



Sales Offices

Tokyo Branch

11-10 Sayamagahara, Iruma-shi, Saitama, 358-0032 Japan
TEL. 04-2934-1042 FAX. 04-2934-6735

Nagoya Branch

Luminous Center Bld.2F, 1-15-1 Chikusa, Chikusa-ku, Nagoya-shi, Aichi, 464-0858 Japan
TEL. 052-728-1114 FAX. 052-728-1124

Osaka Branch

Yodoyabashi Mitsui Bld.16F, 4-1-1 Imabashi, Chuo-ku, Osaka-shi, Osaka, 541-0042 Japan
TEL. 06-7633-0611 FAX. 06-7633-0616

Manufacturing Offices

Head Office / Factory

11-10 Sayamagahara, Iruma-shi, Saitama, 358-0032 Japan
TEL. 04-2934-5261 FAX. 04-2934-6074
Email info@mks-tokyo.co.jp
URL <http://www.mitsui-kensaku.com>

Thailand Factory

MITSUI GRINDING TECHNOLOGY (THAILAND) CO.,LTD.
TEL.+66-38-213382 ~ 3 FAX.+66-38-214438
700/338 Amata City Chonburi Industrial Estate, Moo 6 Bangna-Trad Road,
Tambol Donhuaroe, Amphur Muangchonburi, Chonburi 20000 THAILAND

Indonesia Representative Office

Mitsui Grinding Technology(Thailand)Co.,Ltd. Representative office Indonesia
Room No.9 BeFa Square,2nd floor Jl.Kalimantan,Kawasan Industri MM2100
Gandasari,Cikarang Barat,Bekasi Jawa Barat,Indonesia 17520



MITSUI GRINDING WHEEL Co.,Ltd



MITSUI GRINDING WHEEL Co.,Ltd

■ Purpose of Mitsui Grinding Wheel

Bring smiles to the world through a spirit of exploration and fusion of diverse technologies.

■ Mission of Mitsui Grinding Wheel

Support industries by providing environmentally-conscious grinding tools and solutions through grinding technologies.

■ Values of Mitsui Grinding Wheel

- Creating value for customers
- Providing products and grinding technology services tailored to customer needs
- Pioneering business rooted in the ASEAN region
- Providing comprehensive technical support from general grinding wheels to super-abrasive wheels
- Having the determination to persevere without fear of failure

■ 三井研削砥石の目標

通過探索精神和多樣技術的融合，讓地球充滿笑容。

■ 三井研削砥石的使命

通過研削加工技術，提供注重環保的研削工具與解決方案，持續支持產業發展。

■ 三井研削砥石的價值觀

- 為客戶創造價值
- 提供符合客戶需求的產品及研削技術服務
- 迅速進入東南亞地區，開展扎根於當地的業務
- 提供從普通砂輪到超硬磨料砂輪的廣泛技術支持
- 無懼失敗，堅持到底的力量

Profile

Company Name	MITSUI GRINDING WHEEL Co., LTD.
Founded	Established in 1927, began manufacturing grinding wheels under the "Meguro Grinding Wheel" brand.
Established	1974
Capital	400 million yen
Shareholder	Mitsui Mining & Smelting Co., Ltd. (100%)
Location	11-10 Sayamagahara, Iruma-shi, Saitama (Head Office / Factory)
Business Discription	Manufacturing and sales of precision grinding wheels

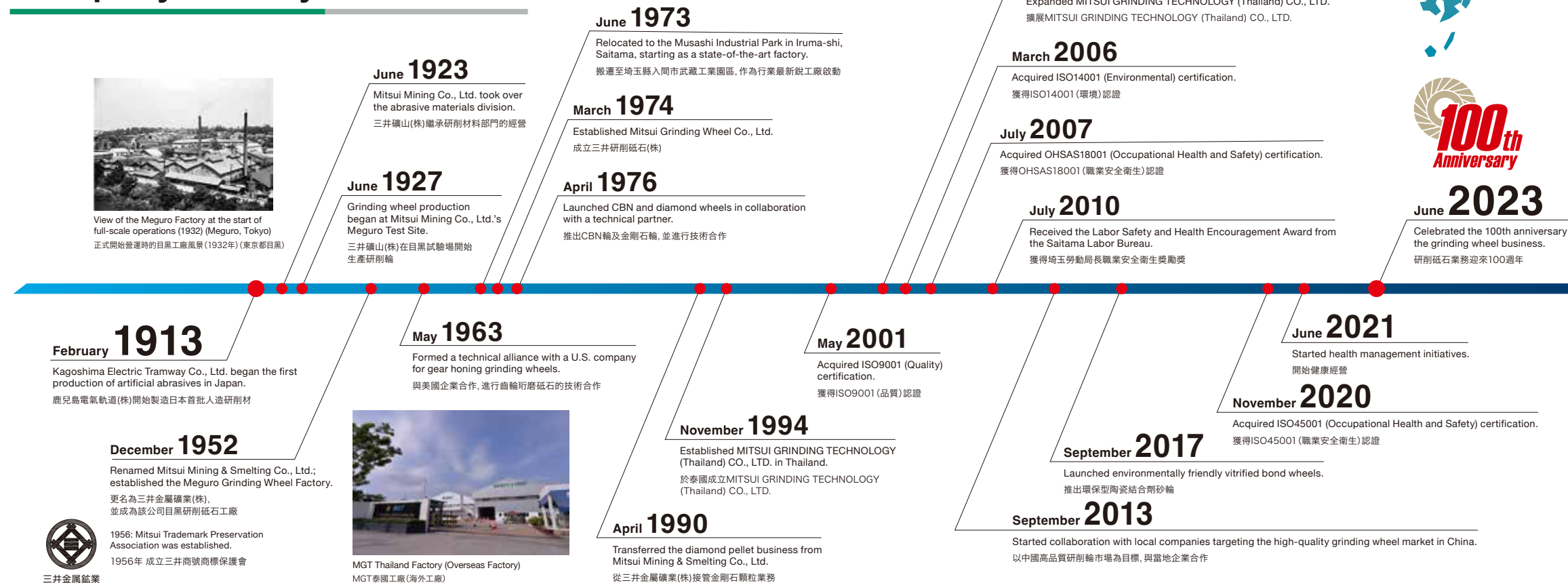


Head Office (Iruma City, Saitama)
總部 (埼玉縣入間市)

HP



Company History



Network

Head Office / Factory
11-10 Sayamagahara, Iruma-shi, Saitama,
358-0032 Japan
TEL. 04-2934-5261 FAX. 04-2934-6074

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MGT Profile

MITSUI GRINDING TECHNOLOGY (MGT) was established in 1994 as a joint venture between Thailand and Japan in the Bangpakong Industrial Estate (now Amata City Chonburi Industrial Estate). Our main products, grinding wheels (vitrified and resinoid), boast a monthly export volume of 300 tons. As a production base for the ASEAN market, we provide grinding wheels tailored to customer needs.

Company Name	MITSUI GRINDING TECHNOLOGY (THAILAND) CO.,LTD.
Founded	1996
Established	1994
Capital	248,750,000 THB
Shareholder	Mitsui Mining & Smelting Co., Ltd. (99.95%)
Location	700/338 Amata City Chonburi Industrial Estate, Moo 6 Bangna-Trad Road,Tambol Donhuaroe, Amphur Muangchonburi,Chonburi 20000 THAILAND TEL.+66-38-213382~3 FAX.+66-38-214438
Business Discription	Manufacturing and sales of high precision grinding wheels

Company Name	Mitsui Grinding Technology(Thailand)Co.,Ltd. Representative office Indonesia
Established	2023
Location	Room No.9 BeFa Square,2nd floor Jl.Kalimantan, Kawasan Industri MM2100 Gandasari,Cikarang Barat, Bekasi Jawa Barat,Indonesia 17520
Business Discription	Customer support and marketing

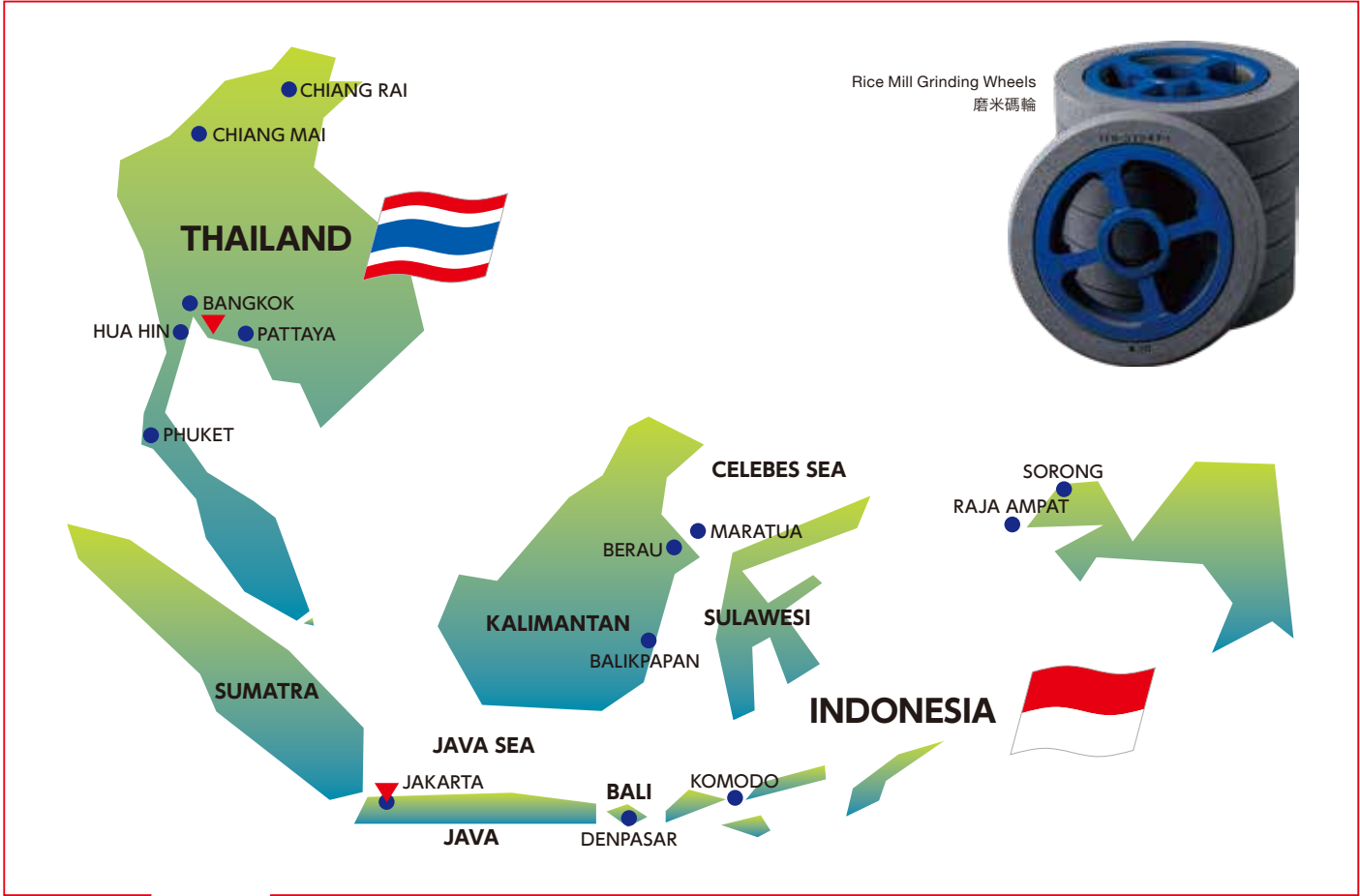
MITSUI GRINDING TECHNOLOGY (MGT)於1994年在邦巴功工業區(現稱阿瑪塔城春武里工業區)成立, 為泰國與日本的合資企業。 本公司的主要產品: 砂輪(陶瓷結合劑及樹脂結合劑)每月出口量高達300噸, 作為東南亞市場的生產基地, 提供滿足客戶需求的砂輪。



