the IF method of JIS R1607.
*5. The value of tensile strength or later are reference value from documents.
*6. The value is higher than the value of grade G5.

术语
GLOSSARY

术语 Term	专业术语描述 Description
WC粒子径 WC grain size	用适当的方法测量颗粒的线性尺寸。 Linear size of grain measured by using bolter or other proper method.
钴含量 Cobalt content	相结合的钴含量（一部分材料的结合相为Ni） Quantity of cobalt which is binder phase.(the binder phase is Ni at some grade)
密度 Density	单位体积的质量。 Mass per unit cubic volume.
硬度 Hardness	物体对于材料的损伤及变形的阻力。 Resistance of object on damage or deformation against material.
抗弯强度 Transverse rupture strength	将试验片放置在一定距离内的2支点上，取支点间的一点进行加重，直到试验片断裂时负荷最大弯曲应力值。 Value of bending stress calculated from load of broken sample which is pressed from one point between two supports.
破坏韧性值 Fracture toughness value	预裂纹开始快速扩展时材料的抵抗值。 Resistance value of material when pre-crack started to expand rapidly.
抗张强度 Tensile strength	试样在承受负荷时抵抗破坏的能力。 The highest tensile load which sample was broken on subjecting load.
压缩强度 Compression strength	让试样承受压缩静负荷，在发生破坏时的最大压缩应力。 Strength when object was broken on subjecting compression static load.
杨氏模量 Young's modulus	材料的弹性特性之一，表示施加应力时应力方向弹性变形的阻力。 One of elastic properties of material which indicates resistance of elastic property of stress direction.
柏松比 Poisson's ratio	横向正应变与轴向正应变的绝对值的比值。 Ratio of vertical and lateral strain.
热膨胀系数 Thermal expansion coefficient	材料加热时，单位温度变化时，某一方向（长度）的增长。 Increase of a certain direction(length) per unit temperature when heating material.
热传导率 Thermal conductivity	材料传导热量的物理性能值。 Physical property value of heat transmission in material.
冲击强度 Impact strength	抗冲击强度由冲击破坏样品材料吸收的能量大小来测量。 Strength against impact measured from size of energy which is absorbed in material of sample broken by impact.

TAS分类代号 TAS (Japan Cutting & Wear-resistant Tool Association) classification symbol

表1 第1位分类法
Table 1. Classification method of 1st digit

代号 Mark	结合剂成分 Binder phase elements
V	Co
R	Co/Ni
N	Ni

表2 第2位分类法
Table 2. Classification method of 2nd digit

代号 Mark	WC平均粒度 WC average grain size [μm]
F	小于1.0
M	1.0-2.5
C	2.5-5
U	大于5.0

表3 第4·5位分类法
Table 3. Classification method of 4th and 5th digit

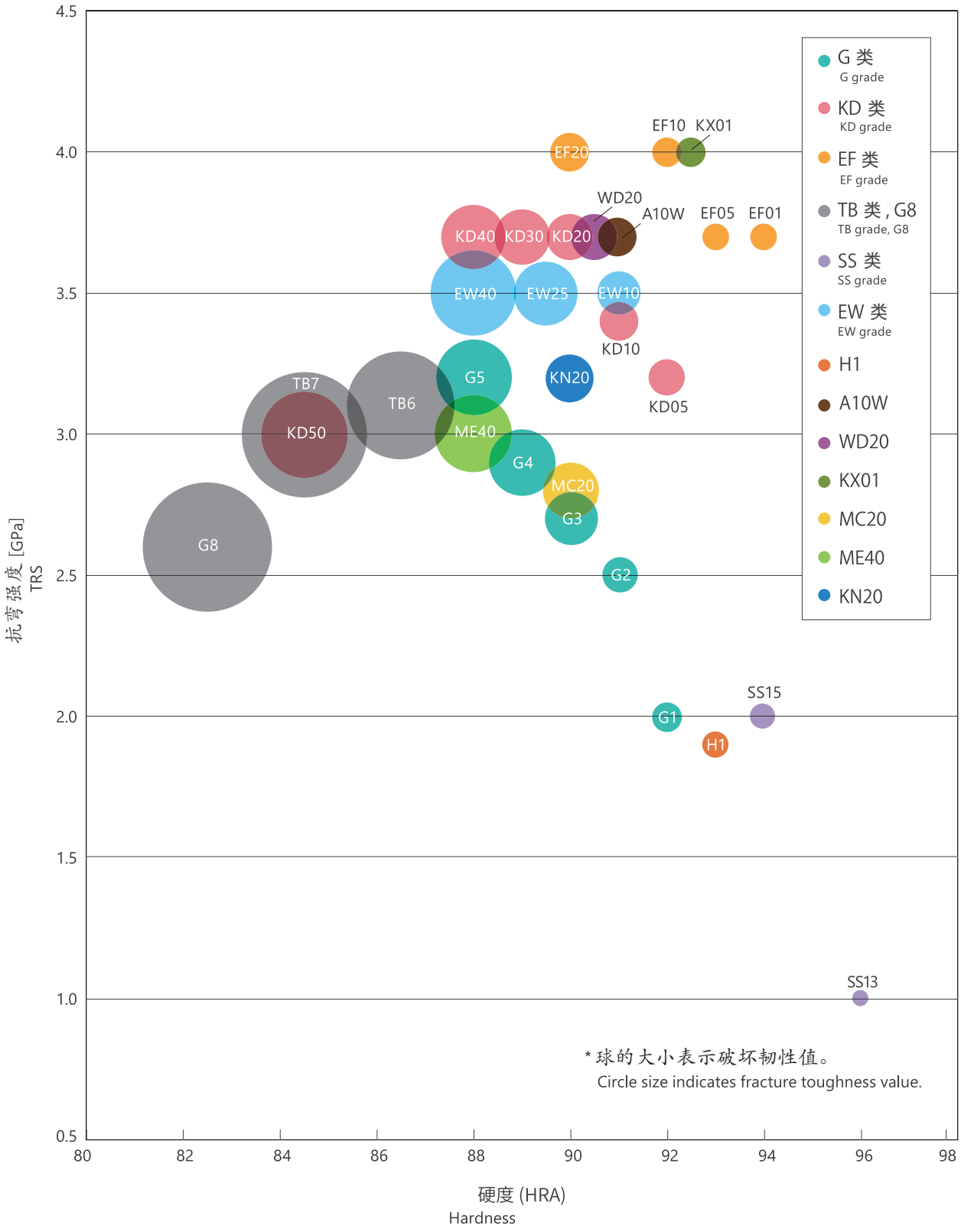
代号 Mark	硬度 Nominal hardness (HRA)
10	大于93
20	92-93
30	91-92
40	89-91
50	87-89
60	85-87
70	82-85
80	小于82

备注 表1-3是从TAS规格7000:2017中引用.

Remark Table 1 to 3 are quote from the TAS standard 7000：2017.

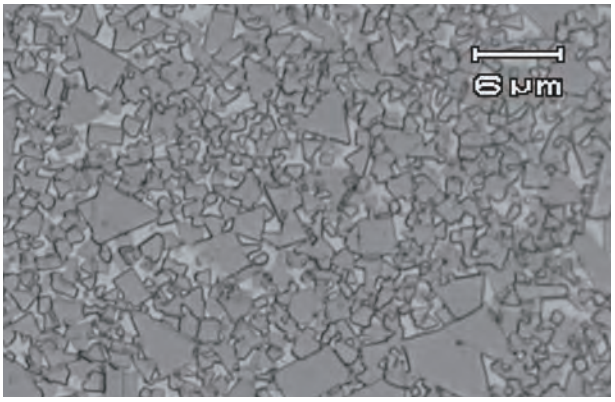
超硬合金材料定位表

SPECIFICATION CHART



材料类型显微镜组织
MICROSTRUCTURE OF EVERLOY GRADES

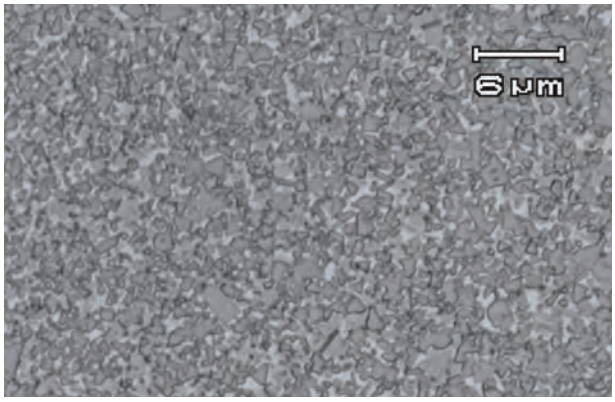
G类 G grade



WC粒度[μm] WC grain size	0.5～8.0
Co量[%] Co content	6～22

图例：G5
Photo : G5

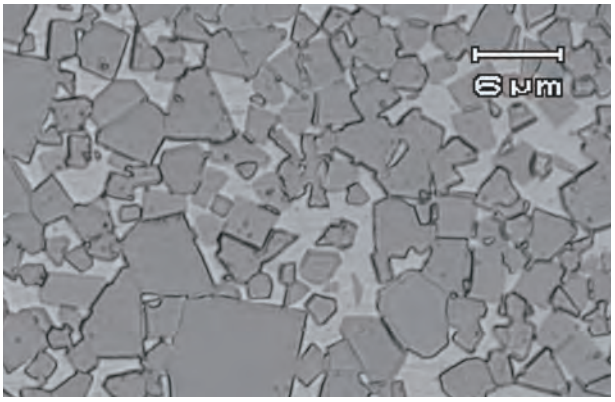
KD类 KD grade



WC粒度[μm] WC grain size	0.5～1.5
Co量[%] Co content	8～28

图例：KD20
Photo : KD20

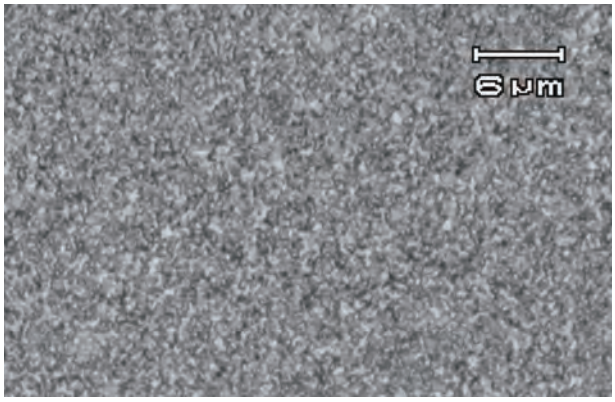
TB类 TB grade



WC粒度[μm] WC grain size	2.0～8.0
Co量[%] Co content	15 , 21

图例：TB6
Photo : TB6

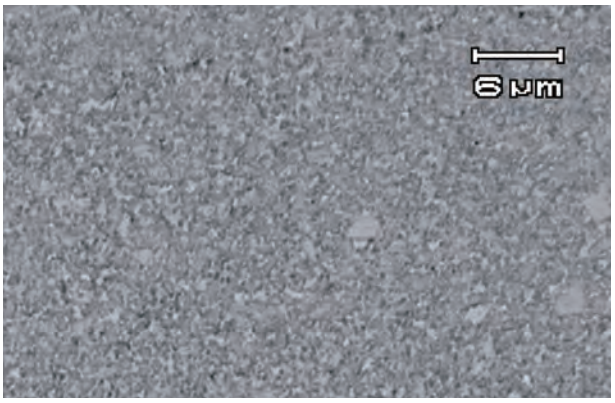
EF类 EF grade



WC粒度[μm] WC grain size	0.5～0.8
Co量[%] Co content	8～18

图例：EF10
Photo : EF10

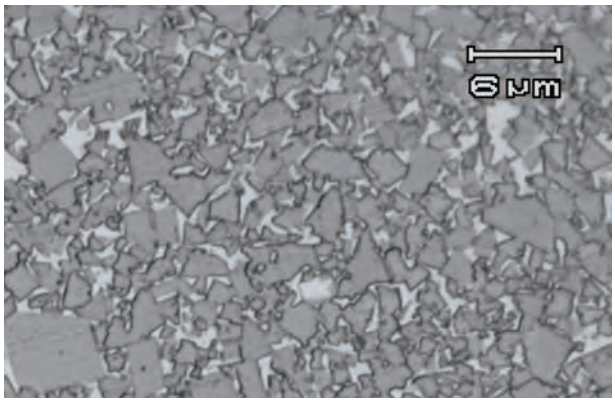
SS类 SS grade



WC粒度[μm] WC grain size	0.5～1.5
Co量[%] Co content	1 , 4

图例：SS13
Photo : SS13

EW类 EW grade



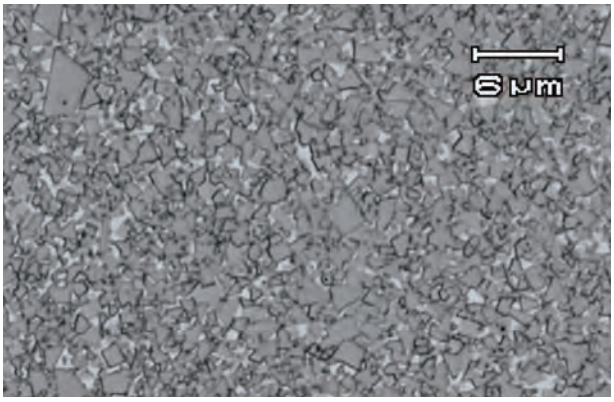
WC粒度[μm] WC grain size	1.0～5.0
Co量[%] Co content	7～15

图例：EW25
Photo : EW25

金属显微镜（X1000）
By metallurgical microscope (x1000)

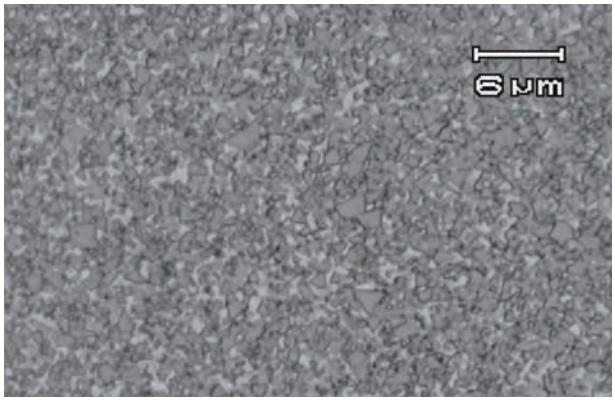
材料类型显微镜组织
MICROSTRUCTURE OF EVERLOY GRADES

A10W



WC粒度[μm] WC grain size	0.5～5.0
Co量[%] Co content	9

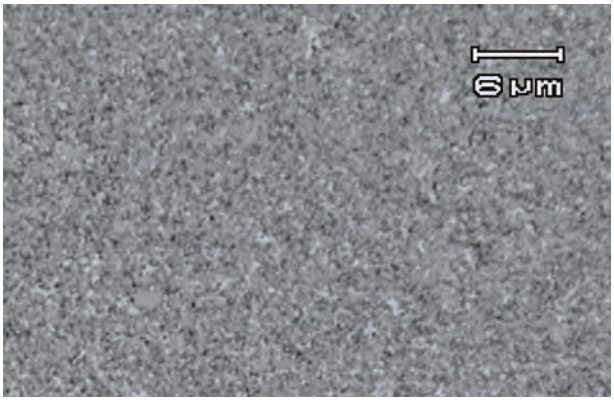
WD20



WC粒度[μm] WC grain size	0.5～1.5
Co量[%] Co content	13*

* 部分含有Ni。*Nickel is comprised partially.

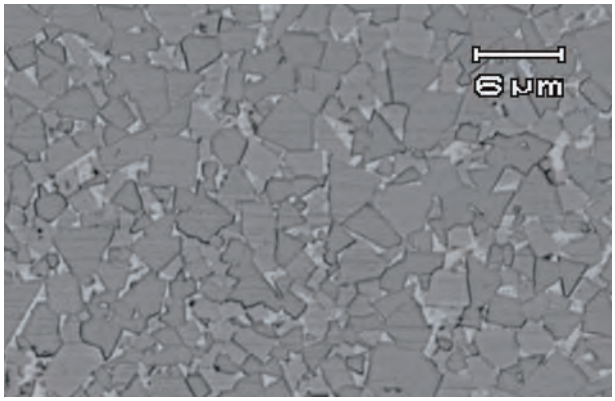
KX01



WC粒度[μm] WC grain size	0.5～0.8
Co量[%] Co content	13*

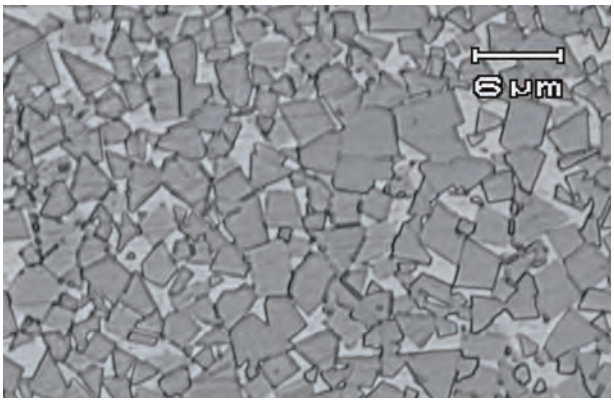
* 部分含有Ni。*Nickel is comprised partially.

MC20



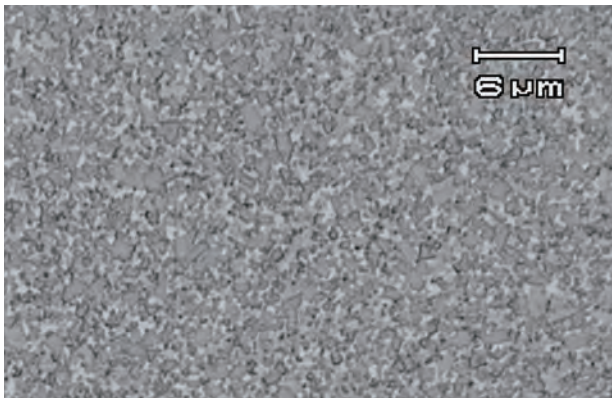
WC粒度[μm] WC grain size	0.5～5.0
Co量[%] Co content	6

ME40



WC粒度[μm] WC grain size	0.5～5.0
Co量[%] Co content	12

KN20

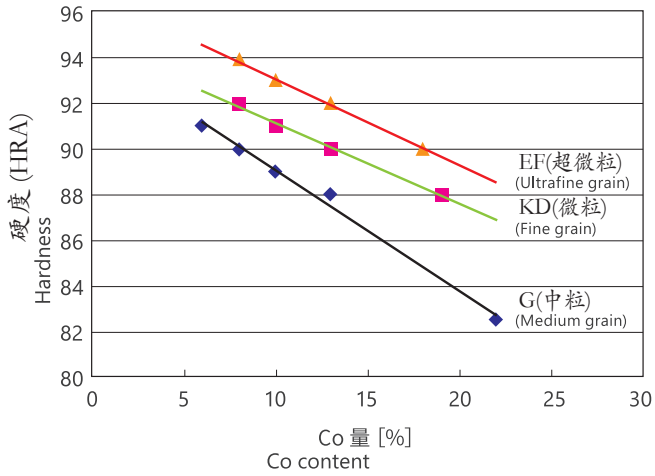


WC粒度[μm] WC grain size	0.5～1.5
Ni量[%] Ni content	12

金属显微镜（X1000）
By metallurgical microscope (x1000)

材料类型之各种特性
CHARACTERISTICS OF EVERLOY GRADES

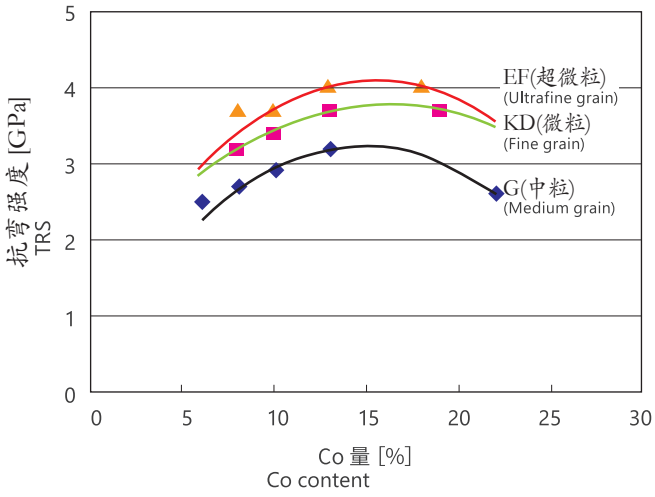
1. Co量与硬度之关联性
Relationship between Co content and hardness



Co含量越少，硬度就越高。于相同的Co含量之下，WC粒径越小硬度越高。

Hardness is increased when Co content is reduced. When the Co content is constant, hardness rises as the WC grain size becomes finer.