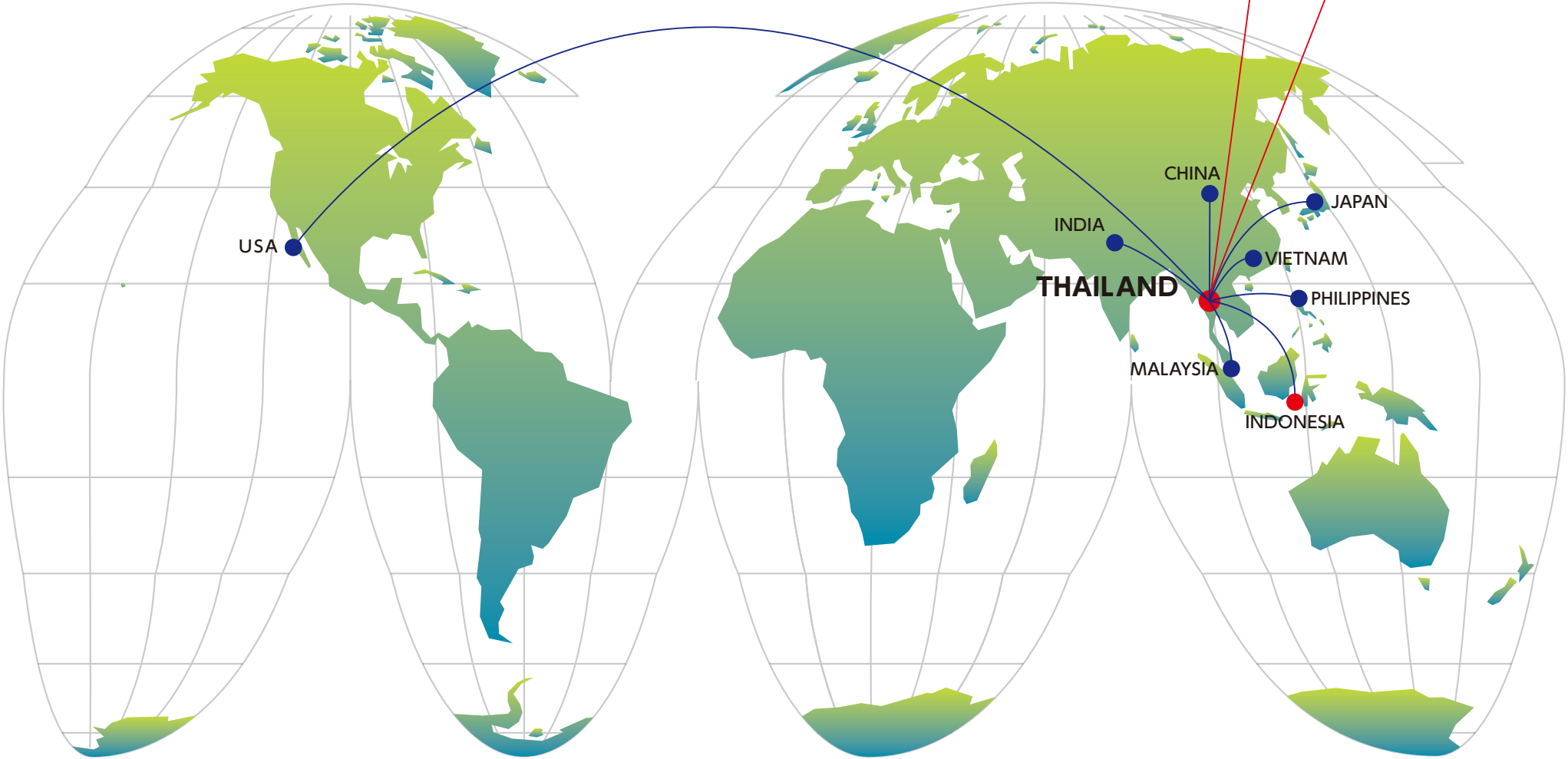
MGT Factory (Thailand) MGT工廠(泰國)



MGT Indonesia Office MGT印尼據點



Rice Mill Grinding Wheels 磨米碼輪



Contents

Profile, Company History, Network	公司概要、沿革、據點	01~02
MGT Profile	MGT概要	03~04
Product Introduction	產品介紹	
Sintered Alumina Wheel Abrasive	陶瓷砥石 磨料	05
General Wheel Abrasive	一般砥石 磨料	06
General Wheel Vitrified Bond	一般砥石 陶瓷結合劑	07~09
General Wheel Resinoid Bond	一般砥石 樹脂結合劑	10
General Wheel Regulating Wheel	一般砥石 磨導輪	11
Super-Abrasive Wheel	超硬磨料砂輪	11
CBN Wheel Vitrified Bond	CBN砂輪 陶瓷結合劑	12~14
CBN Wheel Resinoid Bond	CBN砂輪 樹脂結合劑	15~17
Diamond Wheel Vitrified Bond	金剛石砂輪 陶瓷結合劑	18
Diamond Wheel Resinoid Bond	金剛石砂輪 樹脂結合劑	18
Diamond Dressers	金剛石修整器	19~20
Basics of Grinding Wheel	砂輪的基礎知識	21~24
Basics of Super-abrasive Wheel	超硬磨料砂輪的基礎知識	25~26

Sintered Alumina Wheel Abrasive

陶瓷研削輪 磨料

General Wheel Abrasive

普通砥石 磨料

MITSUI HIGH PRECISION GRINDING WHEEL

Mitsui's sintered alumina wheel

Sintered alumina abrasive has progressively improved productivity in grinding process.

“LCA Lightning” grinding efficiency oriented grain, “MC” precision oriented grain and “ME” high cost-performance oriented grain are available.

Combinations of these grains and TB(TOUGH BOND) bond would enhance your productivity even better.

三井的微晶刚玉磨料砂轮

使用微晶磨料, 可以将切削能率大副提高

三井的微晶磨料又分为磨削效率定向 “LCA” Lightning” 磨粒、精密定向

“MC” 磨粒和高性價比 “ME” 磨粒可供選擇

另外, 配合三井研发的可以最大限度保持磨料磨削性能的高强度 <TB(TOUGH BOND)> 磨料, 为客户的磨削工程的生产性提高贡献我们的力量

LCA Lightning 輕微晶

“Lightning” Building new era in the grinding

構築研削加工新時代的微晶砂輪

Features of LCA abrasive

- **Excellent micro-chipping property**
Its micro-chipping property keeps sharp-cutting, which means you can grind more parts per dress and wheel life is longer.

- **Excellent for high pressure grinding**
Grinding force can be lower than MC wheel. You can put more loads to the LCA wheel and save machine time.

LCA磨料的特点

- 優异的微小破碎性能
可時時發生且保持安定持續的微小破碎, 砂輪的修整間隔延長。
砂輪壽命大幅延長
- 适用于高負荷研削
与MC磨料比較, 其特点是切削抵抗低, 特别适用于高負荷的切入。

MC Mitsui Ceramics 三井微晶

High performance sintered alumina wheel

高性能微晶磨料砂轮

Features of MC abrasive

MC consists of sintered alumina abrasive with fine and controlled microstructure. The microstructure leads to excellent self-sharpening effect. Hard steels like SKD or SKH can be ground efficiently with MC. For applications like grooving grinding or plunge cutting, which require both form holding and sharpness, MC is expected to have much longer life comparing with conventional alumina abrasive.

MC磨料的特点

MC微晶磨料是由微小晶体燒結而成的。由MC磨料制作的砂輪可時時發生微小破碎, 長時間保持切削力
对于加工經過熱处理的SKH SKD材, 以及其他高硬度材料, 能發揮優异的切削性能
在同時要求形狀保持性和切削力的加工上, 例如沟槽加工, 円筒直角加工等, 和普通砂輪比, 具有压倒性的砂輪寿命

ME

High Cost performance

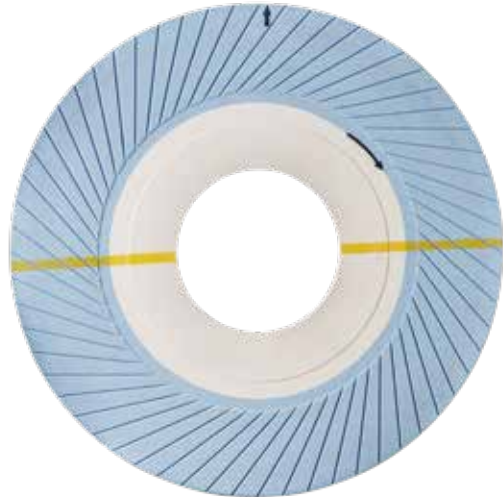
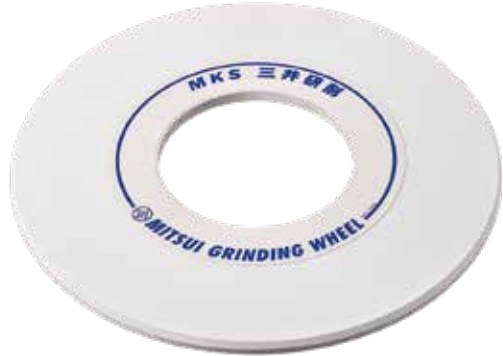
性價比型陶瓷磨粒

Features of ME abrasive

- High performance ceramic abrasive following LCA abrasive / MC abrasive
By switching from conventional alumina abrasive, it is possible to dramatically improve grinding efficiency.
- Pricing can be cheaper than LCA abrasive /MC abrasive
Applicable to both vitrified and resinoid bond.

ME磨料的特点

- 僅次於LCA/MC的高性能陶瓷磨粒
與普通磨粒相比, 可以顯著提高磨削性能。
- 價格可以比 “LCA/MC磨粒” 便宜
陶瓷結合劑和樹脂結合劑兩者都適用。



Mitsui's general wheel 三井的普通砥石

JIS JIS標記	type 類型	color 顏色	Composition *only advisory 組成 *僅供參考	application 適用範圍
A	Brown fused alumina 褐色刚玉	Brown	Al ₂ O ₃ 95 % TiO ₂ 1.5~3 %	Free-hand/mechanical grinding of mild steel 一般鋼材、生材的自由研削、機械研削
WA	White fused alumina 白色刚玉	White	Al ₂ O ₃ 99%	Precision grinding of alloyed steel, tool steel and other hardened steel. For light load. 合金鋼・工具鋼・燒入鋼材的精密研削 輕研削
PA	Pink fused alumina 淡紅色刚玉	Pink	Al ₂ O ₃ 99 % Cr ₂ O ₃ 含有	Precision grinding of alloyed steel, tool steel and other hardened steel. 合金鋼・工具鋼・燒入鋼的精密研削
HA	Monocrystalline fused alumina 解碎型刚玉	Gray	Al ₂ O ₃ 98.5% 單結晶	Precision grinding of alloyed steel, tool steel and other hardened steel. 合金鋼・工具鋼・燒入鋼材的精密研削
C	Black SiC 黑色碳化硅磨料	Black	SiC 95 %	Precision grinding of non ferrous metal, non metal and cast iron. 非鉄金属 非金属材料 鑄鉄的精密研削
GC	Green SiC 綠色碳化硅磨料	Green	SiC 99 %	Precision grinding of non ferrous metal, non metal, cast iron and cemented carbide. 非鉄・非金属 鑄鉄 超硬合金的精密研削

MBA Mitsui Blue Alumina

New alumina abrasive with excellent shape retention and high toughness

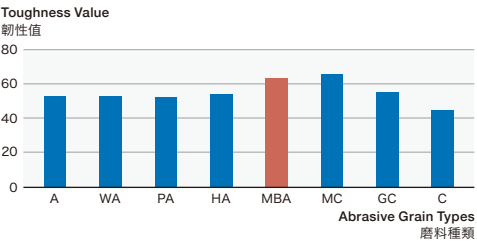
具有優異保形性的新型高韌性氧化鋁磨料

Features of MBA abrasive

- **Excellent shape retention**
MBA abrasive show excellent toughness values next to ceramic abrasive. By maintaining the shape of the abrasive grain after dressing for a long time, it is possible to secure the amount of protrusion of the abrasive grains, suppress grinding burns, and extend the dressing interval.
 - **Combination with vitrified bond**
It is possible to maintain the shape of the wheel for a long time by combining MBA abrasive + TB bond.
 - **Combination with resinoid bond**
Can be used with all resinoid bonds.
- Recommended grinding application**
- Form grinding (vitrified bond), Centerless grinding (resinoid bond), Double-disk surface grinding (resinoid bond)

MBA磨粒的特點

- **出色的保形性**
MBA磨粒顯示出僅次於陶瓷磨粒的優異韌性值。修整磨粒後, 可維持長時間的形狀保持, 確保磨粒突出量, 從而達到抑制磨削燒傷, 延長修整間隔。
 - **與陶瓷結合劑的組合**
通過將 MBA 磨粒 + 磨粒保持力優良的結合劑 TB相結合, 達到長時間保持砂輪的形狀。
 - **樹脂結合劑**
可用於所有的粘合劑。
- 推薦應用**
- 成形磨削(陶瓷結合劑)、無心磨削(樹脂結合劑)、雙邊平面磨削(樹脂結合劑)



CS Series

Line-up for grinding steels of any kind.

能對應各種鋼鐵材料的新時代高性能單結晶剛玉砂輪

Features of CS abrasive series

- **Many variations**
Capable of grinding mild to hardened steel.
- **Excellent sharpness**
Low grinding force and easy to dress.
- **Long life**
More parts per dress, so the wheel life is longer.

CS磨料的特点

- **丰富的选择搭配**
从生材到調質材, 再到堅硬的熱处理材等均可广泛对应
- **優异的切削性能**
切削抵抗低, 切削起来感覺輕快, 易修整
- **長寿命**
因其研削比高, 砂輪壽命長, 且面粗糙度良好



CS series line-up 可对应多種材料的CS系列砂輪

	name 磨料	features 特性	applications 推荐用途
○	CSA	High end spec. with excellent sharpness and wheel life 高寿命且高切削性能	Precision grinding of Hardened steel (carbon steel, alloyed steel, tool steel) 面向SxxC SUJ2 SCM SK等熱处理材的精密加工
○	CSB	Mid-range model valuing sharpness. 注重高切削性能	Precision grinding of Hardened steel (carbon steel, alloyed steel, tool steel) 面向SxxC SUJ2 SCM SK等熱处理材的精密加工
○	CSC	Mid-range model valuing shape retention & sharpness. 注重形狀保持性能和切削力	Crankshaft grinding and cylindrical grinding(plunge cut) 曲軸直角等精密円筒研磨
○	CSD	Economic model with sharp cutting edge. 偏重切削性能且價格实惠	Precision grinding of Hardened steel (carbon steel, alloyed steel, tool steel) 面向SxxC SUJ2 SCM SK等熱处理材的精密加工
○	CSE	High wear resistance model 偏重耐磨性能	Precision grinding of mild steel, tempered steel 生材、調質材為主的各種精密加工

General Wheel Vitrified Bond

普通砂輪 陶瓷結合劑

MITSUI HIGH PRECISION GRINDING WHEEL

TB Tough Bond 高強度

High-strength bond

高強度結合劑

Features of TB bond

- **High Shape Retention**
Strong abrasive retention minimizes wheel deformation

- **Unlocks the Potential of sintered Alumina grain**

Sintering process maintains the microstructure of sintered Alumina High Rotational Strength: Enhances safety during high-speed grinding

Recommended applications

- Crankshaft grinding, angular grinding, groove grinding, cylindrical grinding (plunge cutting), etc.

Range of application

- Grit Sizes: F46~F220

TB的特點

- 長期保持形狀
透過強大的磨料保持力, 減少砂輪的變形。
- 發揮陶瓷磨料的性能
燒結過程中維持陶瓷磨料的微細結構
高旋轉強度 - 提高高速旋轉中的砂輪的安全

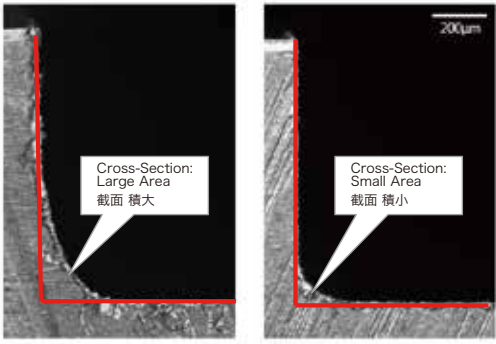
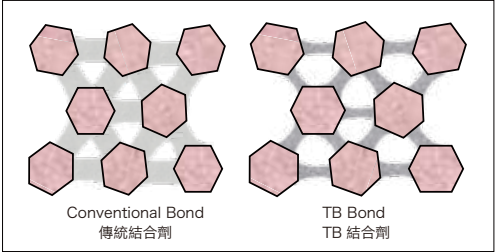
推薦用途

- 曲軸研磨、斜角研磨、溝槽研磨、圓柱研磨(切入研磨)等

生產範圍

- 粒度 F46~F220

Concept Diagram of TB Bond
TB 結合劑概念圖



MI TB
Indicates High Shape Retention
表現出能高度保持形狀

MI

Standard precision bond for grinding wheels

標準精密研磨結合劑

Features of MI bond

- **Reduce grinding resistance**
While it tends to have lower abrasive retention compared to TB bonds, it effectively reduces grinding resistance. We propose the most suitable grinding wheels tailored to your application needs.

MI的特點

- 減低研磨阻力
與TB結合劑相比, 雖然磨料保持力略遜一籌, 但可以有效降低研削阻力。
根據客戶的使用用途, 提供最佳的砂輪解決方案。

TM Tough Matrix

Strong vitrified bond

高強度陶瓷基結合劑

TM bond has improved strength from conventional bond, so we can make grinding wheel of same hardness grade with small amount of bond. Friction between bond and work piece is less, performance of grain is maximized. TM is applicable to fused alumina grains only. Combinations with CS series are good choice to start with.