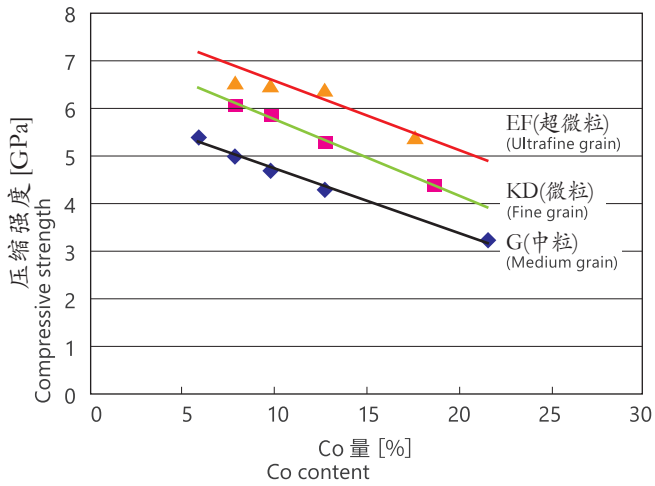
2. Co量与抗弯强度之关联性
Relationship between Co content and transverse rupture strength (TRS)



至一定量为止，Co 量越多抗弯强度就会越高。于相同的 Co 量之下，WC 粒径越小抗弯强度越高。

Up to a certain percentage, a higher Co content will increase the transverse rupture strength. Under the condition of constant Co content, finer WC grain size will result in a higher transverse rapture strength.

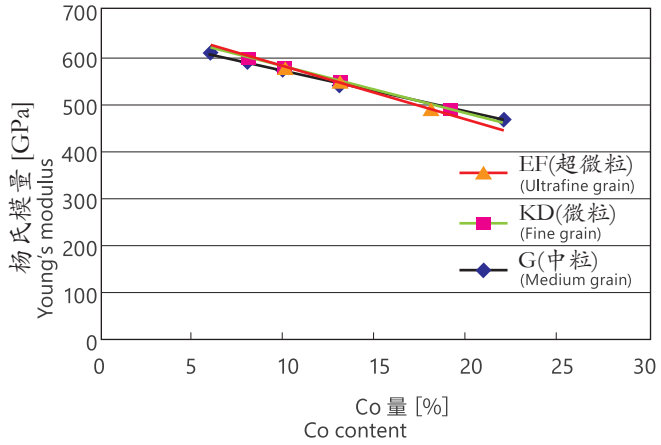
3. Co量与压缩强度之关联性
Relationship between Co content and compressive strength



Co量越少压缩强度就会越高。于相同的Co量之下，WC粒径越小压缩强度越高。

Lower Co content gives rise to a higher compressive strength. If the Co content remains constant, finer WC grain size raises the compressive strength.

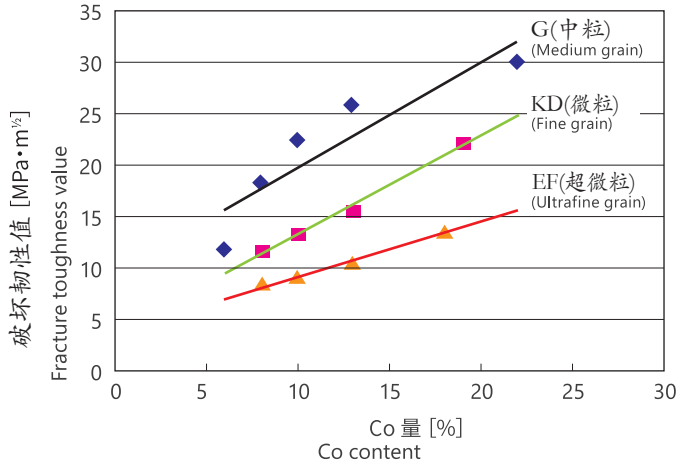
4. Co量与杨氏模量之关联性
Relationship between Co content and young's modulus



Co量越少杨氏模量就会越高。

Lower Co content gives to a higher young's modulus.

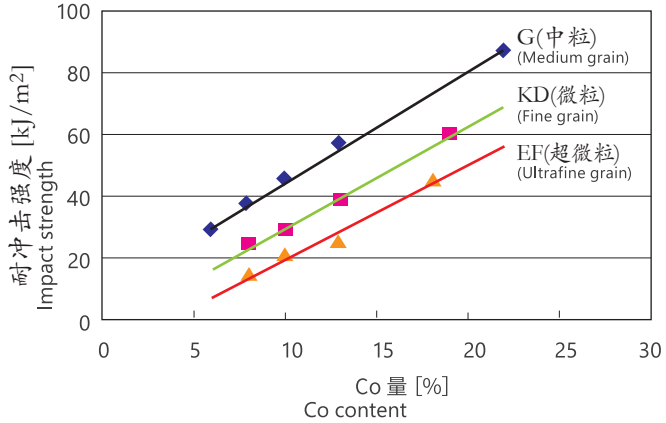
5. Co量与破坏韧性值之关联性
Relationship between Co content and fracture toughness value



Co量越多破坏韧性值就会越高。于相同的Co量之下，WC粒径越大破坏韧性值越高。

A larger content of Co increases fracture toughness value. When the Co constant stays constant, higher fracture toughness is achieved when the WC grain size is larger.

6. Co量与耐冲击强度之关联性
Relationship between Co content and impact strength



Co量越多耐冲击强度就会越高。于相同的Co量之下，WC粒径越大耐冲击强度越高。

A larger content of Co increases impact strength. If the Co content is constant, larger WC grain size will result in higher impact strength.

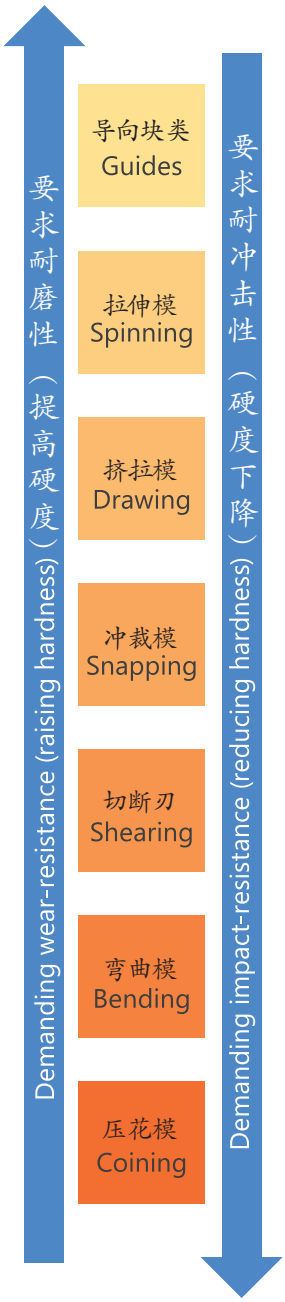
冲压模具选材TIPS

TIPS FOR PRESS MOLD

材料将从以下表格挑选出最适合之材质（若材料选择上出现错误，通常造成损坏或提早磨损。）

Everloy selects the most suitable material for respective applications from the materials shown in the chart below.
(A erroneous selection might engender breakage or wear-out in early stage.)

一般用途之选定标准
Selection criteria in the general applications



用途 Applications	材质 Grades	TAS分类 TAS classification	旧规格 (*1) Old standards	加工优势 Merits while processing
拉伸模（轻度冲击）Spinning dies (slight impact) 导向块类（轻度冲击~一般）Guide types (from slight impact to general conditions) 冲裁模（轻度冲击）Snapping dies (slight impact) 挤拉模（轻度冲击）Drawing dies (slight impact)	EF01（高耐摩耗）(Highly abrasion resistant)	VF-10	Z01	耐剥落性 Chipping-resistance
	EF05	VF-10	Z01	
	EF10	VF-20	Z10	
	KX01（不锈钢用）(Stainless steel processing)	VF-20	Z10	
	KD05	VF-20	V20	
	KD10	VF-30	V20	
	A10W	VM-30	V20	放电加工性 For EDM
	H1	VM-10	V10,K01	耐剥落性 Chipping-resistance
	G1	VM-20	V10,K10	—
	G2	VM-30	V20,K20	
拉伸模（一般~重度冲击）Spinning dies (from general conditions to heavy impact) 导向块类（一般）Guide types (general conditions) 冲裁模（轻度冲击~一般）Snapping dies (from slight impact to general conditions) 挤拉模（一般~重度冲击）Drawing dies (from general conditions to heavy impact)	EF20	VF-40	Z30	耐剥落性 Chipping-resistance
	KD20	VF-40	V30	
	KN20（非磁性·耐腐蚀）(Non-magnetic, Anti-corrosive)	NF-40	V30	
	WD20	VF-40	V30	耐剥落性·放电加工性 Chip.-resistance/for EDM
	MC20（软质金属用）(Soft metal processing)	VC-40	V20	—
	G3	VM-40	V30,K30	
	G4	VC-40	V30,K30	
拉伸模（伴随冲击）Spinning dies (with impact) 弯曲模（最普通）Bending dies (most general conditions) 冲裁模（最普通）Snapping dies (most general conditions) 切断刃（一般）Shearing blades (general conditions)	KD30	VF-40	V30	耐剥落性 Chipping-resistance
	KD40	VF-50	V40	
	ME40	VC-50	V30	放电加工性 For EDM
	G5	VC-50	V40	—
弯曲模（伴随冲击）Bending dies (with impact) 冲裁模（伴随冲击，板厚较大等情况）Snapping dies (with impact, with thick, large plates, etc.) 压花模（轻度冲击）Coining dies (slight impact) 切断刃（伴随冲击）Shearing blades (with impact)	TB6	VU-60	V40	—
弯曲模（冲击特别严重时）Bending dies (especially with large impact)	KD50	VF-70	V60	耐剥落性 Chipping-resistance
拉伸模（冲击大、板厚大等情况）Snapping dies (with impact, with thick large plates, etc.) 压花模（一般）Coining dies (general conditions) 切断刃（冲击大）Shearing blades (with large impact)	TB7	VU-70	V50	—
压花模（伴随冲击）Coining dies (with impact)	G8	VU-80	V60	—

注记 *1. JIS 包含　Notes *1. Included JIS

特殊用途之材料选定标准
Selection criteria in the special applications

选定时期 Timing of selection	特性 Characteristic	选用参考 Selection criteria	
加工时 While processing	耐崩落性 Chipping-resistance (Grinding-resistance)	一般选用KD类，需要锐利锋刃冲头时选用EF类。	Select KD grade for general use and EF grade when a sharper edge is needed.
	放电加工性 For EDM	一般选用KD类，如果想要抑制放电加工中裂纹的影响可选用A10W。另外，在采用水作为加工液时如需要抑制腐蚀可选用WD20。	Select KD grade for general use and A10W to control the electrical discharge crack effect. Select WD20 grade to control corrosion when water is used as a processing fluid.
使用时 While using	高耐磨损性 High abrasion resistant	一般来讲，H1、EF05硬度高，耐磨性好，如想进一步提高耐磨性，可选用对使用有一定要求的SS类和EF01材料。	Generally, H1 and EF05 offers the highest hardness and excellent abrasion resistance. When increased abrasion resistance is needed, select SS grade or EF01, but it must be handled with care.
	非磁性，耐腐蚀性 Non-magnetic and anti-corrosive	磁场成形用模具等需要非磁性材料时，选用KN20。同时，KN20有良好地耐腐蚀性、耐氧化性，也可用于机械密封和镜片成形用模具。	Select KN20 for non-magnetic applications such as molding for forming magnetic fields. Select KN20 for mechanical seals and so on because it is highly corrosion-resistant and acid-resistant.
	软质金属加工用 Soft metal processing	加工纯铁、纯铜等易于与超硬合金产生亲和反应的金属时，选用可抑制反应的MC20。	When processing pure iron, pure copper, and other highly reactive metals with tungsten carbide, select MC20 to suppress reactions.
	不锈钢加工用 Stainless steel processing	加工不锈钢等热传导率低，易产生加工硬化的金属时选用KX01。	Select KX01 when processing stainless steel and other metals with low thermal conductivity that tend to contribute to work-hardening.

冲压模预成型件的尺寸
Dimension for press mold tips

冲压模预成型件分为按照指定尺寸所制作之烧结品、部分加工品(磨削)及成品。烧结品之标准单边尺寸为0.5mm。但模具方块具有异形孔时，一般会以1个开孔或复数开孔的状态来出货。(此开孔将作为用户端进行放电加工时之通液导孔)。另外亦可供应螺纹孔制品。

There are several types of tips for press mold as follows ;
Tips totally sintered to dimensions.
Tips partially ground.
Finished tips.
For sintered chips, standard grinding allowance is 0.5 mm per side, however, in cases of designed various differently shaped holes in a die block, it is common for the block to be supplied with one or several holes left in it. (Liquid solution is passed through the hole for electric discharge machining process.)
Furthermore, direct tapping is available.

■直接攻丝的加工范围（烧结品） Manufacturing coverage of direct tapping (Sintered tapping)

正常的螺纹径 Nominal designation of thread	M2	M3	M4	M5	M6	M8	M10	M12	M14	M16
深度 [mm] Depth of complete thread	8	30	30	30	30	30	30	30	30	30
间距 [mm] Pitch	0.4	0.5	0.7	0.8	1.0	1.25	1.5	1.75	2.0	2.0

备注
- 螺纹形状为JIS(ISO)以外规格。
- 除上述尺寸外，其它尺寸可以咨询商谈。
- 除上述记载的加工范围，其它加工范围也可咨询商谈。

Remarks
- The screw shape is JIS(ISO) non-standard.
- Please consult about a size other than the above.
- Please consult screw size except above-mentioned.

超硬合金G类

CEMENTED CARBIDE - G GRADE

LINE UP..... G1, G2, G3, G4, G5, G8

普通的超硬合金材质。
“EVERLOY”品牌的超硬合金因高品质高性能被国内外广知。

多用于通用工具和模具零件。优异的耐磨性，韧性和可加工性的平衡。

General cemented carbide.
"EVERLOY" cemented carbide is well known as high quality and performance around the world.

Be often adopted as various versatile tools and mold parts.
Excellent balance of wear-resistance, toughness and machinability.

产品说明 Explanation	通过使用细粒WC可以获得高硬度和高强度，具有良好地耐磨性和抗裂性。 Outstanding wear and crack resistance by fine grained WC.
使用注意 Note	在腐蚀环境下使用时，注意腐蚀的问题。 Be careful of corrosion problem under corroding environment.
用途/实例 Applications	冲裁模、弯曲模、拉伸模、粉末成型模、辊轧等 Snapping, Bending, Spinning, Powder compacting, Cold rolling, etc.

超硬合金TB类

CEMENTED CARBIDE - TB GRADE

LINE UP TB6, TB7

耐冲击用超硬合金材质。

适用于需要耐冲击的多用途工具和模具零件。

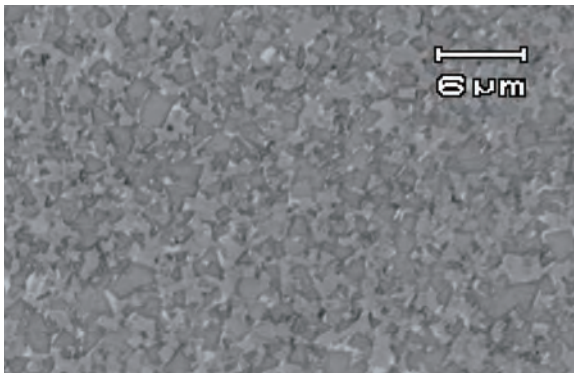
良好地抗放电加工破损性能。

Cemented carbide for impact-resistance.

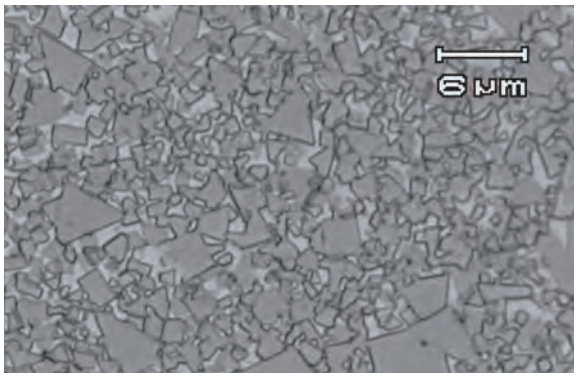
Be often adopted for versatile tools and mold parts which need impact-resistance.
Excellent durability for breakage caused when EDM.

产品说明 Explanation	使用粗颗粒WC和高钴含量，具有优异的耐破损性和抗裂性。 Outstanding wear and crack resistance by coarse grained WC and high cobalt content.
用途/实例 Applications	冷锻模具零件等 Cold forging mold parts, etc.

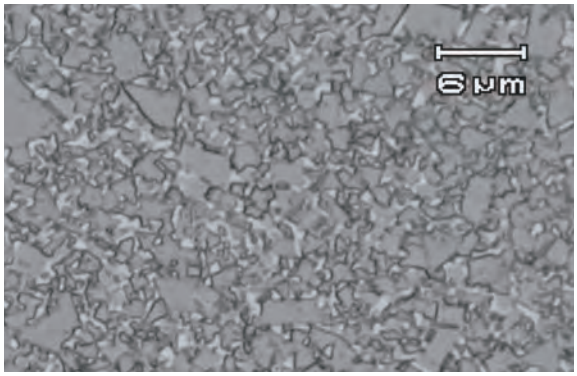
G类与TB类之显微镜组织图
Micrographs of the G grade and TB grade



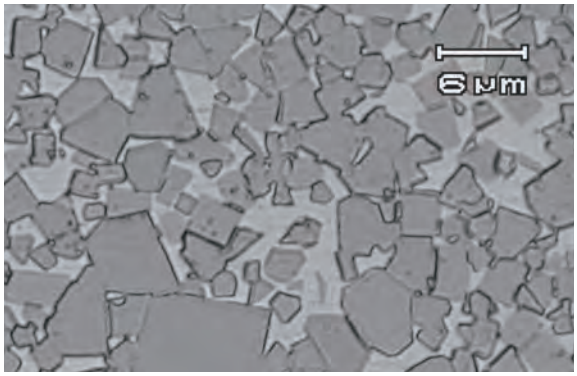
G1



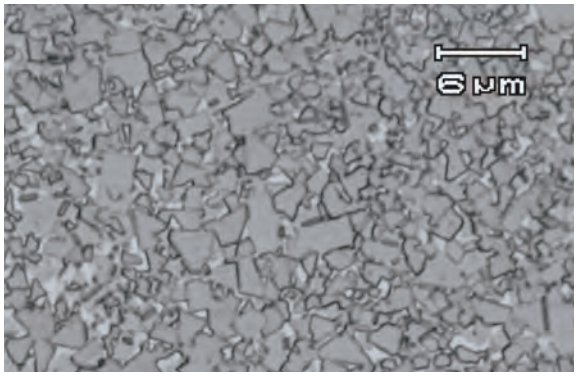
G5



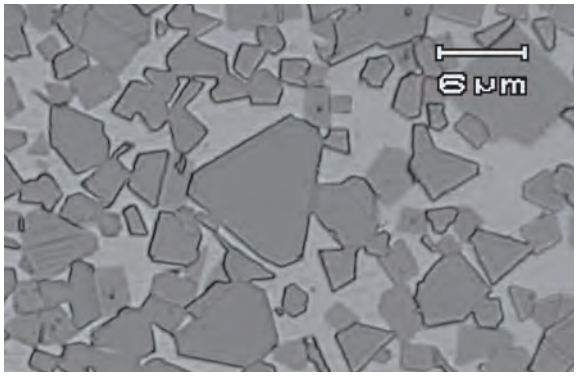
G2



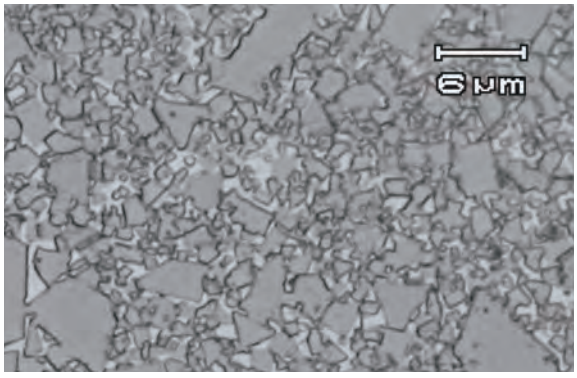
TB6



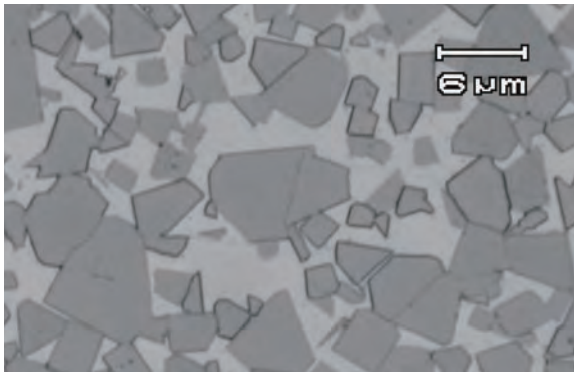
G3



TB7



G4



G8

金属显微镜（X1000）
By metallurgical microscope (×1000)

微粒子超硬合金 KD类

FINE-GRAIN CEMENTED CARBIDE - KD GRADE **LINE UP..... KD05, KD10, KD20, KD30, KD40, KD50**

用于IC引线框架冲压的标准硬质合金材料。“EVERLOY”的“KD20”类材料因其高品质和高性能在海内外业界享有非常高的知名度。

KD类超硬质合金是以提高耐剥落性及韧性为目的所研发的材质，是一种Co量含量较高，含有微粒子WC（直径0.5-1.5μm）的微粒子超硬合金。

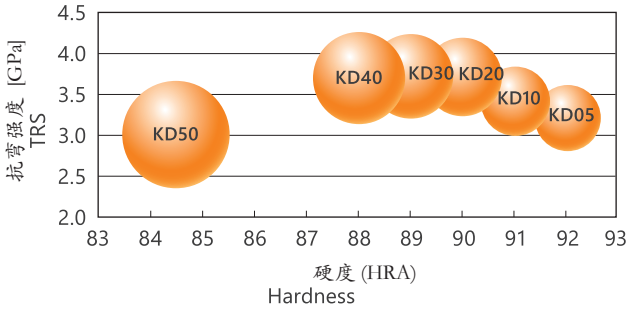
多用于半导体的IC引线框架、连接器、电动机的电磁钢板以及粉末成型等冲压模具。
具有卓越的耐剥落性及韧性，在精密加工及使用时不容易产生剥落，可延长精密模具的使用寿命。

Standard cemented carbide grade for IC lead frame industry.
"EVERLOY""KD20" cemented carbide is well known as high quality and performance around the world.