TM結合劑和以往的結合劑比具有超堅固的特点。可以強力固定磨料。因此在同樣硬度下, 結合劑的使用量更少, 減少了結合劑和工件之間的摩擦。因此能最大限度發揮磨料本身的性能。

TM 結合劑是剛玉系列磨料的專用結合劑。特別是配合以CS系列為代表的單晶剛玉, 可以發揮出TM的最大性能

Features of TM bond

- Excellent form holding
- Stable and fine surface roughness
- High rotational strength. Safe.

TM結合劑的特征

- 砂輪形狀保持性能非常好
- 可以獲得均勻安定的面粗糙度
- 砂輪回轉强度高, 更加安全。

Larger size_ newly available TM結合劑在大型砂輪製造上的應用

- D760+ : max.T50 ⇒ 100
- D510~610 : max.T100 ⇒ 205

Recommended applications

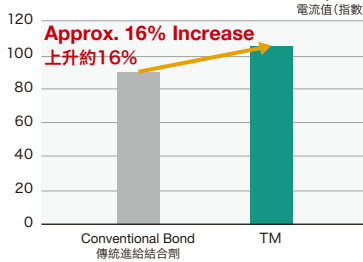
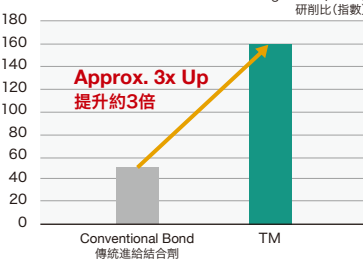
- Cylindrical grinding, Crankshaft grinding, angular grinding, in-feed centerless grinding

推薦用途

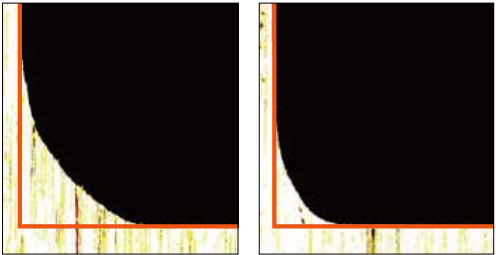
- 各種圓筒研磨 各種拐角處的研磨 曲軸, 凸軸研磨 切入式無心磨

Internal Test with the Same Amount of Bond

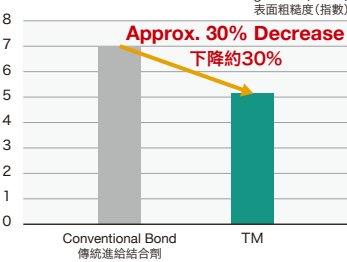
使用相同結合劑量的內部測試



Comparison of Plunge Cutting on SCM440
SCM440 進給切削的比較



Conventional Bond TM Bond
傳統進給結合劑 TM 進給結合劑



AFV/CFV

Vitrified bond with a new concept.
Soft-touch and smooth self-sharpening.

低韧性新概念陶瓷基砂輪

輕研磨易切削自刃作用良好的低韧性新概念陶瓷結合劑

AFV : bond for alumina abrasive

運用于以WA為代表的剛玉系列磨料

CFV : bond for SiC abrasive

運用于以GC為代表的碳化硅系列磨料

Features of AFV/CFV bond

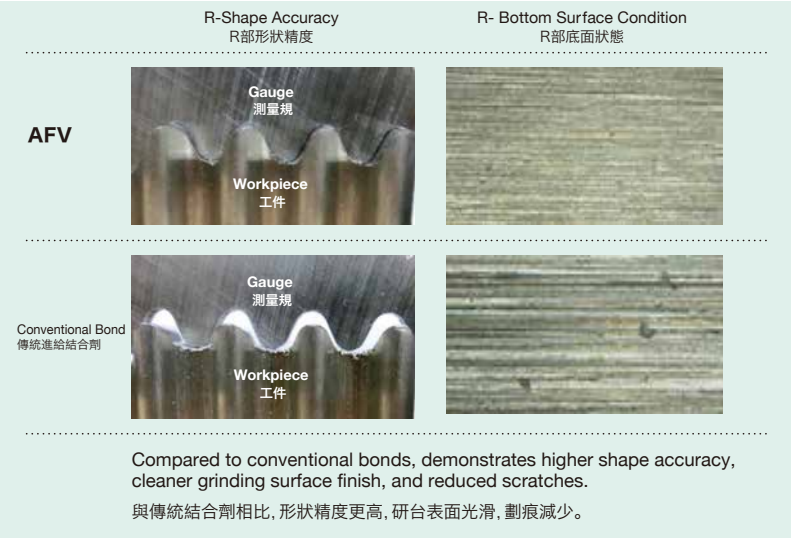
- Wheel wears evenly, so the wheel may keep its form.
- Low grinding force, less welding of material. Suitable for hard-to-grind materials like Inconel.
- Shrinkage in firing is small, so fine grit size and porous structures are available.

AFV/CFV 結合劑的突出特点

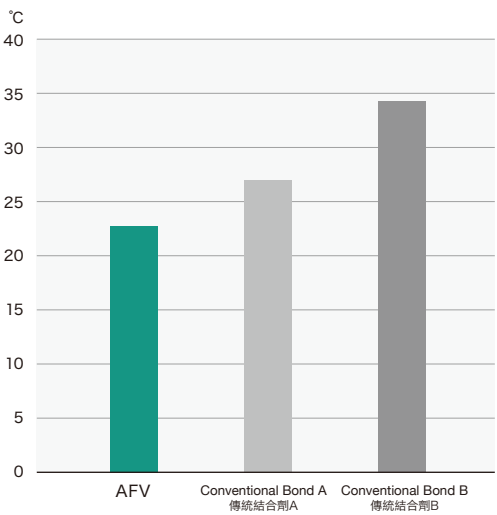
- 与高强度結合劑比, 虽磨耗稍快但發生的是极細小碎裂, 不發生大程度的形狀崩潰, 切削抵抗低
- 与以往的結合劑比, 因其切削抵抗低, 不容易發生切削屑熔着, 适合镍基合金為代表的黏性大, 難研磨材料。
- 燒成時收縮小, 結合度的变化小, 非常适合細粒度磨料的應用。

Grinding Test on Inconel Material

镍基合金材料的研磨測試



Temperature Change of Workpiece Before and After Grinding
研台前後被加工材料的溫度變化



General Wheel **Vitrified Bond**

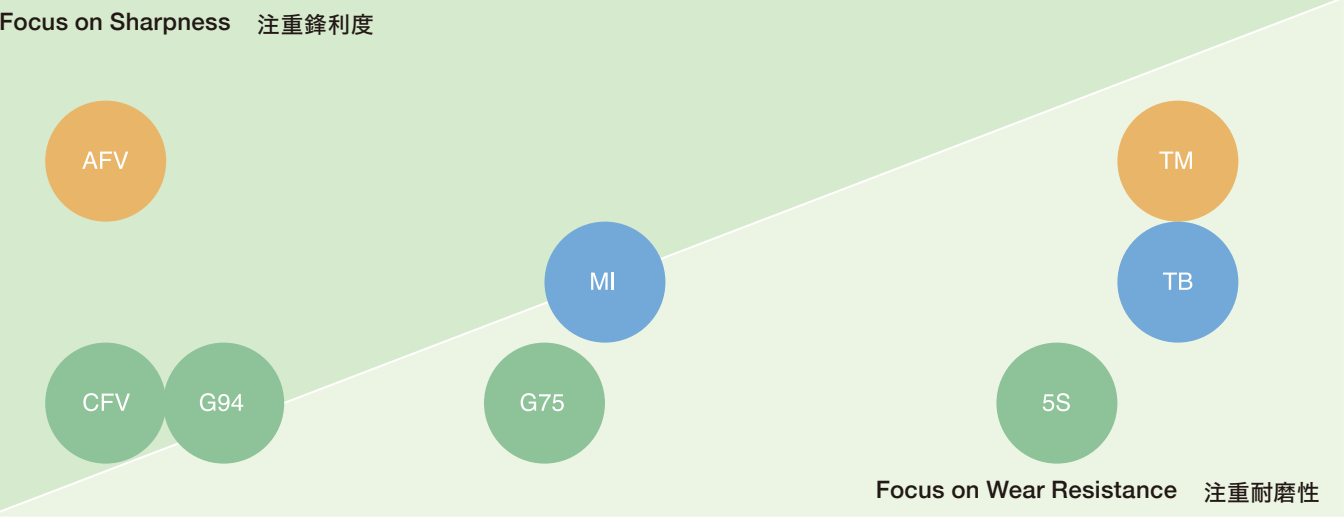
一般砂輪 陶瓷結合劑

General Wheel **Resinoid Bond**

一般砂輪 樹脂結合劑

MITSUI HIGH PRECISION GRINDING WHEEL

Mitsui's Main Lineup of Vitrified Bond 三井的主要陶瓷結合劑



Name of bond 結合劑	Type of abrasive 磨粒種類	Features 特点
TM	Fused alumina	High strength bond for fused alumina grain 刚玉磨料用高强度结合剂
AFV	Fused alumina	Bond for soft & fine grinding wheel 软质地，细粒度用结合剂
TB	Fused alumina & sintered alumina	High strength bond 高強度結合劑
MI	Fused alumina & sintered alumina	Standard bond 標準結合劑
5S	SiC	Long life bond for SiC wheel 耐磨性高的精密研磨用結合劑
G75	SiC	Standard bond for small SiC wheels 切削性能和耐磨性平衡的精密研磨用結合劑
G94	SiC	Bond for soft grade grinding wheel 适用于小型砂輪，切削性能優良
CFV	SiC	Bond for soft & fine grinding wheel 软质地，细粒度用结合剂

Mitsui's Resinoid Bond Wheels

Our resin bonds are combinations of various resins and fillers. Bond recipe is adjusted to your requirements. We have a lot of experience and past records, especially in double disk grinding and centerless grinding.