Be often adopted for press mold of IC lead frame, magnetic steel sheet and powder compacting.
Excellent balance of wear-resistance, toughness, mold life and machinability.

产品说明 Explanation	通过使用微粒WC，获得了高硬度和高强度，具有良好的耐磨损性和耐剥落性。 High performance of hardness, toughness, wear and chipping resistance by fine grain WC.
用途/实例 Applications	用于电子元件，电磁性钢板冲压模具，粉末成型模具等。 Mold for Electronic component, Magnetic steel sheet, Powder compacting, etc.

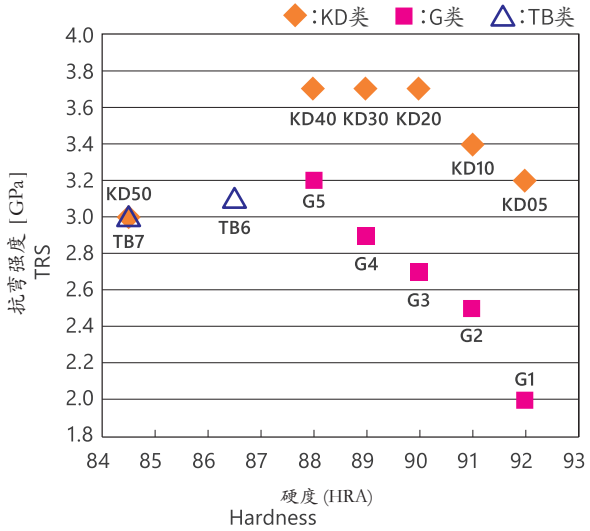
KD类加工性能和耐磨损间的关系
Relation between wear-resistance and machining property for KD grade



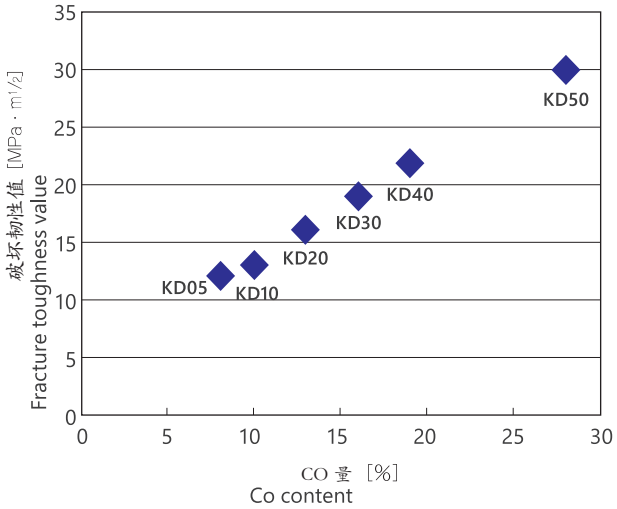
抗弯强度高、球越大=加工性良好
硬度高=耐磨损性良好
High TRS/Larger circle = Excellent machining property
High Hardness = Excellent wear-resistance

*球的大小反映的是材料的破坏韧性值
Circle size indicates fracture toughness value.

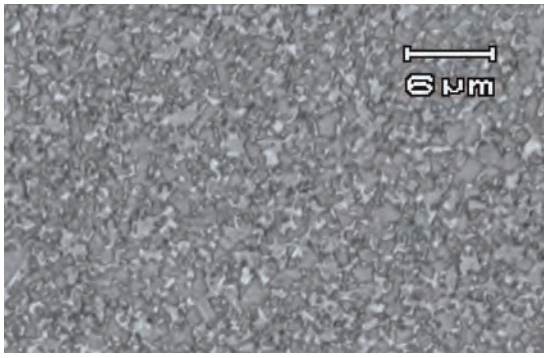
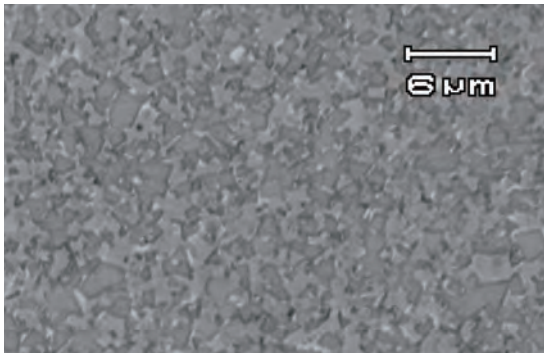
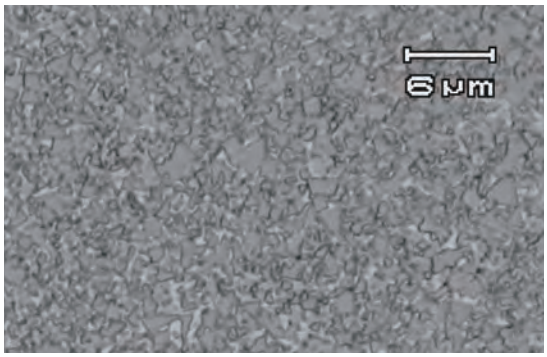
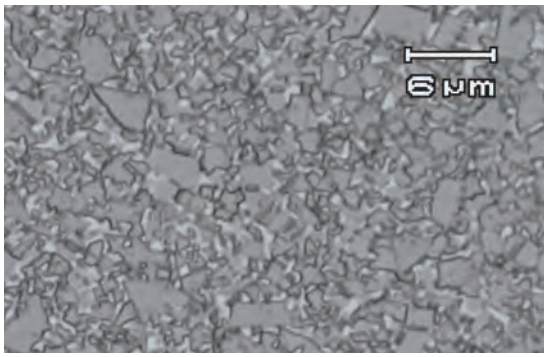
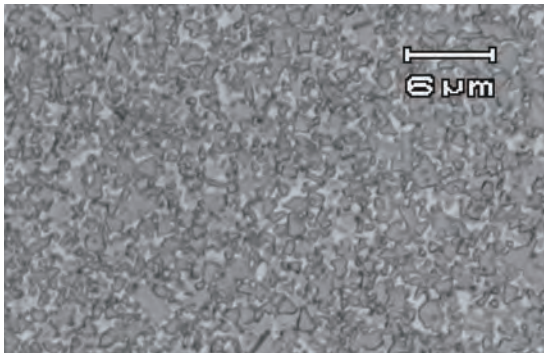
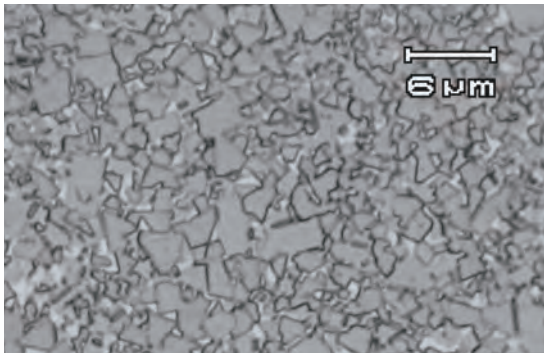
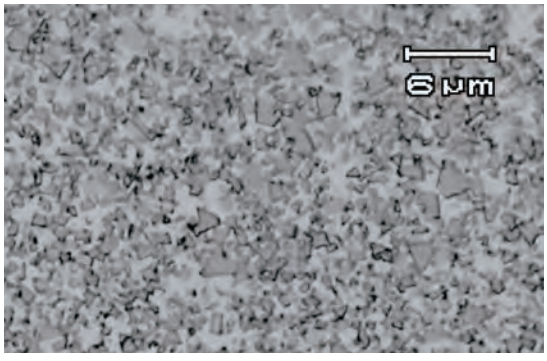
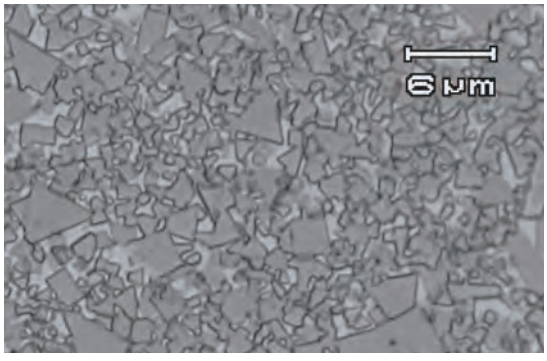
物理特性（HRA硬度和抗弯强度）
Hardness and TRS



物理特性（破坏韧性值）
Fracture toughness value



KD类与G类之显微镜组织图
Micrographs of the KD grade and G grade

KD类 KD grade	G类 G grade
 KD05	 G1
 KD10	 G2
 KD20	 G3
 KD40	 G5

金属显微镜（X1000）
By metallurgical microscope (×1000)

平面研磨时所产生之剥落比较实验结果（根据显微镜照片）
Comparison test results of the chipping generated during the surface grinding （micrographs）

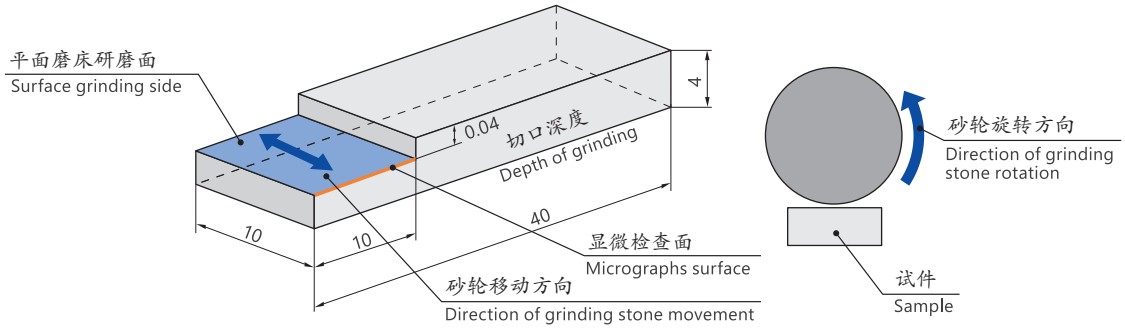
■试件 Sample

KD类 KD grade	KD20　KD30　KD50
G类　G grade	G5
EF类　EF grade	EF10

■平面磨床研磨条件 Surface grinding conditions

加工量 Amount moved	0.04 mm（0.004mm/次 重复10次） 0.04 mm (10 × 0.004 mm)
进给速度 Speed	17 m/min
使用砂轮 Grinding stone	#600　φ180 mm
砂轮转数 Grinding stone revolutions	3200 rpm

■显微检查面: 砂轮离开侧之侧面边缘
Micrograph surface : Escape side edge of grinding stone



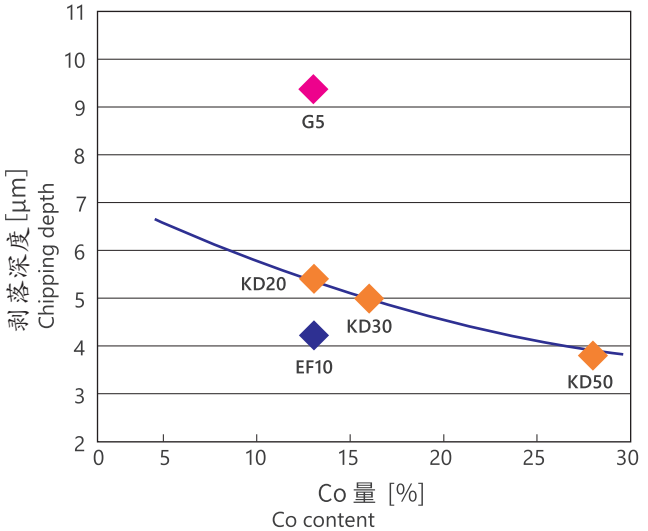
■实验结果 Test results

剥落评价结果 Chipping test results

材质 Grade	Co量 [%] Cobalt content	剥落深度 [μm] Chipping depth
KD20	13	5.4
KD30	16	5.0
KD50	28	3.8
G5	13	9.4
EF10	13	4.2

耐剥落特性　Chipping-resistance characteristics

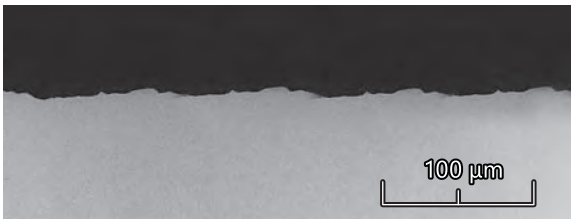
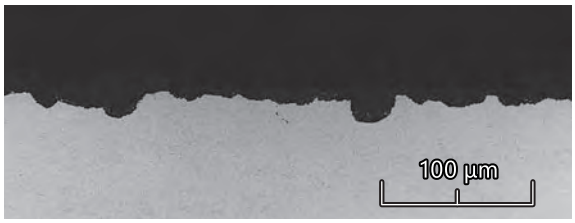
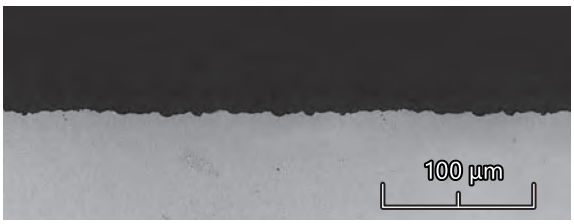
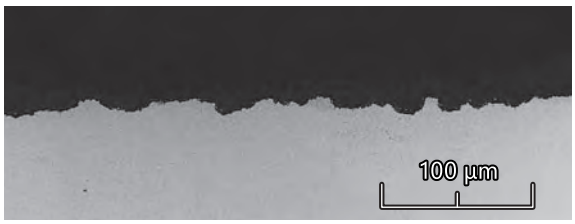
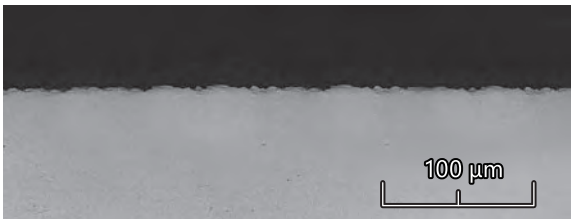
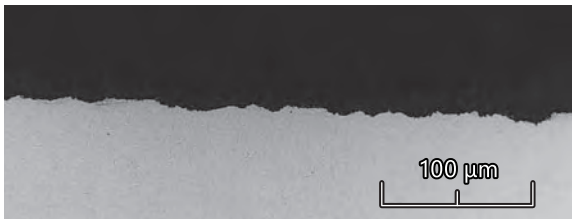
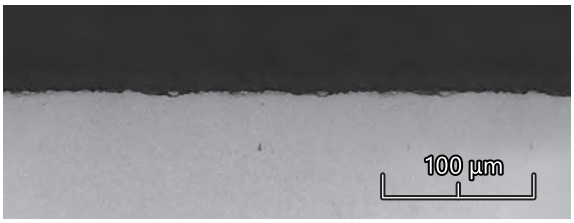
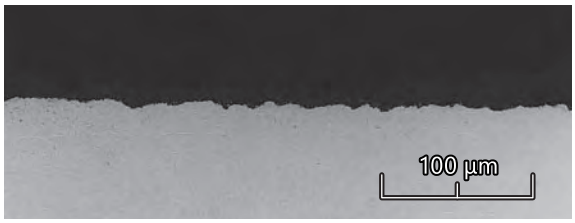
粒子径越细、钴含量越多、耐剥落性越强。
The finer grain and the more cobalt contained, the greater chipping-resistance it has.



检查面的照片（×500）
Micrographs surface (×500)

以下为针对各表面边缘部位中剥落明显可见之部位所拍摄之照片，虽然并不是所有的边缘都呈现这样的状态，但各种材料之剥落趋势与照片中所呈现之趋势相同。

The following photos show the phases of the edges where chipping was notable and are not representative of all the edges. However, the photos do show the tendency for chipping in various types of materials.

KD 类 KD grade	G 类 G grade
 KD05	 G1
 KD10	 G2
 KD20	 G3
 KD40	 G5

■ 试件 Sample

KD类 KD grade	KD05	KD10	KD20	KD40
G类 G grade	G1	G2	G3	G5

■ 表面研磨条件 Surface grinding conditions

加工量 Amount moved	0.07 mm (0.02 mm/次 重复3次+0.01 mm/往返) 0.07 mm (3× 0.02 mm+ 0.01 mm / both ways)
进给速度 Speed	3.0 mm/min
使用砂轮 Grinding stone	#400 ϕ75 mm
砂轮转数 Grinding stone revolutions	3600 rpm
行程数 Number of strokes	85 spm
行程量 Amount of strokes	27 mm

放电加工用超硬合金A10W

CEMENTED CARBIDE FOR EDM - A10W

抑制放电加工时的损坏。

缓和了放电线切割时的损伤，同时具备高硬度。
减少了放电线切割时的裂纹。

Easing damage when EDM.

Easing damage when EDM with high hardness.
Crack reduction when EDM.

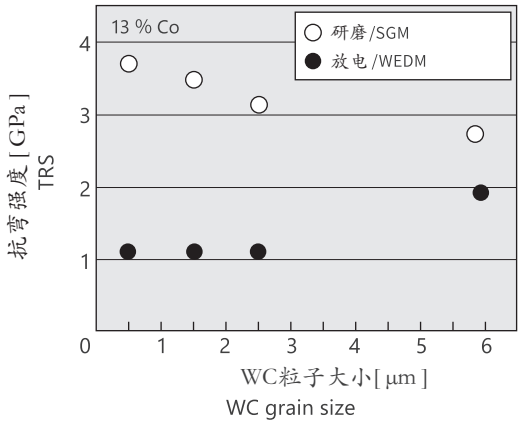
产品说明 Explanation	由于是微粒子合金，具有良好地耐磨损性和耐剥落性。 通过在微粒WC中添加适量分散的粗粒WC的粒子设计和耐腐蚀成分，有效阻止放电加工时的龟裂传播，抑制了材料的剥落及电解腐蚀。 因为钴含量低，降低了放电加工时发生的变质层厚度。 Outstanding wear and chipping resistance by ultrafine grain cemented carbide. This material prevents chipping, corrosion and crack extension when EDM because coarse grain WC are dispersed in the main field of fine grain WC. This material has alteration layer thickness thinning on the surface of cemented carbide for when EDM because of low cobalt content material.
用途/实例 Applications	精密模具（冲裁・弯曲・拉伸・粉末成形）放电加工模具等其它超硬合金制品。 Precision molds (Snapping, Bending, Spinning and Powder compacting), Molds produced when EDM, etc.

一般放电加工与超硬合金之相关性

The relation between generality WEDM and cemented carbide

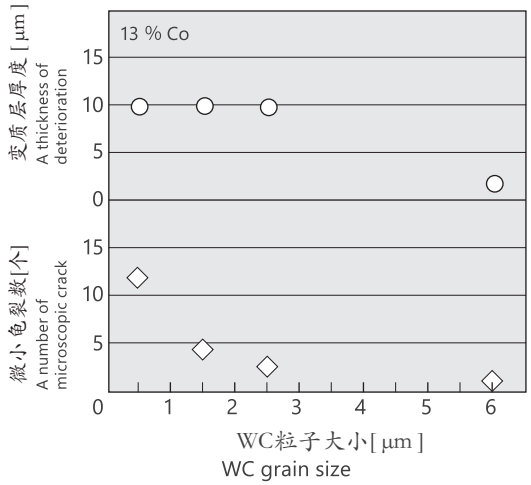
于不同WC粒子大小下之平面研磨和放电加工后抗弯强度比较

The relation between WC grain size and TRS (Transverse Rupture Stength) after SGM (Surface Grinding Machining) or WEDM (Wire Electric Dischage Machining) of the first cut.



于不同WC粒子大小下之放电加工后（第一割）于500μm距离中的微小龟裂数及变质层厚度比较

The relation between WC grain size and a number of microscopic crack in 500 μm distance of a thickness of deterioration layer after WEDM of the first cut.



此图表代表放电加工与超硬合金 WC 粒子大小的相关性。WC 粒子越小，放电加工后的抗弯强度就会呈现降低的趋势。
这是因为微粒类合金中的微粒越小，放电加工后所产生的加工变质层越厚、微小龟裂也较多的缘故。

These figures show the relation between the WEDM process and the WC grain size of cemented carbide. It is revealed that the smaller the WC grain size becomes, the lower TRS after WEDM results. This is probably because the finer the alloy grains become the thicker the layer deteriorates after the WEDM process gets and more microscopic cracks are produced.