三井的樹脂砂輪

三井的樹脂砂輪，運用多種樹脂及填充劑組合，可對應各種情況下的切削條件，用途広範。特別是兩頭平面磨和無心研方面 我公司積累了長年大量的実績和經驗

Mitsui's Main Lineup of Resinoid Bond 三井的樹脂結合劑主要產品系列

Applications 用途	Focus on Sharpness 注重鋒利度	General Purpose 通用	Focus on Wear Resistance 注重耐磨性
Centerless 無心研磨	5AM	5AB	
Cylindrical 圓柱研磨			
Springs 彈簧			
Fine Grit 細粒	—	3IA	—
Disk 盤片	5LT	5JS	5IS
Ring 環形		5ID	BEX

Airy

Smooth Cutting Performance

轻快研削

Features

- Good self-sharpening would keep grinding resistance low.
- Recommendable for grinding high hardness steel.
- Stable self-sharpening is useful to through-feed double disk grinding or roll grinding.
- Spec. such as grain combination is widely customizable to improve performance.

Recommended applications

- Double disk grinding of hardened steel parts
- Roll grinding

特征

- 切削抵抗低，切削性能在高自刃作用下長時間保持
- 对于各种熱处理高硬度材料及高負荷的研磨，都能發揮出類拔粹的切削性能
- 在需要稳定自刃作用的切削加工上，如無心磨兩頭磨、軸研磨工程中、發揮安定且優良的切削能
- 可以根据客戶加工条件，搭配各种磨料和填充劑，達到最佳切削效果

推荐用途

- 各种熱处理鋼材的平面磨（環形砂輪，双端面砂輪）
- 軸的研磨



BEX BEL Extra

Opening New Horizons in Resinoid Grinding Wheels

開創樹脂砂輪的新境界

Features

- Its porous structure leads to sharp-cutting.
- BEX bond holds grains strongly, so the wheel life is longer than ordinary resin bond.
- It is highly resistant against heat and water, so the performance is stable throughout the year.

Recommended applications

- Surface grinding of mild/tempered steel (cylinder type and disk type)

特征

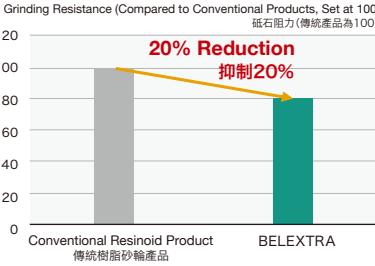
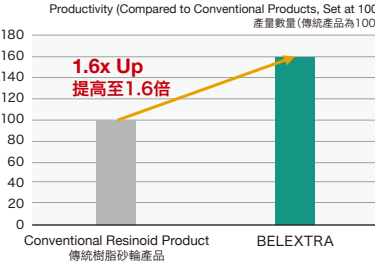
- 由特殊製法製成，氣孔率高，切削性能優異
- 拥有強大的磨料保持力，和普通樹脂砂輪比，耐磨性能十分突出
- 对水和熱的化学稳定性高，季節因素对砂輪性能的干扰小

推荐用途

- 生材 調質材的平面研磨（環形砂輪，双端面砂輪）



Case Study: Double-Sided Grinding (Carrier Through System) of Cold Rolled Steel Sheets
冷軋鋼板的雙頭平面研磨（連續加工）案例



General Wheel Regulating Wheel

一般砂輪 磨導輪

Rubber Regulating Wheel

Standard rubber regulating wheel with excellent grip performance
安定且工件抓握能力高的標準無心磨導輪

Rubber wheel is a versatile and good-gripping regulating wheel. A grain is ordinary. Alumina-zirconia (AZ) grain is also available for high-load use.

該產品以橡膠為原料, 是標準的高抓握力無心磨導輪。
通常使用A磨料。为了提高其耐磨性能, 三井也提供以 AZ為磨料的導輪



Standard Specifications A 150 R R
標準規格

Rough 粗	←	Grit size 粒度	→	Fine 細
Strong 強	←	Grip 抓握力	→	Weak 弱
Low Processing Accuracy High 低	←	Processing Accuracy 加工精度	→	High 高

Super-abrasive Wheel

超硬磨料砂輪

CBN and diamond abrasives are called super-abrasive. Abrasives such as alumina or SiC are called conventional abrasive in contrast.

与刚玉 碳化硅等一般人造磨料相比, CBN钻石磨料為超硬磨料

- **Diamond**
The typical applications of diamond, well known as a hardest material in the world, are abrasive for hard & brittle materials such as ceramics, carbide, sapphire, etc. Usually it is not good choice to grind steels, because it is reactive against iron under high temperature.
- **CBN**
CBN is composed of boron and nitrogen. It's a second hardest material in the world. Compared with diamond, it is thermally stable and inactive to ferrous materials. That is why CBN has been used to grind steel work pieces.

Abrasives grains are evaluated based on two indicators.

- **TI (Toughness Index):**
Indicates the strength of abrasives at room temperature.
- **TTI (Thermal Toughness Index):**
Indicates the strength of abrasives at high temperatures.

Fracturability

- Promotes active renewal of cutting edges through repeated micro-fracturing.
- Strength decreases at high temperatures
⇒ Unsuitable for processes generating high heat.

High Fracture Toughness

- Less prone to fracturing, with minimal changes in abrasive characteristics.
- Strength is less affected by high temperatures
⇒ Effective for heavy-load, high-temperature processes.

- **钻石磨料**
已知的最堅硬物質, 可以運用在硬質陶瓷, 超硬合金, 藍寶石玻璃等極硬的非鉄, 非金属的加工上。但是因其熱穩定性差, 且由炭元素構成, 所以通常不使用在鉄系材料的加工上
- **CBN**
CBN是立方氮化硼的簡称 存在有立方晶体結構。是仅次于钻石的堅硬物質。且耐熱性極高, 和鉄不發生反應, 可運用在鉄系材料的加工上。但因其造價高昂, 通常使用在熱處理材的高精度加工上

磨料通過兩個指標進行評估。

- **TI (韌性指數):**
表示磨料在常溫下的強度指數。
- **TTI (熱韌性指數):**
表示磨料在高溫下的強度指數。

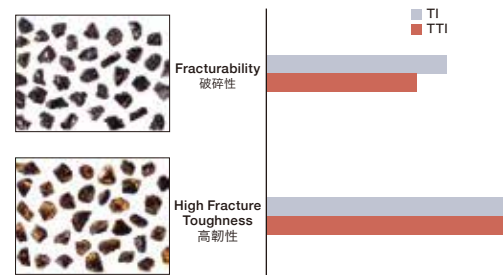
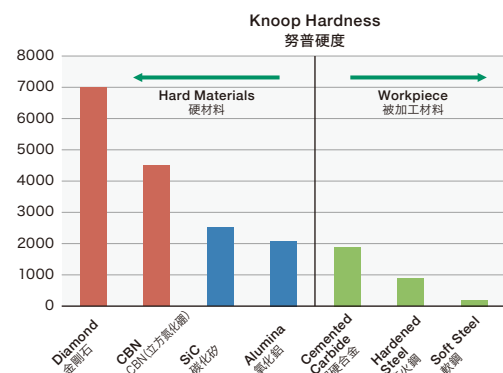
破碎性

- 通過反覆引起微破碎令切刃不停更新。

- 強度在高溫中下降。
⇒ 不適合產生大量熱的加工。

高韌性

- 不易破碎, 磨料特性的變化小。
- 即使在高溫下也不易降低強度。
⇒ 適合重負荷和高溫加工。



CBN Wheel Vitrified Bond

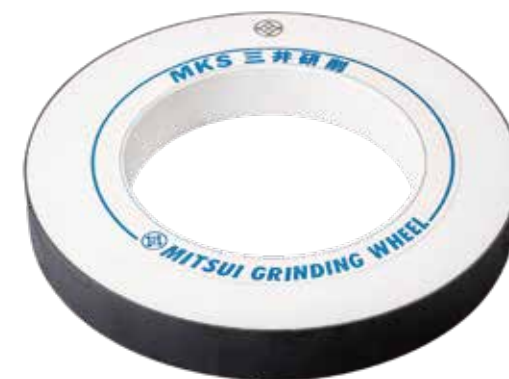
CBN砂輪 陶瓷結合劑

Seamless Wheel

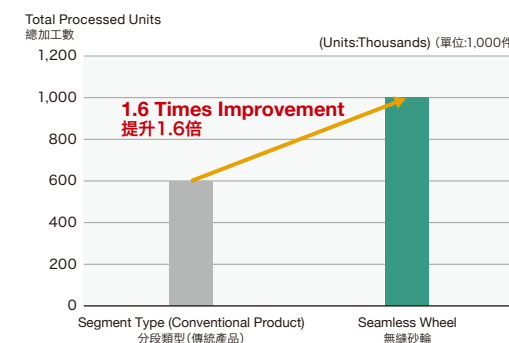
Strong vitrified bond
完全一体型陶瓷基CBN砂輪

Seamless wheel would provide you fine and precise surface, comparing with segmental wheels. It is the best choice for in-feed centerless grinding or plunge grinding. Grit size from #80 to #500 is available.

砂輪完全没有接缝, 可以發揮優越的切削性能可製造 #80~#500, 粒度的砂輪
适用于高加工精度要求的切入式無心磨以及円筒直角磨



Case Study : Infeed Centerless Grinding of Compressor Crankshaft (FCD)
壓縮機曲軸 (FCD) 進給無心加工案例



Multi Wheel

High-performance CBN wheel for through-feed centerless grinding
使用在貫穿磨加工的高性能多層型CBN砂輪

Options

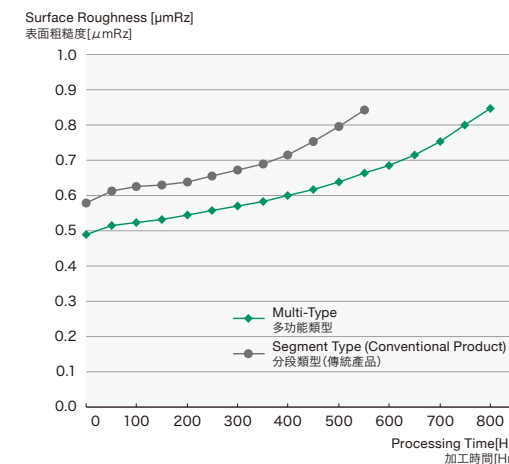
- **“Gradation” wheel**
Efficiency can be compatible with precision. Just make the inlet part rough, and outlet part fine.
- **Protective resin plate**
Resin plates could be installed on one or both side of wheel. These plates protect wheel from corner's break and also prevent scratches at inlet/outlet.