放电加工用超硬合金A10W

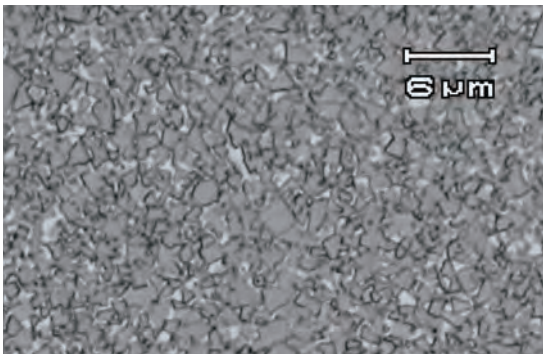
CEMENTED CARBIDE FOR EDM - A10W

A10W之物理特性
Physical property of A10W

本公司产品代号 Our grade	密度 Density [×10³ kg/m³] {g/cm³}	硬度 Hardness HRA	抗弯强度 TRS [GPa]
A10W	14.5	91.0	3.7

(代表值/ Typical figures)

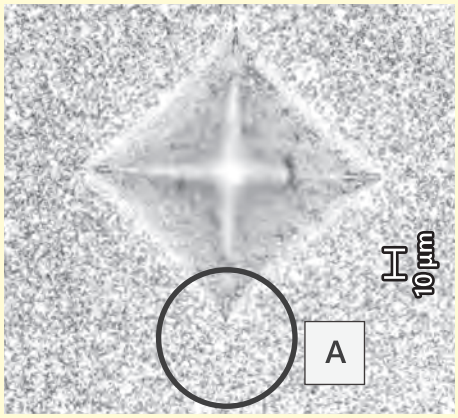
A10W组织照片
Micrographs of A10W grade



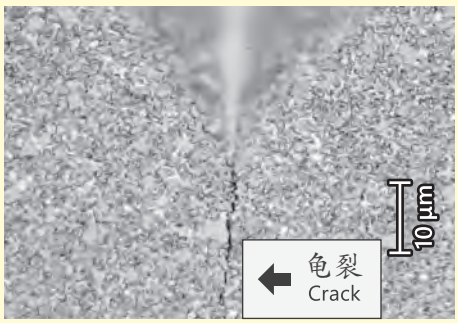
金属显微镜（X1000）
By metallurgical microscope (×1000)

A10W与KD10之龟裂进展比较
Comparison of crack extension between A10W and KD10

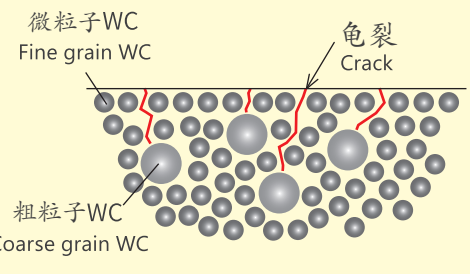
A10W HV(98N)1700



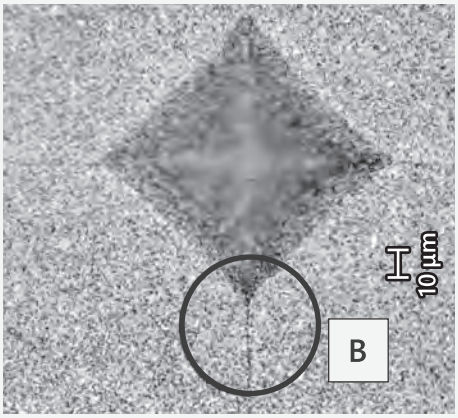
×400



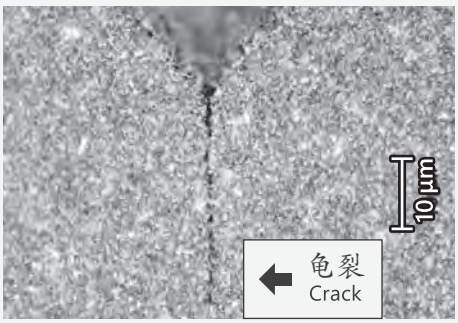
A部放大 ×1000
"A" part expansion



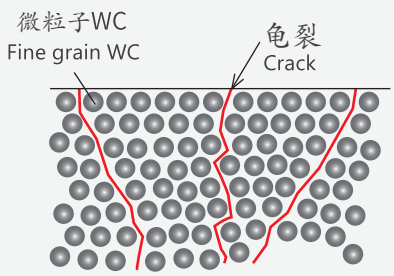
KD10 HV(98N)1700



×400



B部放大 ×1000
"B" part expansion



线切割用超硬合金WD20

CEMENTED CARBIDE FOR WEDM (WATER TYPE) - WD20

大幅提升线切割时之耐腐蚀性。

比起KD20的耐腐蚀性WD20得到了更好的改善

Excellent corrosion-resistance in the WEDM (WATER TYPE) process.

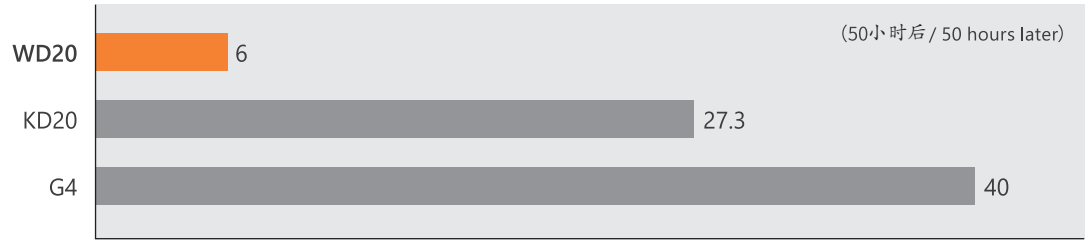
Improvement of corrosion-resistance against KD20 during dielectric water immersed WEDM (WATER TYPE) process over long operating hours.

产品说明 Explanation	通过提高耐腐蚀性成分，从而实现了优异的耐腐蚀性。 通过使用微粒子WC，获得了高硬度和高强度，使其具有良好的耐磨损性和耐剥落性。 WD实现了KX01不能加工厚的不锈钢的问题。 Excellent corrosion-resistance by the special component design. High hardness, toughness, wear-resistance and chipping-resistance by fine grain WC. Has succeeded for thick stainless sheet such as unsuitable for KX01.
用途/实例 Applications	适用于长时间水介质线切割放电加工模具、湿式加工时发生腐蚀现象的模具、以及在潮湿环境下贮存时易发生腐蚀的模具用，或者作为超硬合金制成的部件。 Mold parts concerned when WEDM (water type) in prolonged manufacturing. Mold parts concerned corrosion when wet type processing. Mold parts concerned corrosion under humidity environment at storage, etc.

耐腐蚀性比较
Comparison of corrosion-resistance

将试件（WD20、KD20、G4）浸泡在线切割加工液（水）中比较其腐蚀减少量。

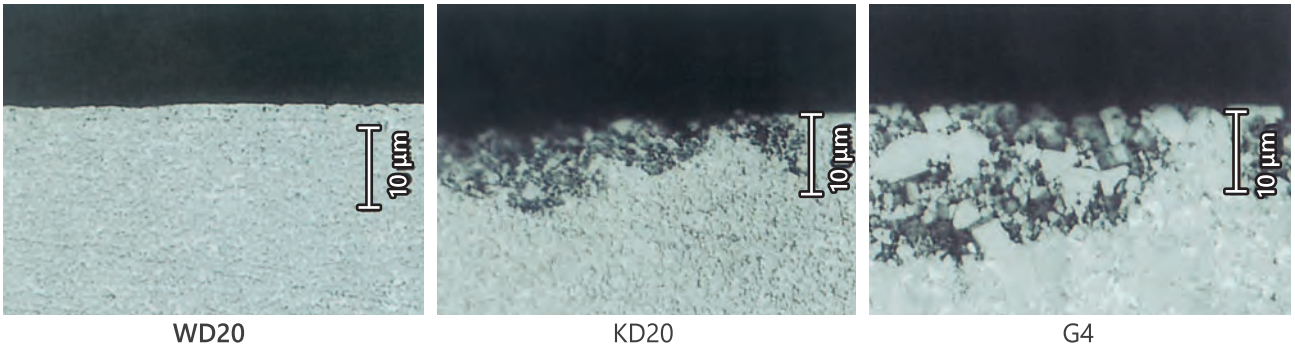
The test pieces of WD20, KD20 and G4, were tested to determine the loss in weight resulting from immersion during dielectric water WEDM (WATER TYPE) process.



在线切割加工液（水）中浸泡50小时后的腐蚀情况

Microstructure of test pieces showing depth of corrosion after 50 hours of immersion during dielectric water WEDM (WATER TYPE) process.

(×1500)



WD20　KD20　G4

腐蚀会导致Co结合剂溶出，从而使WC粒子发生脱落。

Corrosion causes elution of cobalt binder phase and loss of WC grain.

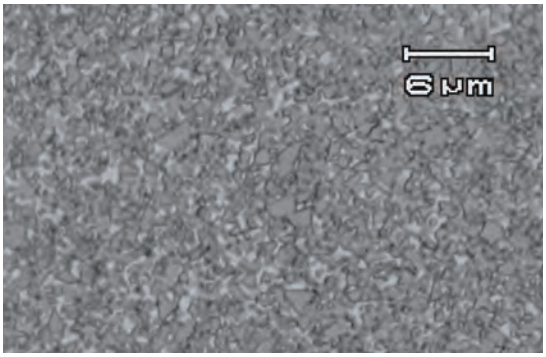
线切割用超硬合金WD20
CEMENTED CARBIDE FOR WEDM (WATER TYPE) - WD20

WD20物理性能
Physical property of WD20

本公司产品代号 Our grade	硬度 Hardness HRA	抗弯强度 TRS [GPa]	破坏韧性值 Fracture toughness values [MPa・m$^{1/2}$]
WD20	90.5	3.7	16
参考 KD20 Reference KD20	90.0	3.7	16
参考 G4 Reference G4	89.0	2.9	22

(代表值/ Typical figures)

WD20组织图片
Micrographs of WD20



金属显微镜（X1000）
By metallurgical microscope (×1000)

腐蚀实验方法
Corrosion test method

如图1般将试件排列于线切割加工（50小时）中的超硬合金上并浸泡于加工液中。
试件已预先在线切割机进行精加工（单面），使加工面与加工物件呈现垂直配置的状态。

A test was carried out with the following procedure :
- One surface of each test piece of WD20, KD20 and G4(8 mm × 10 mm × 20 mm) was prepared by WEDM (WATER TYPE).
- The test pieces were placed on a cemented carbide workpiece with their WEDM prepared surface facing upwards while the workpiece was subject to dielectric water immersed WEDM process as shown in the figure below (Fig. 1). The surfaces of the test pieces were then observed through a microscope.

图1　腐蚀试验的状态
Fig. 1 Condition of corrosion test

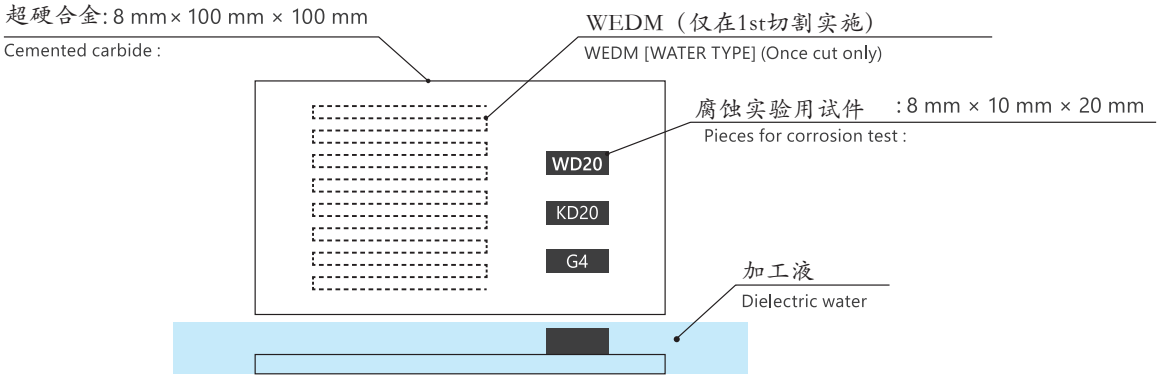
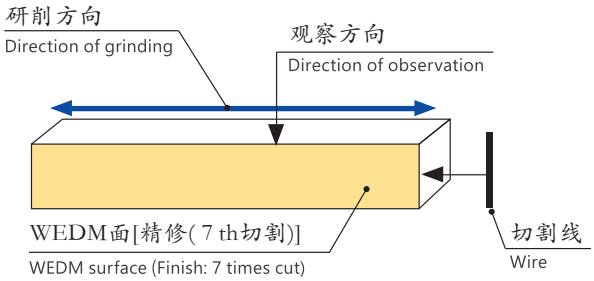


图2　试件放大图
Fig. 2 Magnified figure of a test piece



■加工条件 Cutting condition

线 Wire type	0.1 mm / Brass
工作物件 Workpiece	超硬合金（厚度：8 mm） Cemented carbide (Thichness : 8 mm)
加工液 Dielectric	离子交换水（电阻率：8×10^4 Ω·m） Ion exchange water (Water resistivity : 8×10^4 Ω·m)
加工速度 Cutting speed	600 μm/min

超微粒子超硬合金EF类

ULTRAFINE GRAIN CEMENTED CARBIDE - EF GRADE LINE UP EF01, EF05, EF10, EF20

超微粒子合金

高硬度・高抗弯强度以及锐利模具刀口之精密加工的实现。

Ultrafine grain cemented carbide

High hardness, high transverse rupture strength and sharp edge.

产品说明 Explanation	是广泛硬度（90~94HRA）的超微粒子超硬合金的系列。 通过高耐磨耗性实现了高寿命。 Ultrafine grain material grade with various hardness range (HRA 90 - 94) . Long life by high wear-resistance.
使用注意 Note	EF属于超微粒合金，具有高硬度和高抗弯强度，因此在使用和加工时，需注意冲击和放电加工中的损伤。 Ultrafine grain carbide such as EF have physically unresisting against impact or damage by EDM whereas high hardness and transverse rupture strength.
用途/实例 Applications	用于电子元件、粉末成型、树脂成型、高速冲压等模具 Mold for electronic component, powder compacting, resin forming, high speed press(Punch, Dies, Bending punch and Die), etc.

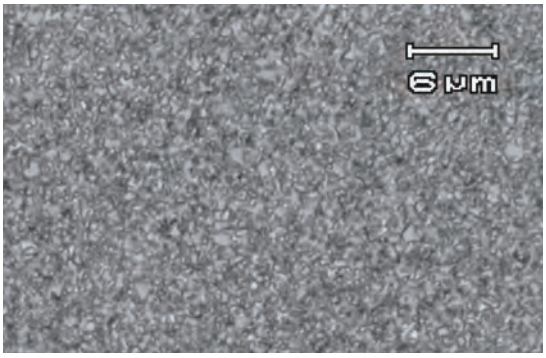
EF类物理性能
Physical property of EF grade

本公司产品代号 Our grade	密度 Density [×10³ kg/m³] {g/cm³}	硬度 Hardness		抗弯强度 TRS [GPa]
		HRA	HV	
EF01	14.5	(94.0) (*1)	2000	3.7
EF05	14.3	93.0	1900	3.7
EF10	14.0	92.0	1750	4.0
EF20	13.6	90.0	1480	4.0

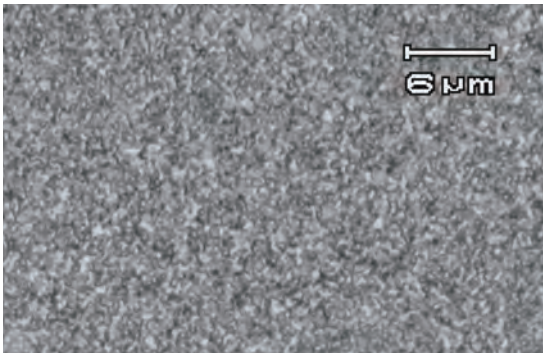
(代表值/ Typical figures)

备注：*1表示的是从HV硬度得出的换算值
Note *1. The number shows the reduced value from HV.

EF类组织照片
Micrographs of EF grade



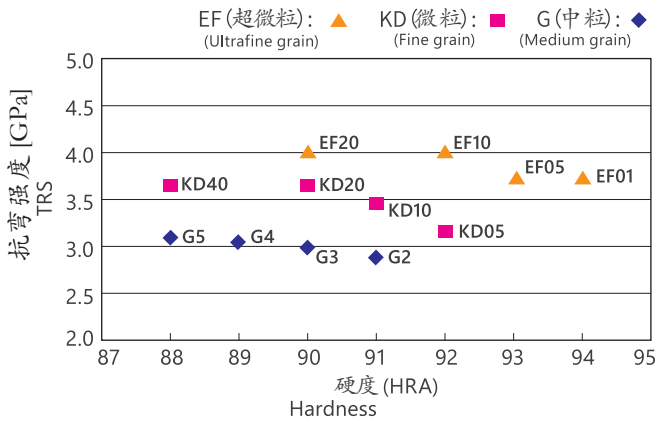
EF01



EF10

金属显微镜（X1000）
By metallurgical microscope (×1000)

硬度与抗弯强度的关系
Relation between hardness and TRS



非磁性・耐腐蚀性超硬合金KN20

NON-MAGNETIC AND ANTI-CORROSIVE CEMENTED CARBIDE - KN20

非磁性·高耐腐蚀性超硬合金

KN20超硬本身没有磁性、即使受外部影响也没有磁性。
具有非常高的耐腐蚀性和耐化学性。
比普通的WC-Co类超硬合金具有更好地抗氧化性。

Non-magnetic and anti-corrosive cemented carbide

Completely free magnetism and magnetization from extraneous effect.
Outstanding corrosion-resistance and chemical proof.
Excellent oxidation-resistance than general WC-Co cemented carbides.

产品说明 Explanation	通过使用超硬合金的结合相Ni实现了非磁性。 由于结合相是Ni，因此具有良好的耐腐蚀性，并对各种溶剂环境皆能发挥稳定的性能。 Non-magnetic carbide by binder phase with Ni. Stable corrosion-resistance against various liquid solution and atmospherics by binder phase with Ni.
用途/实例 Applications	磁场成型用模具、磁带用工具、电子设备、化学设备用零件，机械密封、装饰用品等超硬合金部件。 Magnetic field forming mold, Tools for magnetic tape, Electronic equipment, Parts for chemical equipment, Mechanical seal, Decorative parts, etc.

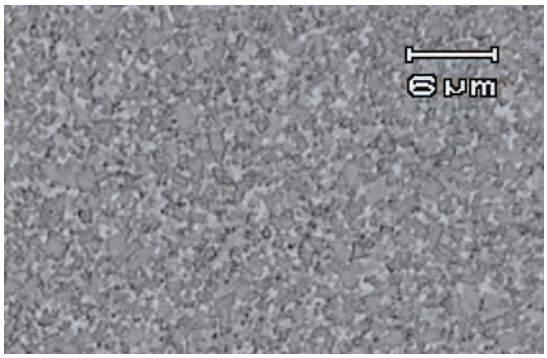
KN20物理性能
Physical property of KN20

本公司产品代号 Our grade	密度 Density [×10³ kg/m³] {g/cm³}	硬度 Hardness HRA	抗弯强度 TRS [GPa]	透磁率 Magnetic permeability [H/m]
KN20	14.2	90.0	3.2	1.28 × 10^{-6}

(代表值/ Typical figures)

透磁率越接近 1.26 × 10^{-6}H/m、非磁性性能越高
The nearer magnetic permeability is 1.26 × 10^{-6} H/m,
the higher non-magnetic performance is.

KN20组织照片
Micrographs of KN20



金属显微镜（X1000）
By metallurgical microscope (×1000)

KN20之耐腐蚀性(与G类进行比较)
Corrosion-resistance of KN20 (Comparison with G grade)

本公司产品代号 Our grade	腐蚀减少量 Decrease in corrosiveness [g/(m²・h)]			
	10 % NaOH	10 % KOH	10 % HCl	10 % HNO_3
KN20	0	0.01	0.08	0.01
G2	0.02	0.03	0.09	7.99
G5	0.02	0.04	0.09	28.34

不锈钢加工用超硬合金 KX01

CEMENTED CARBIDE FOR STAINLESS-STEEL PRODUCTS - KX01

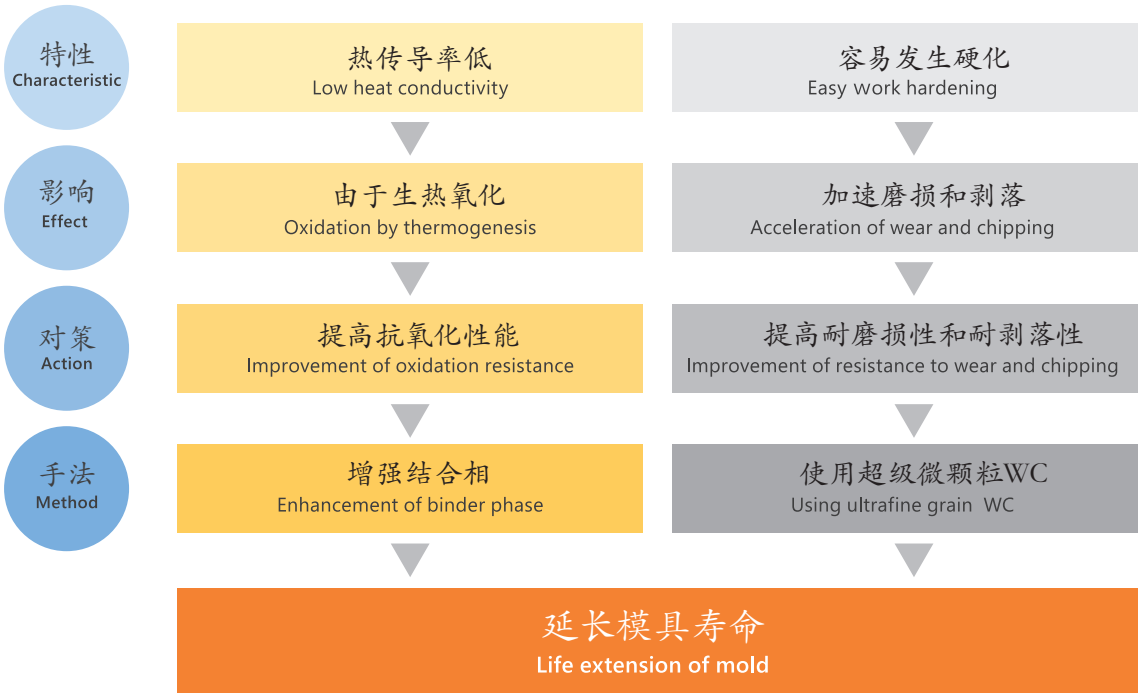
发挥不锈钢材质加工时的优良性能。

作为不锈钢材质和热传导性的不良作业的冲压加工用，发挥出显著的耐磨损性能。
实现高硬度、高抗弯强度以及锐利模具刃口之精密加工。

Excellent performance for press of stainless.

High wear-resistance for press of stainless or low heat conductivity parts.
High hardness, high transverse rupture strength and sharp edge.

产品说明 Explanation	通过考虑不锈钢的特性来组成、设计粒子从而提高了模具寿命。 除不锈钢外对于磷青铜和铍铜也发挥威力。 使用超微粒子WC(WC粒度低于1um），因为它具有优异的硬度和抗弯强度，这种材料适用于锐利模具刃口之精密加工，能充分发挥其性能。 KX01 is specially designed by taking into account the characteristics of stainless steel to extend lifetime of the mold. This effect is applied to not only stainless steel but also other material such as phosphor bronze and copper beryllium alloy. This material grade is suitable for usage which requires sharper edge because it has excellent hardness and transverse rupture strength by ultrafine grain WC (under 1 µm).
使用注意 Note	KX01是针对薄的不锈钢加工用而研发的材质，对于厚的不锈钢加工，可选用WD20。另外，也可考虑ME40. Suitable material grades for thick stainless parts are WD20 or ME40 because KX01 is developed for thin stainless parts.
用途/实例 Applications	用于不锈钢材料（端子、开关面板、HDD悬架等）或难加工材料（间距狭窄的连接器端子的冲裁模等）的冲压加工等。 For stainless steel (stamping for cable teaminals, switch panels, HDD suspensions, etc.), For hard-to-machine materials (increasing life of punches for narrow-pitch connector terminals), etc.



不锈钢加工用超硬合金 KX01

CEMENTED CARBIDE FOR STAINLESS-STEEL PRODUCTS - KX01

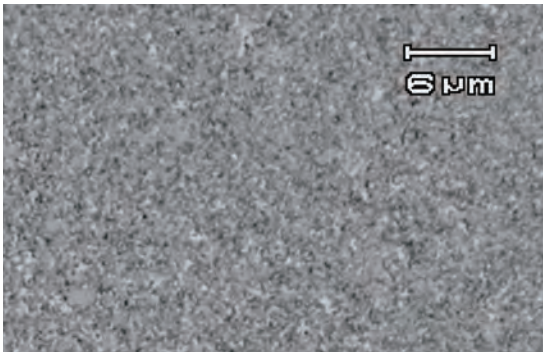
KX01物理性能
Physical property of KX01

本公司产品代号 Our grade	硬 度 Hardness		抗弯强度 TRS	破坏韧性值 (*1) Fracture toughness values
	HRA	HV	[GPa]	[MPa・m$^{1/2}$]
KX01	92.5	1820	4.0	10.2
EF10	92.0	1750	4.0	10.4
KD10	91.0	1610	3.4	13.2
KD20	90.0	1480	3.7	15.5
G5	88.0	1250	3.2	25.9

(代表值 / Typical figures)

注记：*1.以1F法进行测定
Note *1. Value measured by the IF method.

KX01组织照片
Micrographs of KX01



金属显微镜（X1000）
By metallurgical microscope (×1000)

评估实绩
Track record of strokes

工作物件 Workpiece	工作物件厚度 Workpiece thickness	冲压条件 Stamping condition	凹模 Die	凸模 Punch	实绩(冲次) Performance (Stroke number)
SUS	0.10 mm	冲压 Snapping	相当于KD10超硬合金 KD10 / Equivalent to KD10	**KX01**	**300 万 3 million**
			相当于KD10超硬合金 KD10 / Equivalent to KD10	相当于KD10超硬合金 KD10 / Equivalent to KD10	60 万 600 thousand
SUS304	0.15 mm	700 rpm 压花 Coining at 700 rpm	相当于KD10超硬合金 KD10 / Equivalent to KD10	**KX01**	**1800 万 18 million**
			相当于KD10超硬合金 KD10 / Equivalent to KD10	相当于KD10超硬合金 KD10 / Equivalent to KD10	100 万 1 million
SUS301	0.70 mm	200 rpm 冲压 Snapping at 200 rpm	**KX01**	G5	**26 万～35 万 260-350 thousand**
			传统超硬合金(超微粒～细粒) Conventional cemented carbide (Ultrafine-grain to fine-grain)	G5	8 万～18 万 80-180 thousand
SUS304	0.60 mm	230 rpm 冲压 Snapping at 230 rpm	**KX01**	**KX01**	**10 万 100 thousand**
			相当于G3超硬合金 G3 / Equivalent to G3	相当于G3超硬合金 G3 / Equivalent to G3	2 万 20 thousand

高亲和性金属加工模具用超硬合金MC20

CEMENTED CARBIDE FOR STAMPING OF METALS HIGH AFFINITY TO COBALT - MC20

高亲和性金属加工用超硬合金
（耐凝着磨损・耐烧结）

优化了对纯铁・纯铜等易发生烧结的材料的加工寿命。
具有良好地耐放电性和耐腐蚀性。

Cemented carbide for stamping of metals high affinity to cobalt (Adhesive wear-resistance by seizure)

Excellent product life against manufacturing for pure iron or copper which are easy to be seizure.
Excellent performance for EDM and corrosion-resistance.

产品说明 Explanation	通过减少硬质合金的粘结剂相的Co量，并使用特殊的WC，从而抑制凝着磨损和烧结的发生。通过优化粒子设计和组成设计，既保持了高硬度，同时又具有良好地耐放电加工性和耐腐蚀性。 Adhesive wear and seizure resistance by adopting special WC and reducing binder phase of Co. Excellent high hardness, performance of EDM and corrosion resistance by optimizing WC particle and composition design.
用途/实例 Applications	用于引线框架和铜制连接器的冲压模具，SPC型铁冲压模具，需要硬度的模具如果有放电加工的地方，可以抑制破损。 Press mold for lead frame and connector made of copper. Press mold for SPC type steels. Breakage resistance for mold demanded high hardness when EDM, etc.

常用材料的问题 Usual material problem

超硬合金中的Co与亲和性金属的亲和性大
Attraction of Co in cemented carbide from metals with high affinity to Co

↓

超硬合金中的Co脱落
Displacement of Co in the cemented carbide

↓

模具损伤
Damage of mold

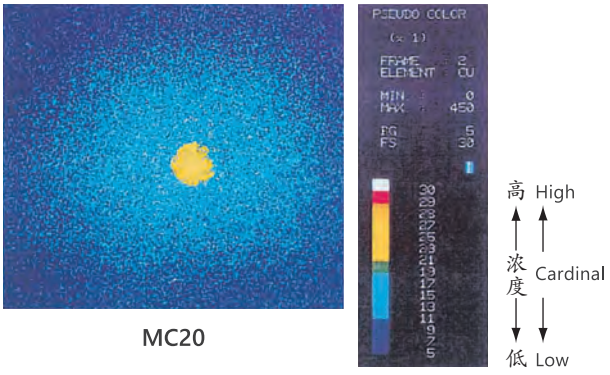
MC20特点 Characteristic of MC20

减少Co量 选择特殊WC材质
Reduction of Co and Selection of special WC

↓

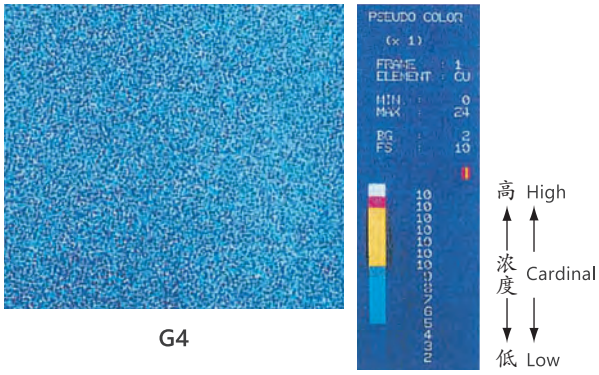
抑制对Co高亲和性的金属
Decreasing the high affinity of Co

与铜的反应性能比较（利用EPMA进行面分析）
Comparison of reaction to copper (Analysis of EPMA)



MC20

在 MC20 和 G4 类压制粉体中心部位放入铜线，烧结后施予 HIP 处理之试片剖面。MC20 中代表铜成分的黄色部分仍存在于原来的位置，没有扩散，而 G4 类中铜成份的黄色部分因扩散而不存在，与 G4 类比较之下，MC20 较能抑制铜的扩散。



G4

Comparative reaction test between MC20 and G4 grade.
Above-shown photos are the cross-section surface of the test pieces which are compacted wire copper in center of MC20 and G4 after sintering and treated by HIP.
Result;
MC20: Copper wire remains in the original position without diffusing.
G4: Copper wire has diffused in the material.

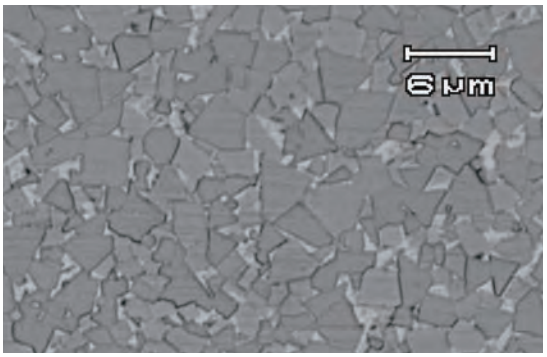
高亲和性金属加工模具用超硬合金MC20

CEMENTED CARBIDE FOR STAMPING OF METALS HIGH AFFINITY TO COBALT - MC20

MC20物理性能
Physical property of MC20

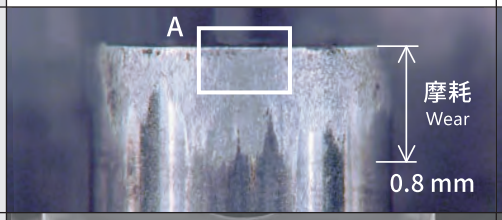
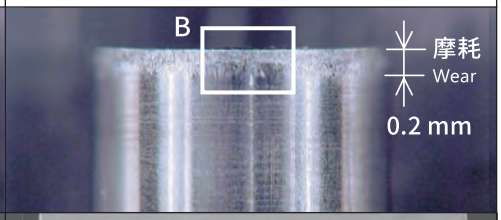
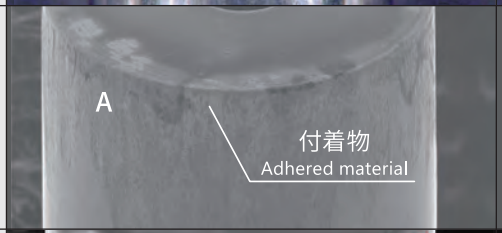
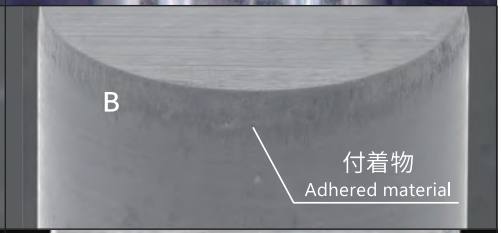
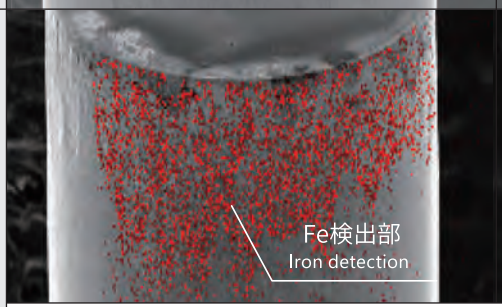
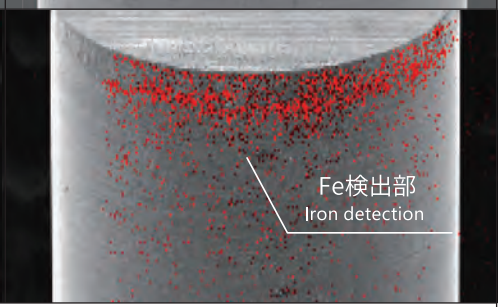
本公司产品代号 Our grade	硬度 Hardness HRA	抗弯强度 TRS [GPa]	Co量 Co content [%]
MC20	90.0	2.8	6
参考G3 Reference G3	90.0	2.7	8

MC20组织照片
Micrographs of MC20



金属显微镜（X1000）
By metallurgical microscope (×1000)

磨损比较实例
Wear comparative example

比较项目 Compare item	G3	MC20
加工条件 Manufacturing condition	被加工材质：S65C 被加工材质厚度：1.3mm 冲压方法：冲裁	Workpiece : S65C Workpiece thickness : 1.3 mm Press method : Punching
冲压数 Stroke number	5～15万 50-150 thousand	18万 180 thousand
冲头前端磨损状态（用显微镜） Wear condition of punch edge (with microscope)		
冲头前端磨损状态（用SEM像） Wear condition of punch edge (with SEM)		
被加工材质粘附状态（铁元素映像） Work adhesive condition (Mapping of iron element)		
	上图为SEM观测的合成像和铁元素的映像，红点为铁元素。 粘附物的位置与铁元素检测出的一致。 (Upper pictures are composition of SEM observation and mapping of Iron element. The red points show Iron.) Position of adhered material accord with Iron detection.	
评论 Comment	虽然用MC20的冲压次数比G3多，但MC20上的粘附物比G3少。 Even though the stroke number of MC20 is larger than G3, the amount of adherence to MC20 is smaller than G3.	

耐腐蚀性・放电加工用超硬合金ME40

CORROSION-RESISTANT CEMENTED CARBIDE FOR EDM - ME40

耐腐蚀・耐放电加工用超硬合金

抑制放电加工时的损伤。
抑制水介质线切割放电加工中的腐蚀。
抑制冲压加工时由于冲击造成的缺口。

Corrosion-resistant cemented carbide

Damage reduction when EDM.
Corrosion reduction when WEDM (water type).
Crack reduction by impact in pressing process.

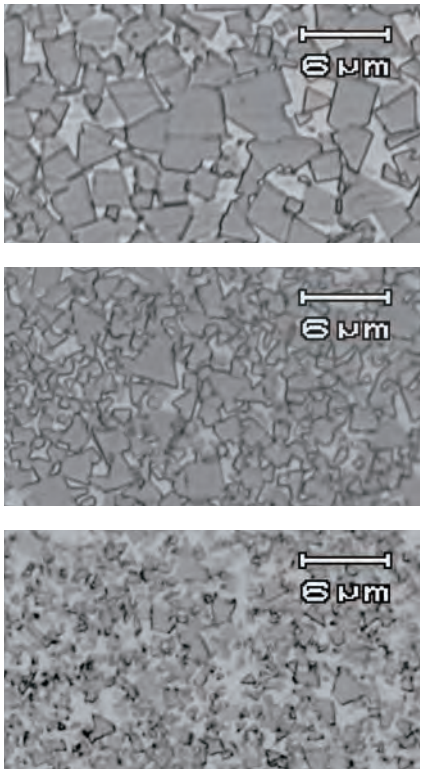
产品说明 Explanation	1. 水介质线切割时强度下降，有效抑制电解腐蚀 ①随着WC粒径的优化，提高了水介质线切割后的抗弯强度。 ②通过优化成分设计，改善了耐腐蚀性能。 2. 从冲压时的切断性能考虑，设计了能抑制磨削时剥落。 (通过去除对剥落产生影响的粗粒径WC，有效改善了磨削时的耐剥落性)。 3. 在不锈钢的冲压中，由于冲击会有破损，如果用KX01和WD20时发生破损的情况，用ME40对破损的防止也有效果。 1. Design to resist corrosion and strength decrease when WEDM (water type). ① Increased transverse rupture strength after WEDM (water type) by optimized WC grain. ② Improved corrosion-resistance by optimized component design. 2. Design to resist chipping when grinding process so that cutting performance when pressing process is improved. (Improved chipping-resistance by exclusion of coarse grain WC which influences chipping problem.) 3. Suitable material grade for crack resistance when crack problems are happened in KX01 or WD20 when pressing process of stainless parts.
用途/实例 Applications	长时间的水介质线切割放电加工模具用（特别是凹模） 采用线切割放电加工，当模具使用时会有一定程度的冲击，如果担心破损的话，可以使用。 采用湿式加工时担心发生腐蚀的问题时可以使用。 贮存时如果担心由于湿度影响而发生腐蚀的话，可以使用。 For WEDM (water type) processing in prolonged manufacturing. (Especially for Die) Proceeded by WEDM has an issue regarding chipping in pressing process. Concerned corrosion by wet type processing. Concerned corrosion under humidity environment at storage, etc.

ME40物理性能
Physical property of ME40

本公司产品代号 Our grade	硬度 Hardness HRA	抗弯强度 TRS [GPa]	放电加工后的抗弯强度 TRS after WEDM [GPa]
ME40	88.0	3.2	2.3
参考 G5 Reference G5	88.0	3.2	2.2
参考 KD40 Reference KD40	88.0	3.7	1.9

(代表值 / Typical figures)

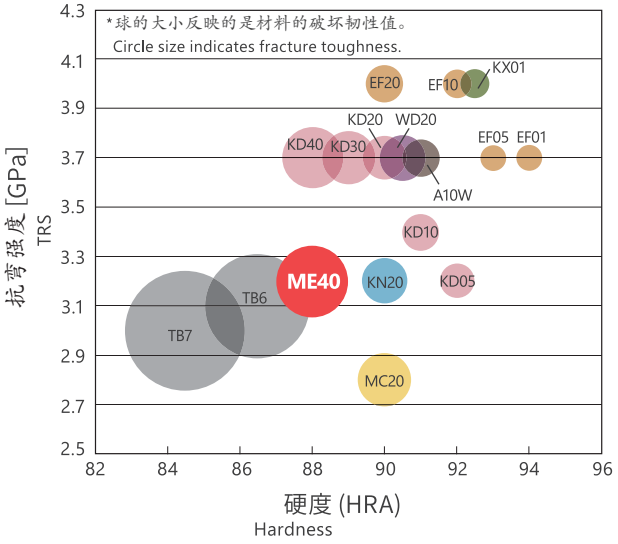
组织图片
Micrographs



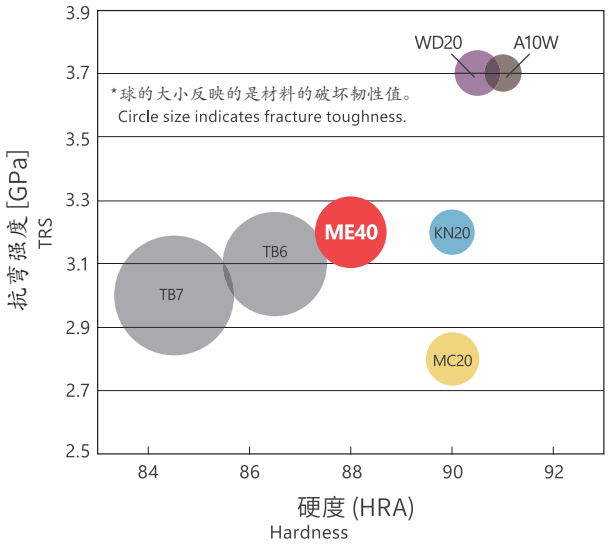
金属显微镜（X1000）
By metallurgical microscope (×1000)

耐腐蚀性・放电加工用超硬合金ME40
CORROSION-RESISTANT CEMENTED CARBIDE FOR EDM - ME40

耐腐蚀硬质合金定位表
Positioning in corrosion-resistant cemented carbide



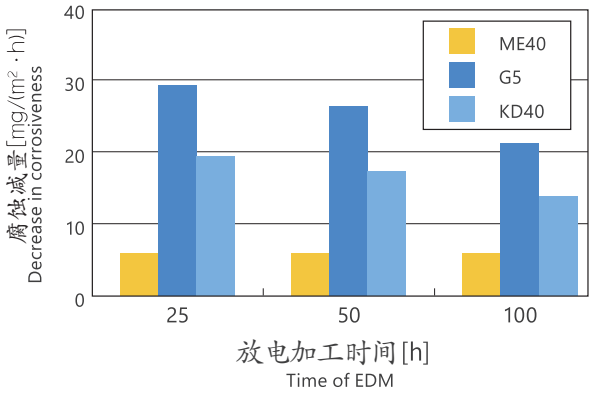
放电加工硬质合金定位表
Positioning in cemented carbide for EDM



放电加工用ME40，具有良好地耐磨性和韧性。

ME40 has excellent balance of wear-resistance and toughness in cemented carbide for EDM.