选择可能

- **磨料粒度漸變型**
在工件入口處配合粗粒度, 在出口處配合細顆粒, 可以兼顧切削和加工精度兩方的性能。
- **輔助板**
可以在出口或入口, 或兩側均添加樹脂輔助板, 不僅可以防止砂輪本身的邊緣磕碰, 也可以保護工件, 不被划傷



Case Study : Through-Feed Centerless Grinding of Needle Steel Material
針狀鋼材通過式無心加工案例



C Series

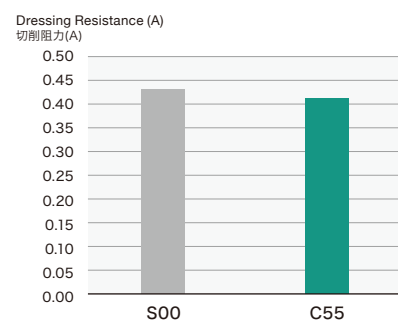
C00/C55

New High-Wear-Resistant Bond for Super-abrasive

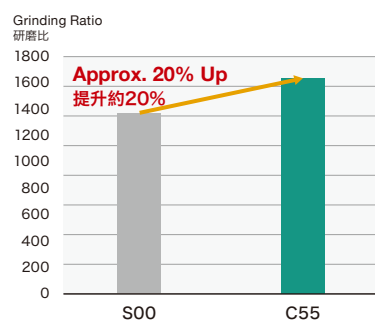
具優異耐磨性，用於超硬磨料的新型結合劑

- Enhanced wear resistance extends tool life.
- Supports high-load processing with superior strength.
- The design ensures easy handling with low resistance in truing and dressing processes, even for products with high bond strength.
- 提高耐磨性，延長工具壽命。
- 高強度，適用於高負荷加工。
- 修整和修刀阻力低，即使是高結合度產品也易於操作。

Dressing Resistance (Measured Value)



Wear Resistance (Measured Value)



00 Series

S00/F00/P00

High conc. CBN vitrified bonds

高濃度用CBN陶瓷結合劑系列

3 excellent features

- 1. Easy to dress**
Directly follows a change in depth of cut or feed rate of dresser. You may adjust your wheel to get sharpness or fine surface roughness.
- 2. Sharpness**
It is made of well qualified grain and bond to provide you excellent sharpness. Hardness grade "J" is available for applications those require especially sharp-cutting.
- 3. Stability**
Our forming process is well practiced to make CBN section homogeneous, so the performance would be good and stable.

Recommended applications

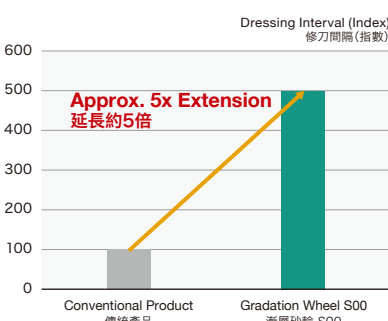
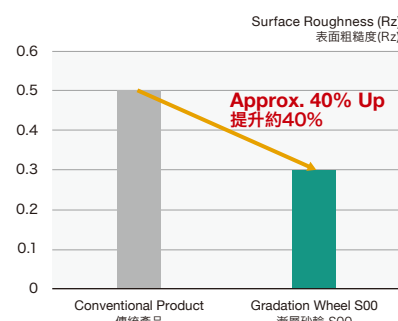
- S00: Centerless, P00: OD grinding, F00: ID grinding
- *Requires dressing equipment for super abrasive wheels.

三種優異特征

- 1. 優越的易修整性能**
砂輪可迅速對應各種修整條件，如修整速度調整、切入深度的變化，可以廣泛應對從粗糙度重視到切削力重視的顧客加工要求
- 2. 優異的切削性能**
因其採用高品質的磨料和結合劑，切削性能優異。尤其是 J 結合度的產品，能發揮出類拔萃的切削性能
- 3. 良好的安定性**
生產過程都經過精密的成型計算，使磨料層的密度幾近完美均一，能時常發揮出安定的切削性能

推薦用途

- S00: 無心磨 P00: 圓筒研磨 F00: 內面研磨
- *需配合使用金剛石滾輪作為修整工具



S Series

S11/S12/S13

Excellent sharp cutting & form holding.

Middle to high conc. c-BN vitrified bonds.

是高切削性能和形狀保持能力的高濃度陶瓷CBN砂輪

Features of S Bond series

- Less burns and precise dimensions.
- Bonding is strong, so fine surface roughness and good geometric accuracy could be obtained.
- Suitable for applications requiring good form holding, such as vane or ID of bearing steel.

Recommended applications

Centerless grinding, OD grinding, ID grinding
*Requires dressing equipment for super abrasive wheels.

S結合劑系列的特点

良好的切削性能，不易發生燒件現象，工件尺寸精度優
磨料保持能力強，除得到良好的面粗糙度之外，工件的幾何精度高
非常適合高速鋼材質翼板為代表的形狀精度要求高的工件
在SUJ2材質的槽內內面研磨上也體現了良好的切削性能和加工精度

推薦用途

圓筒研磨 內面研磨
*需配合使用金剛石滾輪作為修整工具



M Series

M11/M12/M13

Low conc. CBN vitrified bonds. -Pursuing usability-

追求使用便利性的低濃度CBN陶瓷砂輪

M series is designed to enable dressing and truing by single point diamond dresser. Its conc. is low concentration. It is applicable to conventional grinding machine as well. M series may be a good solution for tool steels which have hardness over HRC60 or hard-to-grind materials such as stainless steels.

低濃度的M系列，使用單點金剛筆就能進行修整作業。
在普通磨床上也可以使用CBN砂輪，發揮CBN磨料的高超切削能力
在HRC硬度超過60的工具鋼，SUS440C等難磨材料上可以發揮出類拔萃的研磨性能

1. Saving machine time

High quality CBN grain allows grinding efficiency much higher than conventional wheel.

2. High precision

Sharp cutting would provide high accuracy in dimensions and geometry.

3. Less wheel wear

Even comparing with sintered alumina grain, M series exhibit much higher grinding ratio.

Recommended applications

ID grinding, OD grinding, Jig grinding, surface grinding

1. 加工時間縮短

高品質CBN磨料的高效率作業，可以大幅縮短加工時間

2. 高精度

因其高超的切削性能，得到的尺寸精度，形狀精度優良

3. 砂輪磨耗小

和普通砂輪里壽命最長的微晶磨料砂輪比，也遠遠超過其壽命，工具壽命大幅提高

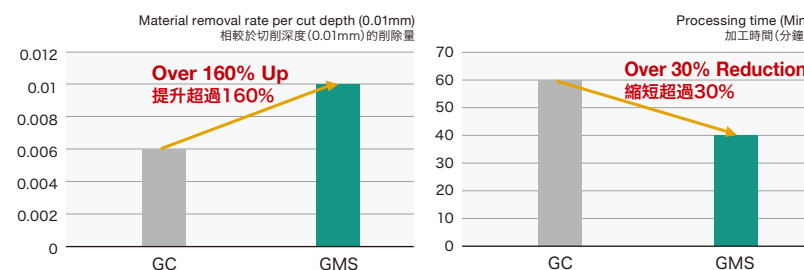
M系列的推薦用途

內面研磨 工具磨，平面磨 圓筒磨



Internal grinding test of SUS440C conducted in-house

SUS440C內孔研磨的內部測試



T Series

New Bond Designed for Specific Workpiece
根據被削材料設計的新型結合劑

- New bond design optimized for chip removal
 - Improved tool life achieved through superior wear resistance
- 根據排出的切屑特性設計的新型結合劑
 - 通過卓越的耐磨性, 提升了工具的使用壽命。



Bond Name 結合劑名稱	T1 [For hard materials] [適用於硬質材料]	T2 [For medium hardness materials] [適用於中硬度材料]	T3 [For materials producing powder-like chips] [適用於切削碎屑以粉末狀排出的材料]	T4 [For ductile materials] [適用於延展性材料]
For Ferrous CBN materials 適用於鐵系CBN	For high-hardness hardened materials Heat-treated SUJ2 Heat-treated die steel 適用於高硬度淬火材料 SUJ2淬火 模具鋼淬火	For medium-hardness hardened materials Heat-treated SCM steel Heat-treated carbon steel 適用於中硬度淬火材料 SCM淬火 碳鋼淬火	For cast iron materials (Raw Gray Cast Iron (FC), Heat-treated Ductile Cast Iron (FCD)) Sintered materials 鑄件相關 (FC生, FCD淬火) 燒結材料	For ductile materials SUS300 series 適用於延展性材料 SUS300系
For Non-Ferrous SD materials 非鐵材料 SD適用			Magnetic materials Various ceramics 磁性材料 各類陶瓷	
Test Results 測試結果	<p>Heat-treated SUJ2 SUJ2淬火</p> <p>Grinding Ratio (Index) 研磨比 (指數) 200</p> <p>Heat-treated SKD11 SKD11淬火</p> <p>Grinding Ratio (Index) 研磨比 (指數) 500</p>	<p>Heat-treated SCM435 SCM435淬火</p> <p>Grinding Ratio (Index) 研磨比 (指數) 200</p> <p></p>	<p>FC250</p> <p>Grinding Ratio (Index) 研磨比 (指數) 200</p> <p>Magnets 磁石</p> <p>Grinding Ratio (Index) 研磨比 (指數) 500</p>	<p>SUS304</p> <p>Grinding Ratio (Index) 研磨比 (指數) 200</p> <p>Grinding Test Overview Grinding Method: In-feed Wheel: φ100, W6 ring Workpiece: φ20 Feed Speed: 1-3 mm/min Total Cut Depth: 5-25 mm</p> <p>研磨測試概述 研磨方式 進給式 砂輪 φ100, W6環 被加工材料 φ20 進給速度 1- 3mm/min 總切削量 5 - 25mm</p>

LC Series

LC1/LC2/LC3

DC Series

DC1/DC2/DC3

NC Series

NC1/NC2/NC3

Ultra-high performance CBN wheel that achieves both superior cutting sharpness and extended tool life
切削力和長壽命兩方兼顧的超高性能CBN砂輪

Features of LC bond /DC bond /NC bond series

- Add special bond filler
Good truing/dressing properties.
The bond matrix retreats easily, ensuring a stable amount of protrusion of the abrasive grains and extending the interval.