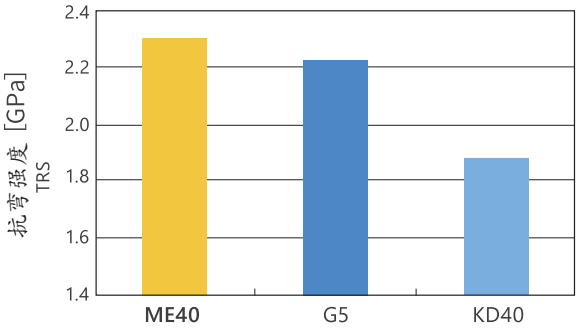
耐腐蚀性能
Performance of corrosion-resistance



ME40与其它硬度相同的材质相比，有更加出色的耐腐蚀性。

ME40 has excellent corrosion-resistance comparing to other grades which have same hardness.

耐放电加工性能（放电加工后抗弯强度）
Performance comparison of TRS after WEDM

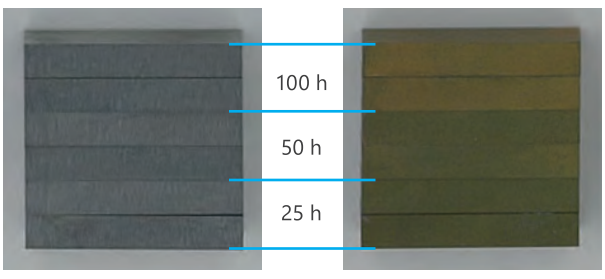


在相同的硬度的材料中，ME40在放电加工后，可以更有效的抑制强度下降。

ME40 restrains deterioration of strength after EDM comparing to other grades which have same hardness.

■ 腐蚀实验外观图

Appearance after corrosion test



对比G5变为茶褐色（生锈状态）
而ME40没有变色。

ME40 keeps same color while G5 became dark brown. (G5 gets rusty)

ME40的耐腐蚀性是G5的5倍
Corrosion-resistance 500% up
对比G5
*Compared with G5

高硬度・高韧性・耐腐蚀性超硬合金EW类

LINE UP.....EW10, EW25, EW40

HIGH-HARDNESS, HIGH-TOUGHNESS AND CORROSION-RESISTANT CEMENTED CARBIDE - EW GRADE

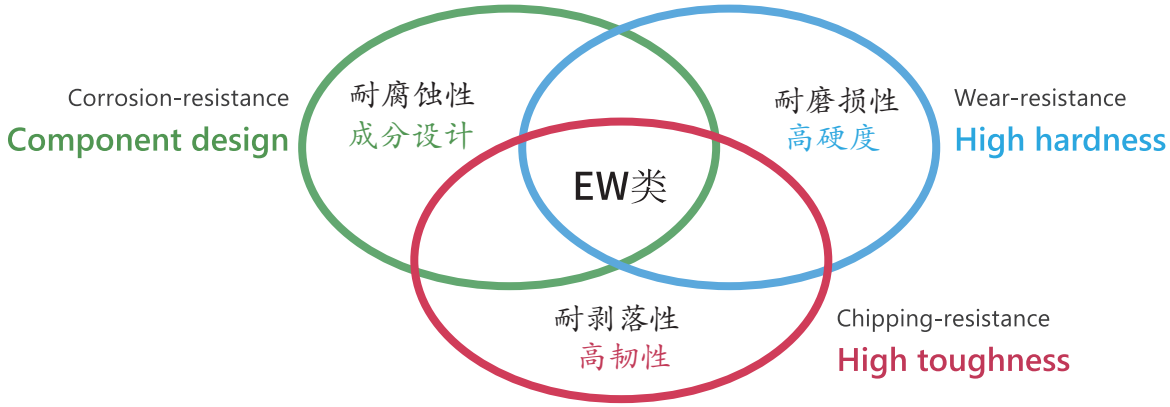
高硬度・高韧性・耐腐蚀性材质

优化耐磨损、耐剥落、耐腐蚀的平衡。

High hardness, toughness and corrosion-resistant cemented carbide

Optimized resistance balance of wear, chipping and corrosion.

产品说明 Explanation	与同一硬度材质进行比较，由于破坏的韧性值相对较高，在不降低硬度的情况下，预防和改善裂纹，剥落，碎片的情况。另外，耐腐蚀性也很突出。 When compare to other grade which is same hardness, there is possibility that resistance of chipping and defects will be improved without dropping hardness because fracture toughness is relatively high. Corrosion-resistance is excellent also.
用途/实例 Applications	对于发生剥落或破损的耐磨损部品，适合放电加工的耐磨损部品或长时间用水介质线切割加工的耐磨损部品。 For wear-resistant parts which has concern about chipping or defect, EDM process or WEDM (water type) processing in prolonged manufacturing.



EW类的物理性能
Physical properties of EW grade

本公司产品代号 Our grade	硬度 Hardness HRA	抗弯强度 TRS [GPa]	破坏韧性值 Fracture toughness value [MPa・m$^{1/2}$]	密度 Density [×10^3 kg/m^3] {g/cm^3}
EW10	91.0	3.5	15	14.8
EW25	89.5	3.5	22	14.3
EW40	88.0	3.5	29	13.9

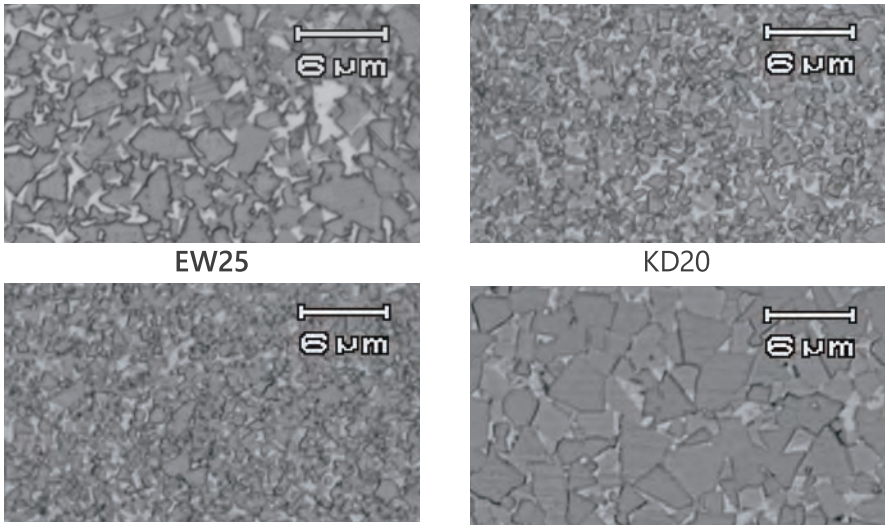
(代表值 / Typical figures)

特性
Characteristics

本公司产品代号 Our grade	硬度 Hardness HRA	抗弯强度 TRS [GPa]	破坏韧性值 Fracture toughness value [MPa・m$^{1/2}$]	密度 Density [×10^3 kg/m^3] {g/cm^3}
EW25	89.5	3.5	22	14.3
KD20	90.0	3.7	16	14.2
WD20	90.5	3.7	16	14.1
MC20	90.0	2.8	19	14.9

(代表值 / Typical figures)

组织照片
Micrographs

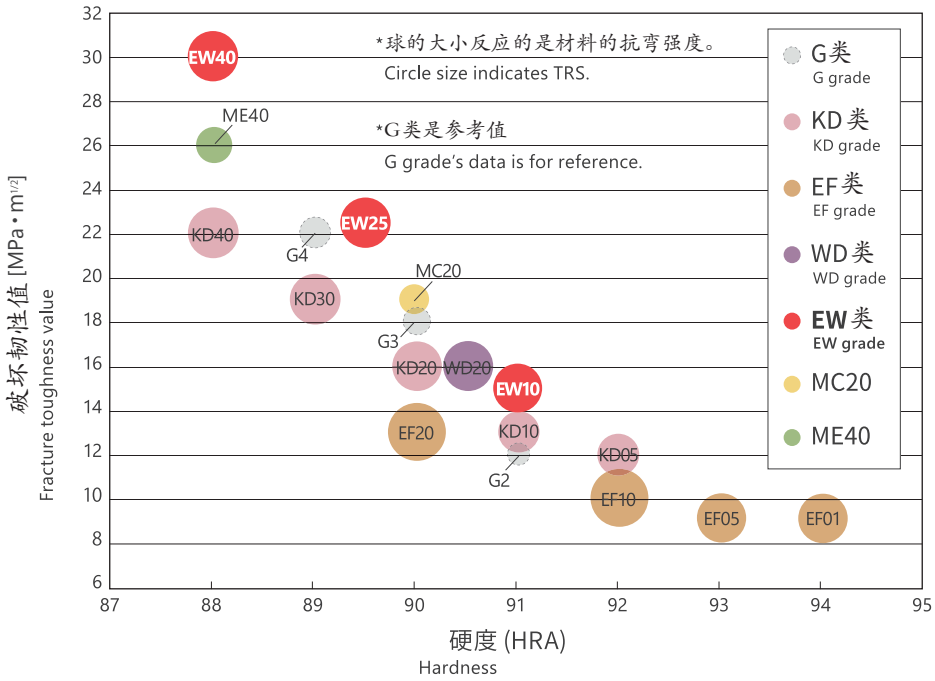


EW25　KD20

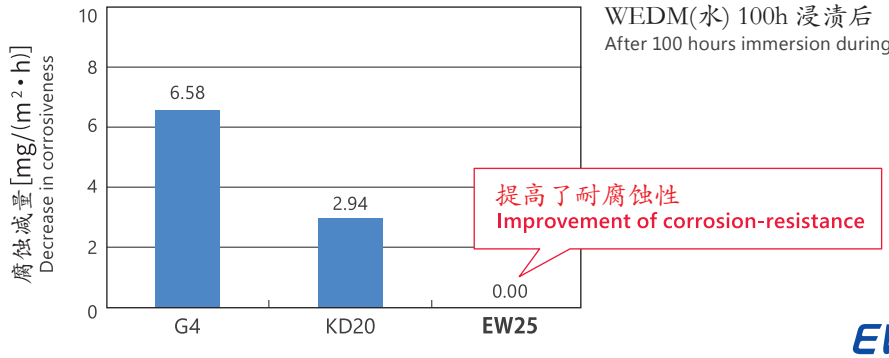
WD20　MC20

金属显微镜（X1000）
By metallurgical microscope (×1000)

耐腐蚀硬质合金定位表
Positioning in corrosion-resistant cemented carbide



耐腐蚀性能
Performance of corrosion-resistance



WEDM(水) 100h 浸渍后
After 100 hours immersion during WEDM (water type) process.

高耐磨耗用超硬合金SS类

HIGH WEAR-RESISTANT CEMENTED CARBIDE - SS GRADE LINE UP..... SS13, SS15

高耐磨耗用超硬合金（耐磨料磨损）

具有极高的硬度，实现提升磨料磨损的耐磨性。

High wear-resistant cemented carbide (Abrasive wear-resistance)

Extremely high hardness for outstanding abrasive wear-resistance.

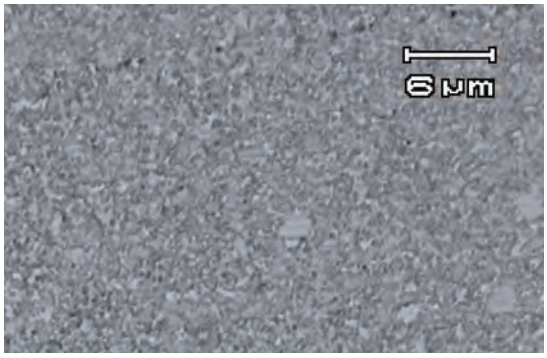
产品说明 Explanation	磨料磨损是硬度越高，磨损量就越小。 通过极其特殊的组成设计，从而提高硬度达到极限。 Regarding abrasive wear, hardness is inversely related to wear amount. Outstanding improved hardness by special composition design.
使用注意 Note	因为韧性与一般的超硬相比差，所以在使用和加工中要注意。 Attention to handling and processing because of lower fracture toughness than general cemented carbides physically.
用途/实例 Applications	喷砂嘴、电火花加工用电源模、喷水嘴、除鳞喷嘴等。 Sandblasting nozzle, Power supply die for EDM, Water jet nozzle, Descaling nozzle, etc.

SS类物理性能
Physical properties of SS grade

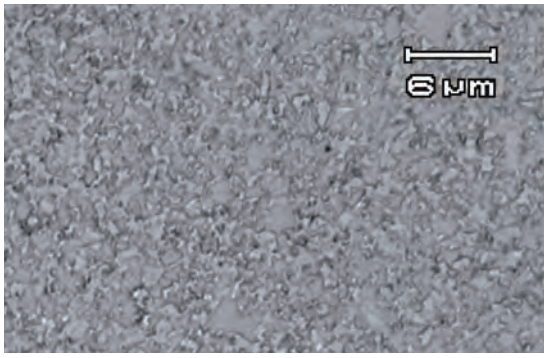
本公司产品代号 Our grade	密度 Density [×10³ kg/m] {g/cm³}	硬度 Hardness HV	抗弯强度 TRS [GPa]	Co量 Co content [%]
SS13	14.2	2450	1.0	1
SS15	14.6	2100	2.0	4
参考G1 Refernce G1	14.9	1750	2.0	6

（代表值 / Typical figures）

SS类的组织照片
Micrographs of SS grade



SS13



SS15

金属显微镜（X1000）
By metallurgical microscope (×1000)

耐磨损特性
Characteristic of wear-resistant

低压喷砂磨损　Blast wear of low pressure

制作下述喷砂用喷嘴，进行8小时连续喷射后之喷嘴内径形状调查结果
（空气压力1.3Mpa，使用氧化铝10~50um，喷嘴径7mm）

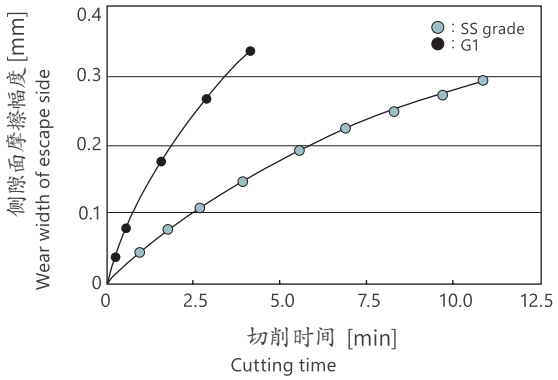
Photo shows the inside of blast nozzle after injected for eight hours running time. (Use the air pressure 1.3 MPa and alumina 10 - 50 μm. Nozzle diameter 7 mm.)

材质 Grade	SS13	SiC (A公司产品) (A's products)	ZrO_2 (B公司产品) (B's products)
喷嘴入口 Nozzle entrance			
喷嘴出口 Nozzle exit			
注记 Notes	无变化 No Change	入口严重磨损 出口亦有磨损 Entrance high wom, exit also wom	全体磨损 出口严重磨损 Overall wear, exit is large wear

与碳素材料之磨损性　Wear of carbon material

以本材料制作之SNGN120308模头进行碳素材料切削实验之前端磨损量调查结果

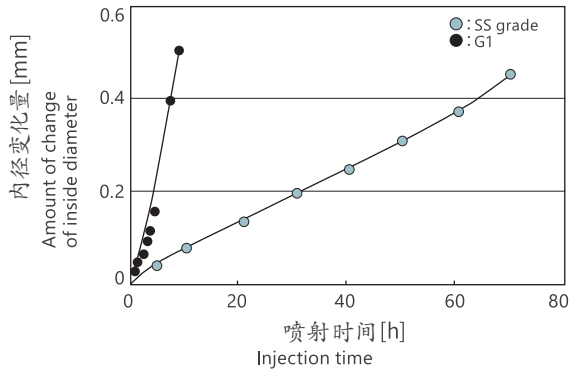
Conducted carbon cutting test by SNGN120308 tip which is made from SS grade. Figure shows wear quantity of cutting part.



高压喷砂磨损　Blast wear of high pressure

高压作业时之喷嘴寿命调查结果（喷射压力 245 MPa）

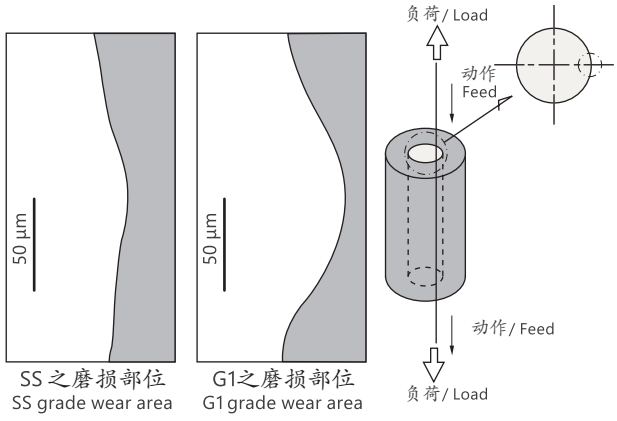
Figure shows life of blast nozzle injected under high pressure. (Injection pressure 245 MPa)



与金属之微动磨损　Rub wear with metal

放电加工设备给电模之模具内径磨损程度观察结果

Figure shows the inside of feed die by electric discharge machining using fine wire.



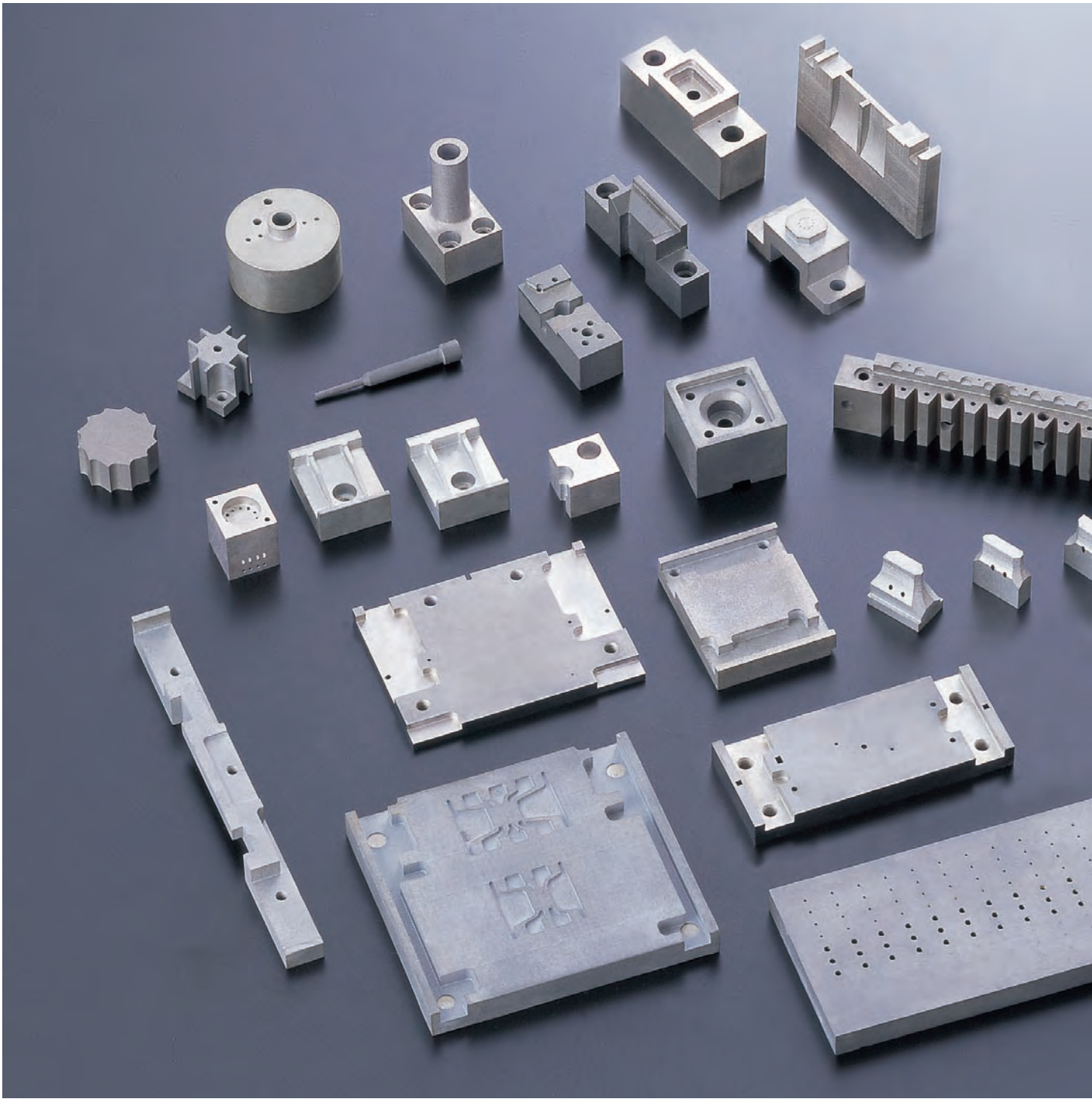
超硬合金预成型品
CEMENTED CARBIDE PRODUCTS

EVERLOY （共立合金制作所）在耐磨耗工具、模具等广泛的领域里开发新材质的硬质合金。

通过对烧结前的压榨体进行成型加工，可以提供复杂形状的预成型品，从而对加工的时间和费用的消减做出贡献。

EVERLOY has developed new grade of cemented carbide in various industries mainly wear-resistant tools and mold parts.