Recommended grinding application

LC Series : Balance type
Recommended to Double-disk surface grinding, Cylindrical grinding, Centerless grinding.

DC Series : Focus on wear resistance
Recommended to Double-disk surface grinding, Cylindrical grinding, Centerless grinding.

NC Series : Emphasis on sharpness
Recommended to Constant pressure grinding, Spring grinding, Hard brittle material processing, Fine grain processing.

LC/DC/NC結合劑的特點

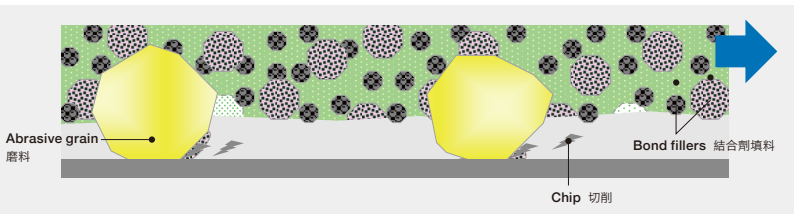
- 添加特殊的結合劑填充物
優良的修整/修整性能
結合劑基體較易自動剝落, 保持穩定的磨粒突出量。
達到延長修整間隔的可能性。

推薦應用

注重平衡性能的LC系列
(推薦應用 雙邊平面磨削、外圓磨削、無心磨削)

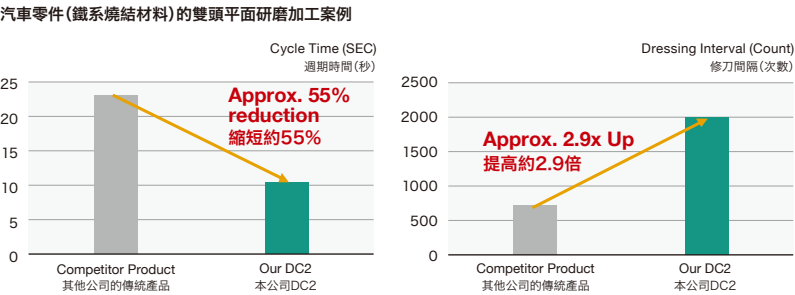
注重耐磨性的DC系列
(推薦應用 雙面平面磨削、外圓磨削、無心磨削)

注重切削力性能的NC系列
(推薦應用 恆壓磨削、彈簧磨削、硬脆材料加工、細晶粒加工)



Newly developed fillers form excellent chip pockets and significantly improves lubrication
通過新開發的填料, 形成了良好的切屑容納空間, 並顯著提高了潤滑性。

Case study: Double-sided surface grinding for automotive components (ferrous sintered material)
汽車零件(鐵系燒結材料)的雙頭平面研磨加工案例



Conventional Product
傳統產品

DC2



Compared to conventional products, DC2 demonstrates higher chip removal efficiency, reducing chip adhesion on the wheel surface.

與傳統產品相比, DC2具有更高的切屑排出性能, 因此可以看到砂輪表面上的切屑更少。



CBN Wheel Resinoid Bond

CBN輪 樹脂結合劑

Diamond Wheel Vitrified Bond

金剛石砂輪 陶瓷結合劑

MITSUI HIGH PRECISION GRINDING WHEEL

L Series L10/L20/L30

Standard CBN wheel with a proven track record
高信賴度和丰富実績的標準型CBN砂輪系列

- L series have been used successfully in various applications.
- Mostly applied to compressor parts, automotive parts, bearing parts and so on.
- 最為广泛被顧客使用、信賴度最高的系列產品
- 切削条件設定容易、修整性能好、积累了丰富的実績、普适性強
适用于壓縮機工件、汽車零部件、軸承等 各種鐵系材料的加工

D Series D10/D20/D30

Long life CBN wheel
實現了工具寿命大幅增長的高性能長寿CBN系列砂輪

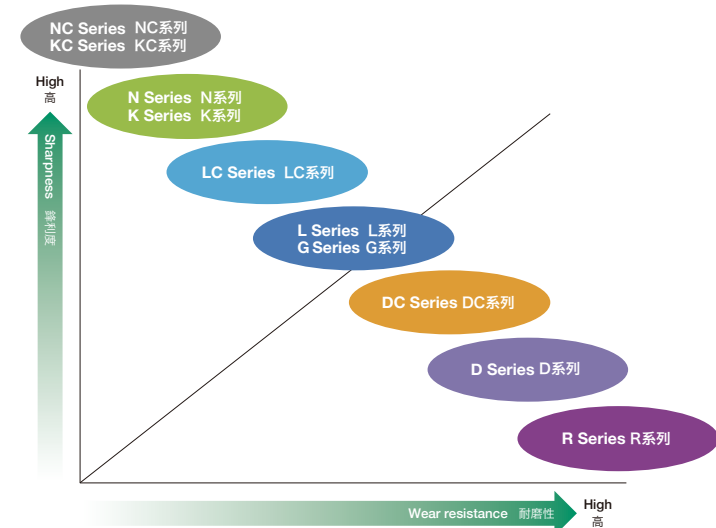
- Durability enhanced from L series.
- Thermally stable resin holds grains strongly. Effective to both rough and fine grit size.
- 在L系列基礎上大幅延長了使用寿命
- 对于切削量多的各種粗磨、或細磨料的高精度加工、均体现高耐熱性和強力的磨粒保持性、發揮優秀的切削性能

N Series N10/N20

CBN wheel specialized for sharp-cutting
重点提昇切削性能的CBN系列砂輪

- Grinding resistance would be kept at low level by self-sharpening effect.
- Avoid grinding burn because grinding resistance is low.
- For example, residual removal stock was smaller in case of coil spring grinding.
- 切削抵抗低、切削性能高
- 在活跃の自刃作用下、切削性能可長時間保持
- 不發生切削燒件、抑制因切削熱導致材料性質的變化
極細直徑乾式彈簧磨該系列也能対応

Mitsui's Main Lineup of CBN Resinoid Bonds 三井的CBN樹脂結合劑主要產品系列



NC Series NC系列 KC Series KC系列	Contains lubricating filler For CBN: NC Series, For SDC: KC Series 含有潤滑填料 用於CBN: NC系列、用於SDC: KC系列
N Series N系列 K Series K系列	Soft bonds for CBN prioritizing cutting sharpness Soft bonds for SDC prioritizing cutting sharpness 用於CBN的軟質結合劑、注重鋒利度 用於SDC的軟質結合劑、注重鋒利度
LC Series LC系列	Cutting sharpness-focused bonds with added lubricating fillers compared to the L series 在L系列中添加潤滑填料、注重鋒利度的結合劑
L Series L系列 G Series G系列	Standard bonds for CBN resin wheels Standard bonds for SDC resin wheels 用於CBN樹脂砂輪的標準結合劑 用於SDC樹脂砂輪的標準結合劑
DC Series DC系列	Longevity + Cutting Sharpness emphasized bonds with added lubricating fillers compared to the D series 在D系列中添加潤滑填料、注重壽命+鋒利度的結合劑
D Series D系列	High-strength bonds with excellent abrasive grain retention 磨料保持力優異的高強度結合劑
R Series R系列	Ultra-high-strength bonds specialized in abrasive grain retention 專注於磨料保持力的超高強度結合劑

C Series C31/C32/C33

Versatile vitrified diamond wheel
適用範圍广泛的陶瓷基金剛石砂輪

- Features of C bond series**
- Wide range of grit size is available. (#80 to over #1000)
 - Low to middle conc. is available.
 - Very sharp-cutting. Applicable to soft or hard materials, such as solder resist and sapphire for example.
- C系列的優異特征**
- 確立了从粗粒度#80到超細粒度#1000範圍的製造。从粗加工到精加工各个環節均可能対応。
 - 可以対応从低濃度到高濃度的各種配方設計
 - 特别是其優秀的切削能力、可適用於加工易發生堵塞的超軟材料、也适用在堅硬的藍寶石玻璃上、各種材質均可対応。
- Successful cases of C series**
- | | | |
|--|--|---|
| Work-piece : sintered alumina substrate
Wheel shape : 6A2 φ150 5W
Spec. : SD 80~800 V | Work-piece : Ceramics plate
Wheel shape : 6A2 φ150 5W
Spec. : SD 100~1000 V | Work-piece : Sapphire wafer (φ3~6in.)
Wheel shape : 6A2 φ300 5W
Spec. : SD 200 V C32 |
|--|--|---|
- 使用C系列加工實績的一例**
- | | | |
|---|--|--|
| 加工對象 : 燒結氧化鋁基板、晶圓加工
外形 : 6A2 φ150 5W~
規格 : SD 80 ~ 800 V | 加工對象 : 陶瓷板加工
外形 : 6A2 φ150 5W~
規格 : SD 100 ~ 1000 V | 加工對象 : 藍寶石外徑研削 (φ3~6英寸)
外形 : 6A2 φ300 5W品
規格 : SD 200 V C32 |
|---|--|--|



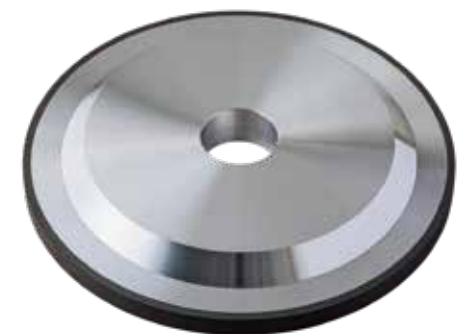
Diamond Wheel Resinoid Bond

金剛石砂輪 樹脂結合劑

G Series G10/G20

Standard diamond wheel
標準型金剛石砂輪

- G series are very versatile because these can be sharp-cutting or long-life type by
- G10: High thermal conductivity with excellent cutting sharpness
 - G20: High wear resistance preventing shape deformation
- 運用三井独自開發的結合劑和充填劑、在研削性能、形狀保持性、耐磨耗性上特別突出。可能対応顧客各種加工要求。
- G10 高熱伝導率、優異的研削能力
 - G20 耐磨耗性好、不易發生形狀崩潰