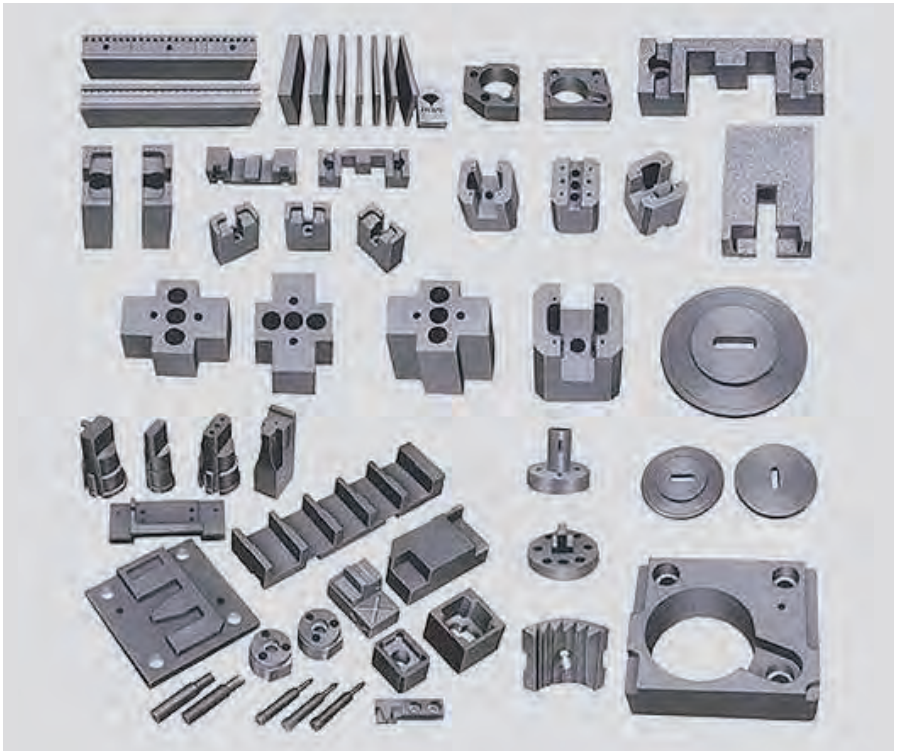
Preformed carbide which is complicate shape is available by processing before sintering.
It helps saving manufacturing time and cost.

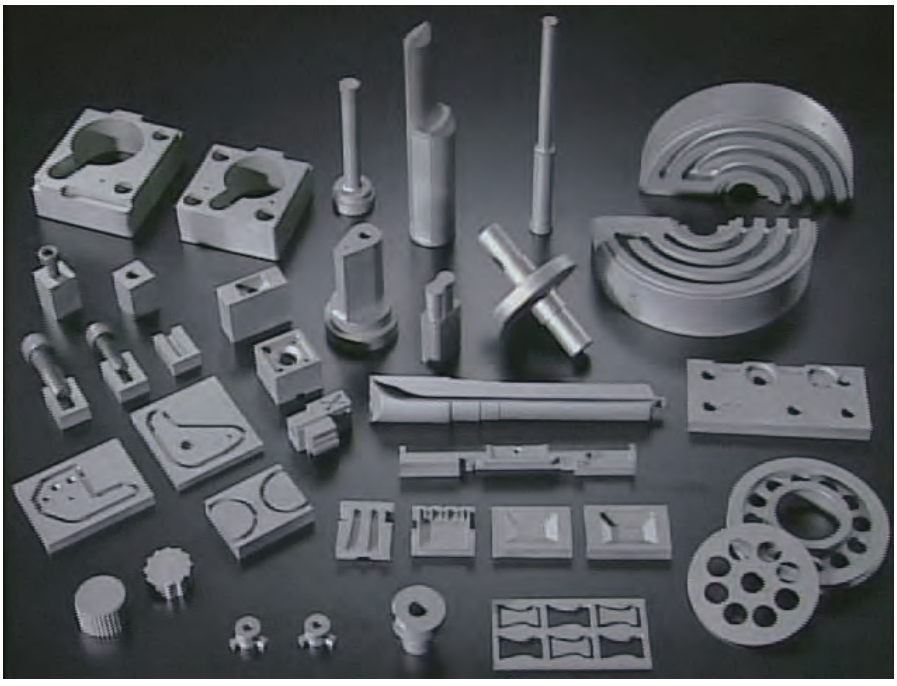


用途/实例
Applications

铆接、弯曲、旋压、粉末压制、冷/热辊、镦头模、冲击模、
机械密封，化学仪器零件，电池密封模具，粉末压实磁场模具，电子器件零件，
磨料喷嘴和防爆保护器等

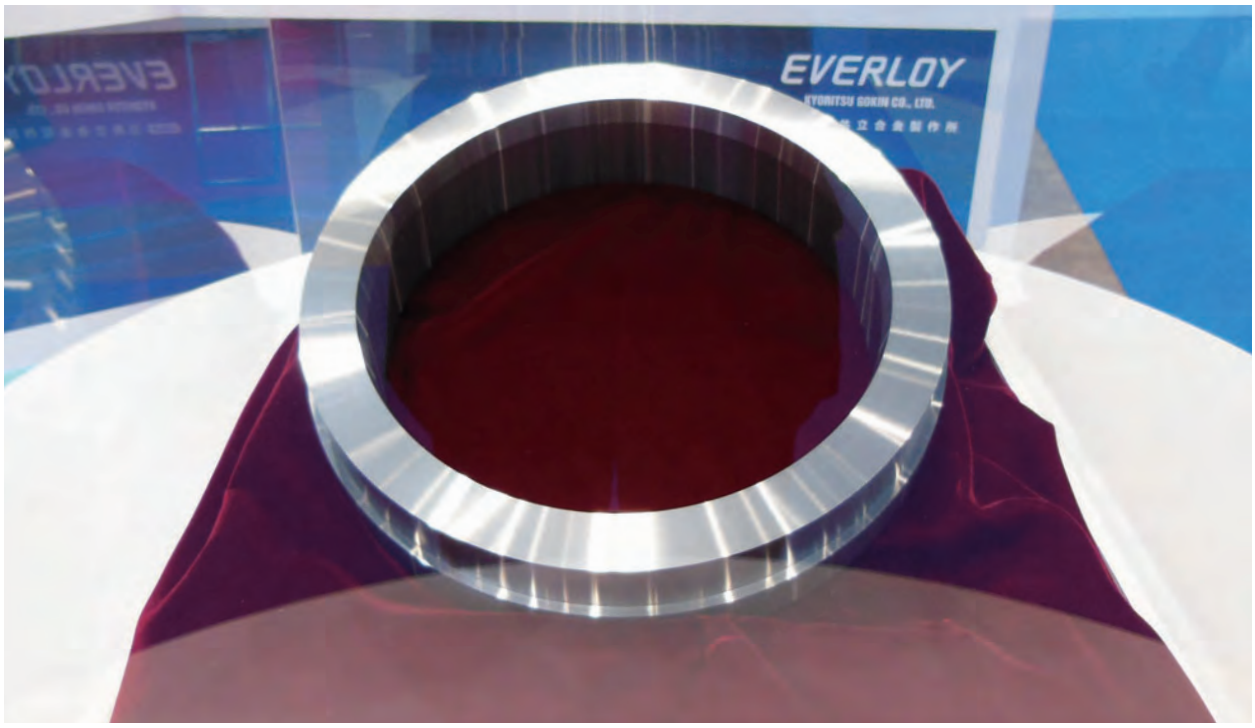
Snapping, bending, spinning, powder compacting, cold/hot roller, header dies, impact dies, mechanical seal, chemical instrument parts, sealing mold for battery, powder compacting magnetic field mold, electronic device parts, abrasive nozzle and burst protector, etc.





大型硬质合金产品
LARGE-SIZE CEMENTED CARBIDE PRODUCTS

生产超过以前制作范围的大型尺寸的材料，可以接受多样化的需求。
We can to accept the needs of a great variety,
because we can produce larger cemented carbide products than previous range.



（2012年11月JIMTOF展示 / JIMTOF 2012）

对应材质 Supporting grades

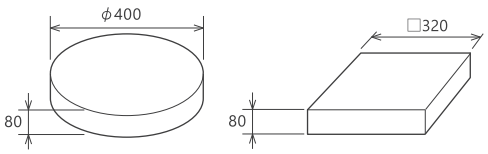
KD20, KD30, KD40

G3, G4, G5

EW25

材料规格(最大) Material size (Maximum)

圆形 Round shape	ϕ400 mm × 80 mm
板材 Angle shape	320 mm × 320 mm × 80 mm



用途 Applications

马达铁芯模具零件 Motor core mold parts	通过集成模具降低加工成本 Reduction of processing costs through integrated mold.
粉末成型模具 Powder-compacting mold	降低生产成本（多腔模具） Cost reduction in production. (Multi-cavity mold)
拉伸模 Drawing dies	模具寿命长（改善了钢制材料的粘着磨损） Long life of mold. (Improvement in adhesive wear resistance with cemented carbide instead of steel.)

标准板件 (T × 105 mm × 105 mm)
Standard-sized plates (T × 105 mm × 105 mm)

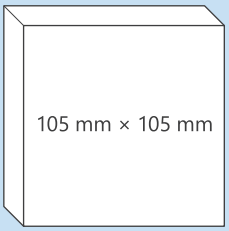
本公司提供各种标准规格及不同厚度之板件。
We offer an extensive lineup of standard-sized plates with various thicknesses.

标准规格[mm] 宽度X长度 Width × Length	厚度[mm] Thickness	本公司产品代号 Our grade		
		G3	G4	KD20
105 × 105	2.2	●	●	●
	3.2	●	●	●
	4.2	●	●	●
	5.2	●	●	●
	6.2	●	●	●
	7.2	●	●	●
	8.2	●	●	●
	9.2	●	●	●
	10.2	●	●	●
	12.2	—	—	●
	15.2	—	●	●
	20.2	—	●	●

- 除了表格中记载的标准板件以外，本公司另备有各种用途之其他尺寸板件。
- 库存量可能会因出货情况而产生变化，订购前请先询问。
- 除库存品以外，可根据客户要求订制各种尺寸规格及材质之板件。

- Multiple thickness of other than those above thickness are also in stock asrequested.
- If standard-sized plates are urgently needed, please inquire about stock status.
- It is available to make any other materials and sizes upon request.

对于考虑降低采购成本的客户来说，标准的板材尺寸非常适合。
Standard plate size is great for customer which considers cutting purchasing cost.



■ 标准尺寸规格

所谓标准规格是指厚度（如：2.2mm）X105mmX105mm。

通过优化制造工艺来实现降低成本。

■ Standard size

105 mm × 105 mm with starting 2.2 mm thickness.

Realized cost cutting by optimizing manufacturing process.

物理特性调查
PROPERTIES INSPECTION

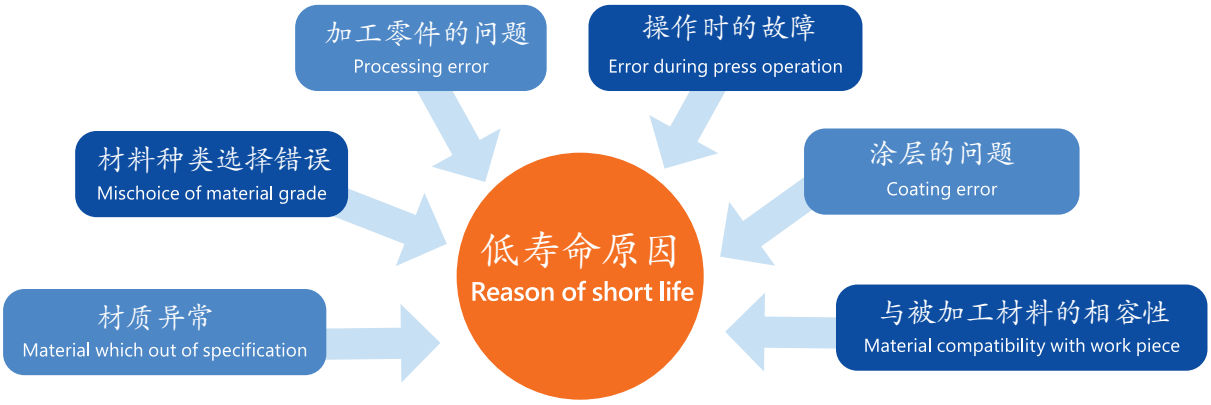
EVERLOY 的提案与服务

通过广泛的经验提高硬质合金的寿命

Proposal skill and servicing

Proposal improving tool life by wide experience as cemented carbide manufacturer.

特征	Features
・站在客户的立场上进行提案 ・提供本公司以外的产品的检查服务 ・提供详细的技术要素。	・Propose in customer's shoes. ・Proper inspection service except EVERLOY product also. ・Supply technical service.

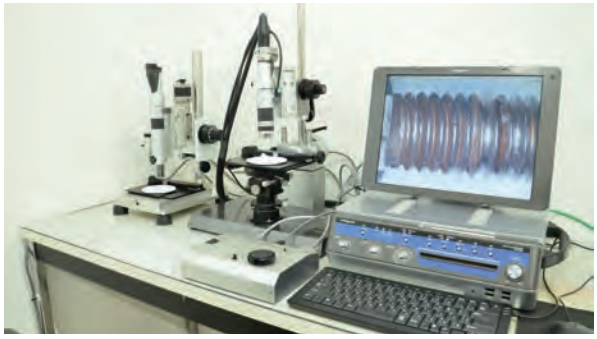


EVERLOY 不断地积累经验，伴随顾客一起成长。
EVERLOY keeps growing up with gaining experience with customer.

高性能的检查仪器，高分析的分析仪器
Excellent analytical faculty by using testing / analytical equipment

立体显微镜
Stereoscopic microscope

金属显微镜
Metallurgical microscope



数字显微镜
Digital microscope

扫描电子显微镜
Scanning electron microscope

X射线衍射仪
X-ray diffractometer

精密加工技术

PRECISION PROCESSING TECHNOLOGY

EVERLOY 的加工技术、在以要求子微米精密度为中心的模具行业等广泛领域中有突出的业绩。

不仅是超硬合金，也可以对高硬度淬火钢、氧化锆、氧化铝等精密零部件加工。

利用优秀的加工技术，用客户希望的材料，不论是方形或圆形，完成符合客户希望形状的加工。

EVERLOY's processing technology has achieved success in various industries which are mainly mold industry demanding submicron precision.

EVERLOY processes precision parts of not only cemented carbide but also high hardness hardened steel, zirconia and alumina, etc.
EVERLOY processes form requested regardless of round or square shape at material our customer demand due to excellent processing technology.

说明 Explanation	EVERLOY利用其材料特征性进行加工。 脆性材料由于加工方法无法发挥原有的特性。 EVERLOY processes with utilizing their characteristics of material. Brittle materials are unable to exercise original characteristics due to processing method.
用途/实例 Applications	精密模具（切断、弯曲等）、粉末成型模具、马达铁芯、引线框架、连接器模具、树脂密封制造模具等 Precision mold (cutting, bending, etc.), mold for powder compacting, motor, connector and IC leadframe and resin sealing manufacturing, etc. ■EVERLOY 能对应的材质 Corresponding material 硬质合金、氧化锆、氧化铝、钢 Cemented carbide, zirconia, alumina, steel (SKD11, SKD61, DC53, SKH51, YXR3, YXR7, HAP40, HAP10, HAP72, HAP5R, MH85, PD613, SKS3, KD11-MAX, SLD-MAGIC, SNCM439, SNCM443, SCM415, SCM435, SS400, S45C, S50C, S55C, SK3, ASP23, ASP60, HPM1, HPM38, SUJ2, DEX40, CENA1, GO40F, NAK55, DH2F, DRM1, DRM3, SUS303, SUS304, SUS316, SUS440C) など

超精密高速微细加工中心
Ultra High-Precision and High-Speed Micro Fine Machining Center

图形轮廓磨床
Graphical profile grinding machine

主要加工设备・主要检查仪器 (株式会社 共立合金制作所 加工品部)

MAJOR PROCESSING EQUIPMENT AND INSPECTION EQUIPMENT (KYORITSU GOKIN CO., LTD.)

主要加工设备一览

平面磨床	13 台
外圆磨床	11
CNC外圆磨床	5
内圆磨床	10
CNC精密内圆磨床	4
珩磨机	1
线切割放电加工机	3
EDM放电加工机	4
光学曲线磨床	9
气压式抛光机	2
加工中心	3
车床	7
NC车床	4
铣床	2
高周波加热设备	1
电炉窑	1
CNC立式内・外圆磨床	1

Major processing equipment list

Surface grinding machine	13 units
External cylindrical grinding machine	11
CNC-external cylindrical grinding machine	5
Internal cylindrical grinding machine	10
CNC-internal cylindrical precision grinding machine	4
Honing machine	1
Wire E.D.M	3
Electric discharge machine	4
Profile grinding machine	9
Aero lapping machine	2
Machining center	3
Lathe	7
NC Lathe	4
Milling machine	2
High frequency induction heating equipment	1
Electric furnace	1
CNC-vertical-internal and external cylindrical grinding machine	1

主要检查仪器一览

工厂显微镜	2 台
万能放映机	2
电子式千分尺	1
数据处理系统	1
各种量规	多数
视频影像测量显微镜	3
轮廓形状测定器	4
3D结构分析	1
镭射测定器	1
数控三维坐标测量机	1
圆度测量机	1

Major inspection equipment list

Factory microscope	2 units
Universal projector	2
Electronic micrometer	1
Data treatment system	1
Gauge	Many
Smart Scope	3
Contour measuring instrument	4
3D structural analysis	1
Laser marker	1
CNC-3D coordinate measuring machine	1
Roundness measuring machine	1

放电加工机
Die sinking electric discharge machine

线切割放电加工机
Wire electrical discharge machine

主要加工设备・主要检查仪器 (株式会社 共立合金制作所 加工品部)

MAJOR PROCESSING EQUIPMENT AND INSPECTION EQUIPMENT (KYORITSU GOKIN CO., LTD.)

CNC 精密内圆磨床
CNC internal cylindrical precision grinding machine

CNC 外圆磨床
CNC external cylindrical grinding machine

加工中心
Machining center

光学曲线磨床
Profile grinding machine

数控三维坐标测量机
CNC 3D coordinate measurement machine

轮廓形状测定器
Contour measuring instrument

主要加工设备・主要检查仪器 (株式会社 九州EVERLOY)

MAJOR PROCESSING EQUIPMENT AND INSPECTION EQUIPMENT(KYUSYU EVERLOY CO.,LTD)

主要加工设备一览

光学曲线磨床	12	台
图形轮廓磨床	1	
外圆磨床	1	
平面磨床	18	
超精密磨床	1	
超精密CNC成型磨床	1	
铸件表面去除机	1	
精切机	1	
台式丝锥倒角机	1	
线切割放电加工机	2	
铣床	1	
EDM放电加工机	3	
小孔电火花加工机床	1	
气压式抛光机	1	
加工中心	2	
绘图仪	1	
大型硬质合金制品设备		
CNC立式复合磨床	1	
平面磨床	1	

Major processing equipment list

Profile grinding machine	12	units
Graphical profile grinding machine	1	
External cylindrical grinding machine	1	
Surface grinding machine	18	
Ultra precision multi grinding machine	1	
Ultra precision CNC molding grinding machine	1	
Casting surface remover	1	
Fine cutter	1	
Table tap chamfering machine	1	
Wire E.D.M	2	
Lathe	1	
Electric discharge machine	3	
Small hole EDM machine	1	
Aero lapping machine	1	
Machining center	2	
Chart drawing system(Plotter)	1	
Equipment for larger cemented carbide products		
CNC Vertical multi-grinding machine	1	
Surface grinding machine	1	

主要检查仪器一览

轮廓、形状测定器	1
万能放映机	1
视频影像测量显微镜	2
镭射测定器	1
工厂显微镜	2
形状解析激光显微镜	1
各种量规	多数

Major inspection equipment list

Contour measuring instrument	1
Universal projector	1
Smart scope	2
Laser marker	1
Factory microscope	2
3D Laser Scanning Confocal Microscope	1
Gauge	Many

大型湿式CIP
Large Wet Cold Isostatic Press

真空加压烧结炉
Vacuum pressurization dewaxing-sintering furnace

CNC立式车床
CNC vertical type lathe machine

加工中心
Machining center

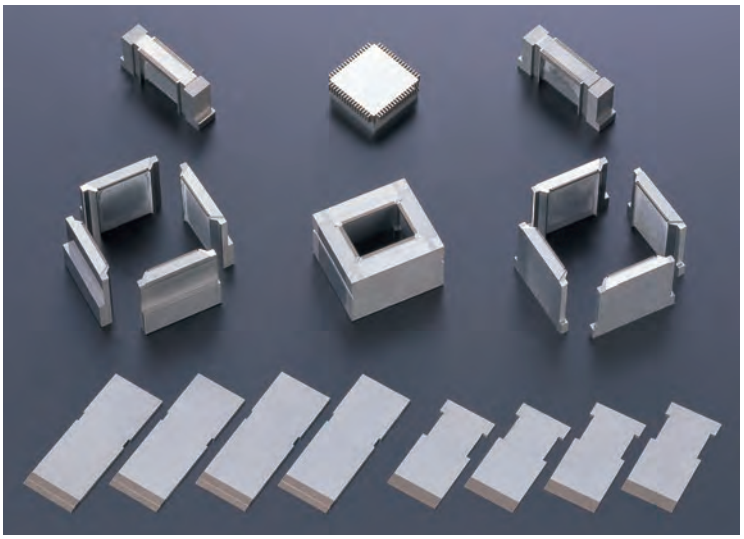
超硬精密模具零件（切断・弯曲）

CEMENTED CARBIDE PRECISION MOLD PARTS (Bending and cutting)

特 色
Characteristics

砂轮加工可实现锐利刃口加工。
亦可进行小间距零件之加工。

By grinding processes, sharper edges can be maintained.
Fine-pitch products are also available.

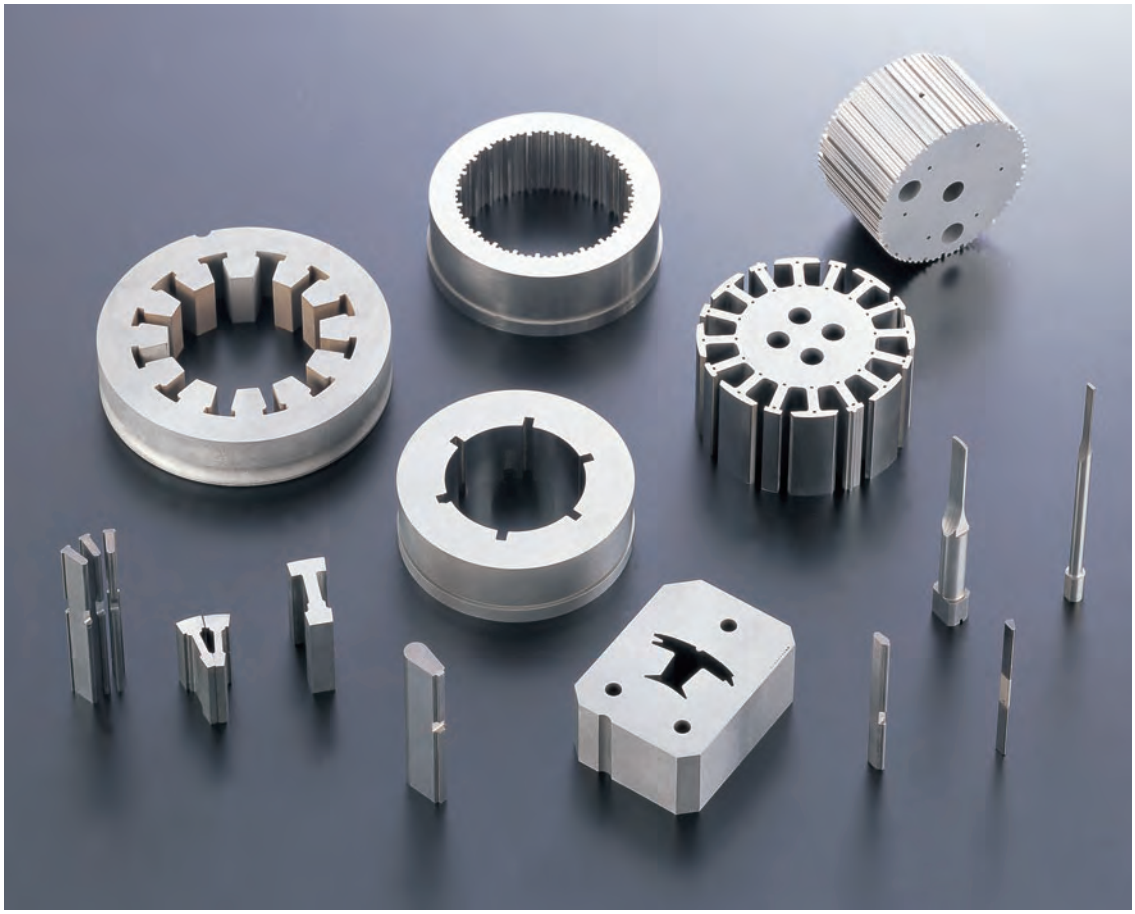


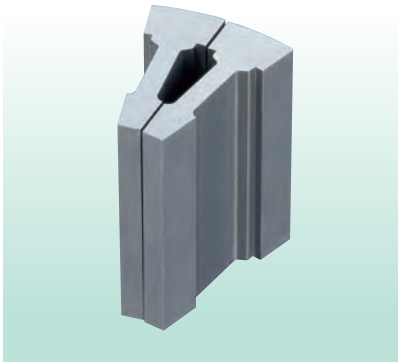
超硬精密模具零件（马达铁芯）
CEMENTED CARBIDE PRECISION MOLD PARTS (Motor core mold parts)

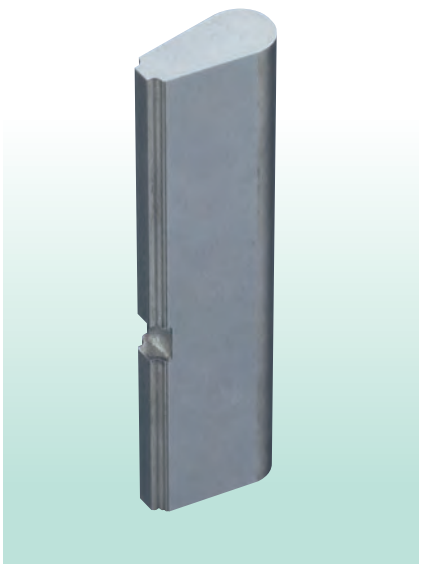
特色
Characteristics

采用自家生产之超硬材料，充分考虑加工余量及成品率，生产低成本之零件。

We can offer reasonable parts in using our own cemented carbide.







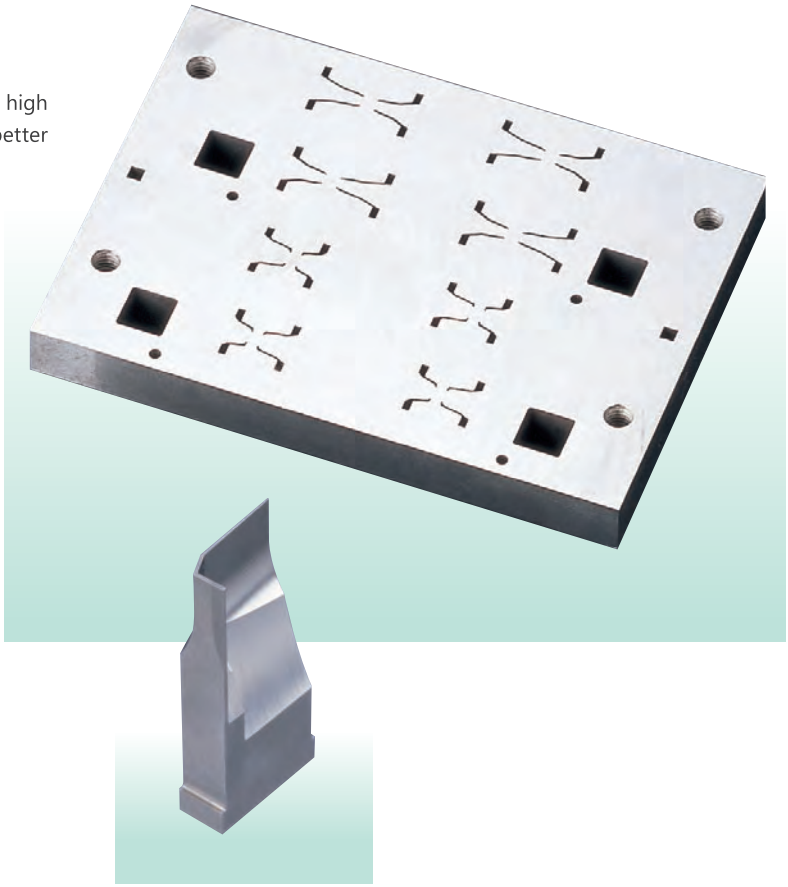
超硬精密模具零件（IC引线框架）

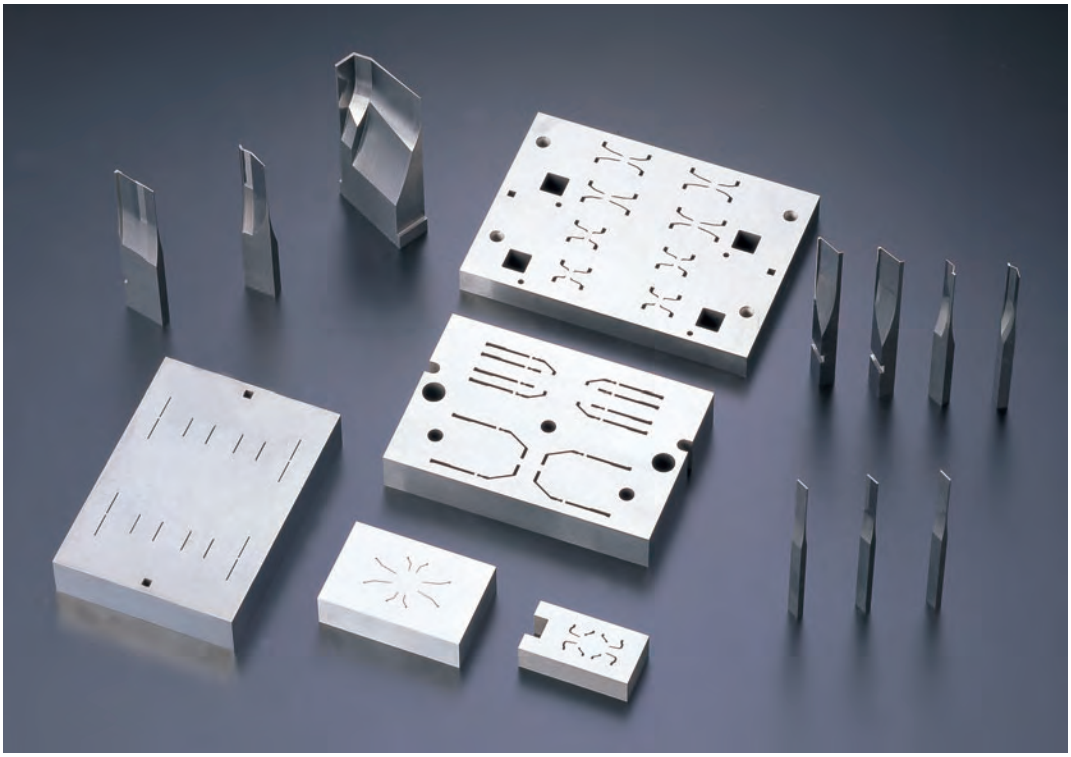
CEMENTED CARBIDE PRECISION MOLD PARTS (For IC Leadframe)

特 色
Characteristics

根据长久以来累积的丰富加工经验，制作高精度的零件。并利用独家加工方式，有效提升全数产品之面粗度。

Our abundant experiences allows us to make high precision parts. We improve all products to better surface roughness by our own processes.





超硬精密模具零件（IC封装）

CEMENTED CARBIDE PRECISION MOLD PARTS (For IC packaging)

特 色
Characteristics

使用本公司自行研发之加工机，可
提高精度、面粗度并延长使用寿命。

We use own designed equipment to produce high precision parts and extend their lifetimes.

超硬精密模具零件
CEMENTED CARBIDE PRECISION MOLD PARTS

特 色
Characteristics

拥有丰富的库存量，可在短期间交货。此外，亦提供高难度加工材料（SUS、铜、纯铁、镍等）使用寿命改善之相关咨询。

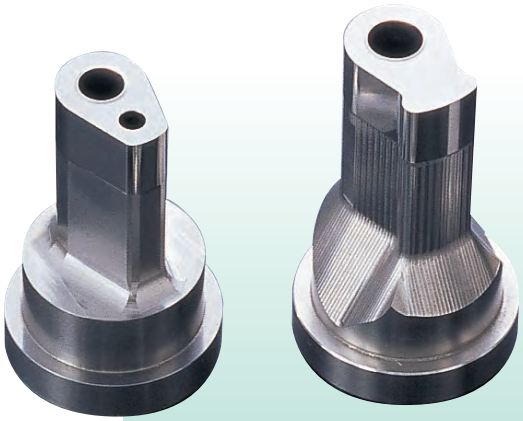
We respond to quick delivery utilizing various plates in stock. Please consult us on short lifetime issues of tools especially regarding stainless steel, copper, pure iron and nickel materials.

粉末成型模具零件
POWDER COMPACTING MOLD PARTS

特色
Characteristics

充分运用独家超硬制造技术，采用与粉体适应性良好的超硬材料所制作的模具零件在各领域皆广受好评。亦接受磁石用非磁性超硬零件之订制。

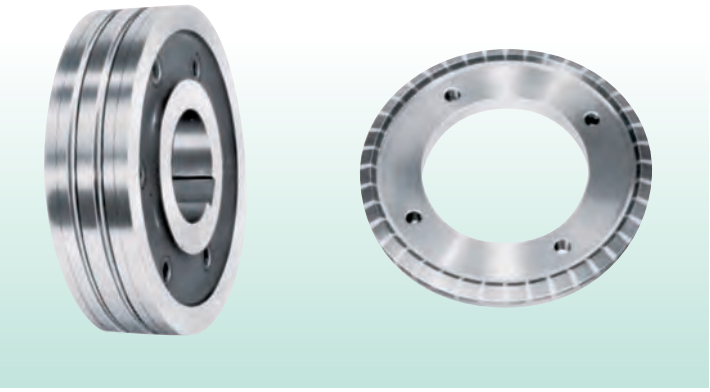
From our experience, we offer suitable material for powder compacting mold parts.
We also offer non-magnetic carbide for magnets.



特 色
Characteristics

考虑到硬质合金和钢材连接方法的形状和大小，我们会制造出最佳的轧辊方法。
我们也会提供超硬部位及配合零件之嵌合方法相关咨询。

Considering the shape and size of the joining method of the cemented carbide and the steel material, we will manufacture a roll that adopts the optimum method.
We will respond to consultation on how to fit the cemented carbide part and case.



特 色
Characteristics

采用本公司自行研发之专用抛光机，
精细的球面是长寿命的关键。

Our own designed lapping machine makes high accurate spherical surface and extends tool life.

共立喷雾喷嘴

EVERLOY SPRAY NOZZLES

日本共立最初利用自己的硬质合金开始生产对钢铁行业的喷雾喷嘴。目前通过我们的持续努力和技术发展正在覆盖世界各地的许多行业。

EVERLOY initially started to manufacture spray nozzles for steel industry utilizing our own cemented carbide.Currently we are covering many industries all over the world through our continued efforts and technical developments.

EVERLOY的网络
EVERLOY network

EVERLOY集团覆盖了整个生产过程，
可以快速地应对质量保证、快速交货、品质改良等多样化需求。
EVERLOY can act quickly on various kinds of customer needs such as Quality assurance,
fast delivery and Quality improvement as EVERLOY group covers whole manufacturing process.

本社・工场
本社营业部/超硬事业部 加工品部（兵库县西宫市）
Head Office, Factory
Sales department /
Cemented carbide division
Machining department

柏原工厂喷嘴事业部（兵库县丹波市）
Kaibara Works
Nozzle division

柏原工厂超硬合金事业部合金部（兵库县丹波市）
Kaibara Works
Cemented carbide division
Alloy department

九州EVERLOY股份有限公司（熊本县大津町）
KYUSYU EVERLOY CO., LTD.

总代理店
エバーロイ商事 株式会社

General Agent
EVERLOY SHOJI CO., LTD.

大阪营业本部（大阪市福岛区）
Osaka sales division

东京支店（东京都千代田区）
Tokyo branch office

九州支店（福冈市博多区）
Kyushu branch office

仓敷营业所（冈山县仓敷市）
Kurashiki branch office

全球化公司合作伙伴关系和共同繁荣

Global company activity to go for partnership and mutual prosperity

総代理店

エバーロイ商事 株式会社

本　　社　〒553-0002 大阪市福島区鷺洲４丁目 2-24
超硬営業部　TEL：06-6452-2271　FAX：06-6452-2050
ノズル営業部　TEL：06-6452-2272　FAX：06-6452-2187
海外営業部　TEL：06-6452-2273　FAX：06-6452-2187

東京支店　〒101-0032
東京都千代田区岩本町２丁目8-12
NKビル２F
TEL：03-3862-9280　FAX：03-3862-9151

九州支店　〒812-0043
福岡県福岡市博多区堅粕４丁目1-6
九建ビル４F
TEL：092-452-0810　FAX：092-452-0814

倉敷営業所　〒710-0826
岡山県倉敷市老松町３丁目14-20
ヤクルトビル401号
TEL：086-422-7560　FAX：086-430-0172

General Agent

EVERLOY SHOJI CO., LTD.

Overseas Sales Department
4-2-24, Sagisu, Fukushima-ku, Osaka 553-0002, Japan
TEL: +81-6-6452-2273　FAX: +81-6-6452-2187

関係会社

株式会社 九州エバーロイ

〒869-1232 熊本県菊池郡大津町大字高尾野字平成 272-38
TEL：096-293-2795　FAX：096-293-8947

愛波洛伊（上海）貿易有限公司

中国上海市長寧区仙霞路 345 号東方世紀大厦 1706 室
TEL：+86-21-5206-9733　FAX：+86-21-5206-9755

Subsidiary Company

KYUSYU EVERLOY CO., LTD.

272-38, Heisei, Takaono, Ozu-machi, Kikuchi-gun, Kumamoto-Pref.
869-1232, Japan
TEL: +81-96-293-2795　FAX: +81-96-293-8947

EVERLOY (SHANGHAI) CO., LTD.

Room 1706, No.345, Xian-Xia Road, Chang-Ning District,
Shanghai, China
TEL: +86-21-5206-9733　FAX: +86-21-5206-9755
WEB: http://www.everloy-china.com.cn

系列会社

東海合金工業 株式会社

〒489-0979 愛知県瀬戸市坊金町 236-1
TEL：0561-84-2611　FAX：0561-86-0255

株式会社 本山合金製作所

〒708-1104 岡山県津山市綾部字緑山 1645-20
TEL：0868-29-3333　FAX：0868-29-7017

Group company

TOKAI GOKIN KOGYO CO., LTD.

236-1, Bogane-cho, Seto, Aichi-Pref.
489-0979, Japan
TEL：+81-561-84-2611　FAX：+81-561-86-0255

MOTOYAMA GOKIN SEISAKUSYO CO., LTD.

1645-20, Midoriyama, Ayabe, Tsuyama, Okayama-Pref.
708-1104, Japan
TEL：+81-868-29-3333　FAX：+81-868-29-7017

株式会社 共立合金製作所

本　　社　〒663-8211 兵庫県西宮市今津山中町12-16
営　業　部　TEL：0798-26-3606 FAX：0798-37-2067
超硬事業部
加工品部　TEL：0798-26-3608 FAX：0798-37-2067

柏　原　工　場
超硬事業部
合　金　部　〒669-3315 兵庫県丹波市柏原町大新屋100-1
TEL：0795-73-0026 FAX：0795-70-2120

ノズル事業部　〒669-3315 兵庫県丹波市柏原町大新屋95-2
TEL：0795-72-3374 FAX：0795-72-3376

KYORITSU GOKIN CO., LTD.

Head Office
12-16, Imazu-yamanaka-cho, Nishinomiya, Hyogo-pref.
663-8211, Japan
TEL: +81-798-26-3606　　FAX: +81-798-37-2067

Kaibara Works
Cemented Carbide Division
100-1, Ohniya, kaibara-cho, Tamba, Hyogo-pref.
669-3315, Japan
TEL: +81-795-73-0026　　FAX: +81-795-70-2120

Kaibara Works
Nozzle Division
95-2, Ohniya, kaibara-cho, Tamba, Hyogo-pref.
669-3315, Japan
TEL: +81-795-72-3374　　FAX: +81-795-72-3376

ISO9001/14001 認証取得
ISO9001/14001 certification
改訂：2018 年 11 月 1 日