K Series K10/K20

Diamond wheel with outstanding sharpness
切削力优异的金剛石砂輪

- K series are specially designed for hard-to-grind materials such as aluminum alloys, ceramics and sapphire.
- Recommended materials to grind**
- Cemented carbide
 - Ceramics materials like SiC, Alumina, Silicon nitride
 - Aluminum alloys and other non-ferrous metals
- 切削抵抗低、在加工藍寶石、陶瓷等脆性材料時不易發生切削屑對工件的划傷
在活跃の自刃作用下、保持長時間的切削能力
在加工鋁合金等粘性非鉄金屬時 抑制熔着現象。
适合加工各种超硬非金屬材料、如陶瓷、藍寶石玻璃等
- 推荐用途**
- 工件材質
 - 超硬合金 SiC 高純度鋁 碳化硅等硬質材料
 - 鋁合金等非鉄金屬



KC Series KC1/KC2

Focused on sharpness bond use for diamond abrasive
鑽石磨粒專用的鋒利型結合劑鑽石磨粒專用的鋒利型結合劑

- Features of KC bond series**
- **Adding special bond filler to K series bond**
Good truing/dressing properties. The bond matrix retreats easily, ensuring a stable amount of protrusion of the abrasive grains and extending the interval.
- Recommended grinding application**
- Insert tip processing (carbide, cermet), Constant pressure grinding, Spring grinding, Hard brittle material processing, Fine grain processing.
- KC系列結合劑的特點**
- 在 K 系列結合劑中添加了特殊的結合劑填充物
優良的修整/修整性能
結合劑基體較易自動剝落、保持穩定的磨粒突出量。
達到延長修整間隔的可能性。
- 推薦應用**
- 鑲裝刀片 (硬質合金、金屬陶瓷)、恆壓磨削、彈簧磨削、硬脆材料加工、細晶粒加工



Diamond Dressers

金剛石修整器

MITSUI HIGH PRECISION GRINDING WHEEL

Role of the Diamond Dressers 金剛石修整器的作用

Dressing 修整

Making new sharp edges by removing grazed or clogged surface.
將發生堵塞,磨料钝化的部分除去,露出新的尖锐的磨料。清理砂轮气孔,為切削屑提供排除口

Truing 圓整

Removing run-out from use-surface.
提高砂輪和軸心的同心度,砂輪圓度的作業

Forming 形整

Making desired shapes on the face of grinding wheel.
在齒輪加工或螺栓加工時,根据加工要求將砂輪邊緣按要求的加工成型的作業

Dressing and truing are essential to use grinding wheels in good condition.
Mitsui would provide you the best diamond dressers to maximize the performance of grinding wheels.

為了發揮砂輪的最大研削能力,在生產過程中,使用金剛筆對砂輪進行修整是必不可少的。
三井作為砂輪生產製造的老字號,運用所積累的豐富經驗,為顧客提供最為滿意,最能提升砂輪性能的金剛筆使用方案

Standard Diamond Sizes for Single-Point Dressers for Grinding Wheels 對應砂輪的單石修整器的標準金剛石尺寸

Reference for Grinding Wheel WA#80

Grinding Wheel Dimensions (mm)	Under 25	25~50	50~75	75~100	100~150	150~205	255 and above
Thickness							
Outer Diameter							
Under 150	1/4ct~1/3ct and below	1/4ct~1/3ct and below	1/3ct~1/2ct and below	1/2ct~3/4ct and below	1/2ct~3/4ct and below	3/4ct~1.0ct	1.0ct and above
150~205	1/4ct~1/3ct and below	1/3ct~1/2ct and below	1/3ct~1/2ct and below	1/2ct~3/4ct and below	3/4ct~1.0ct	3/4ct~1.0ct	1.0ct and above
205~255	1/4ct~1/3ct and below	1/3ct~1/2ct and below	1/2ct~3/4ct and below	3/4ct~1.0ct	3/4ct~1.0ct	1.0ct~1.5ct	1.5ct~2.0ct
255~305	1/3ct~1/2ct and below	1/2ct~3/4ct and below	1/2ct~3/4ct and below	3/4ct~1.0ct	1.0ct~1.5ct	1.0ct~1.5ct	1.5ct~2.0ct
305~355	1/3ct~1/2ct and below	1/2ct~3/4ct and below	3/4ct~1.0ct	3/4ct~1.0ct	1.0ct~1.5ct	1.5ct~2.0ct	2.0ct and above
355~405	1/2ct~3/4ct and below	3/4ct~1.0ct	3/4ct~1.0ct	1.0ct~1.5ct	1.5ct~2.0ct	2.0ct~2.5ct	2.5ct and above
405~510	1/2ct~3/4ct and below	3/4ct~1.0ct	1.0ct~1.5ct	1.5ct~2.0ct	1.5ct~2.0ct	2.0ct~2.5ct	3.0ct and above
510~610	3/4ct~1.0ct	1.0ct~1.5ct	1.5ct~2.0ct	2.0ct~2.5ct	2.5ct~3.0ct	2.5ct~3.0ct	3.0ct and above
610~760	1.0ct~1.5ct	1.5ct~2.0ct	2.0ct~2.5ct	2.5ct~3.0ct	3.0ct and above	3.0ct and above	
760~915	1.5ct~2.0ct	2.0ct~2.5ct	2.5ct~3.0ct	3.0ct and above			
Over 915	2.0ct and above	2.5ct and above	3.0ct and above				

MSA ARTIFICIAL 高性能人造單點金剛筆



Tip: Conical type (top) and Pyramidal type (bottom)
頂端:圓錐型(上)和角錐型(下)

Artificial diamond's quality is more stable than that of natural diamond, thus dress intervals and tool life are more stable too.

安定性
与天然金剛筆比,內在缺陷少品質安定,商品可使用的寿命可予測

MBL BLADE 高性能人造金剛石修刀



Artificial diamond blade dresser

Several artificial diamond pillars are aligned and mounted.
Working surface area of diamond pillars is constant till the end of product life so the performance is also constant.

使用HORNET系列的人造角柱金剛石,將其排列埋入修刀前端,該款修刀在磨耗中金剛石的面積始終不變,因此可提供穩定持續的修整性能

MH HORNET 單柱修整器



Diamond has a pillar shape so the performance will not change till the end of product life.
Repair is unnecessary so management is easy.

無須修理,管理容易,使用人造角柱金剛石,寿命穩定均一,安定發揮其修整性能

MB BOND 多点修刀



Numerous diamond grits work at the same time so the dresser is wear resistant. Performance is constant till the end of product life.

MB BOND 多点修刀
多顆金剛石共同作用,修整時的抵抗力均勻分散,可實現安定的修整性能

MP POINT 單點修整器



Dresser for precise forming.
Qualified diamond is mounted and ground.
Conical shape and pyramid shape are available.
Ridgeline of pyramid is proper direction.

使用嚴格篩選的天然金剛石,配合以高精度研磨加工
分圓錐和角錐兩種形態
圓錐型修刀的軸心始終在軸的軸心,角錐修刀的棱角處切削力最強

MF FORMING 角柱修整器



Tip of diamond dresser is polished to roof-shape or flat-shape.
These dressers are suitable for forming of grinding wheels in angular grinding and form grinding.

使用大顆天然鑽石,前端修整出一定角度專門用於修整 前端有特殊形狀的高精密加工用砂輪

MS SINGLE 單石金剛筆



Common type dresser with "as-is" natural diamond.

最為広範使用的標準型天然金剛石修刀

Basics of Grinding Wheel

砂輪的基礎知識

Constituents of grinding wheel

Grinding wheels are made of 3 elements _grain, bond, pore.
These elements can be described by 5 factors, which are written on specifications.

3 elements

- **Grain** Cutting edges
- **Bond** Holder of the cutting edges
- **Pore** Plays role of chip pocket

5 factors

- **Type of abrasive**
- **Grit size**
- **Hardness grade**
- **Structure (vol.% of abrasive)**
- **Type of bond**

三要素

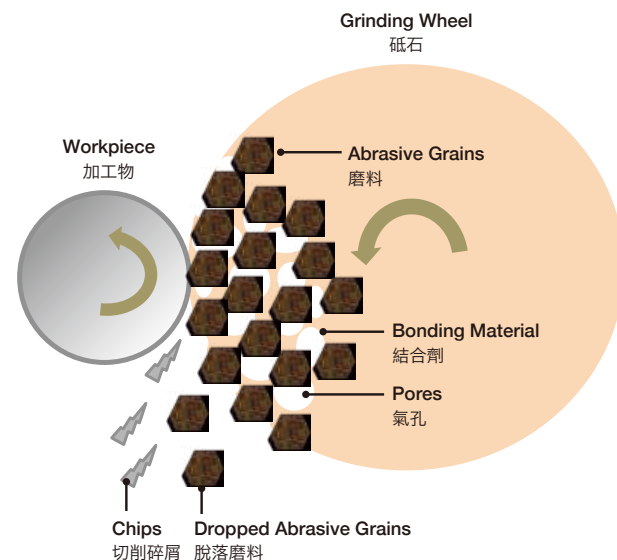
- **磨料** 切削加工物的刀子
- **結合劑** 起到將刀子固定在一起的作用
- **氣孔** 起到將切削碎屑排泄出的作用

五因子

- **磨料** 磨料的種類
- **粒度** 磨料的大小
- **結合度** 砂輪的硬度
- **組織** 砂輪體積中, 磨料的占比
- **結合劑種類** 結合劑的種類

砂輪的基礎知識

砂輪是由 磨料, 結合劑, 氣孔, 这三种要素构成的。
砂輪的性能取决于三要素以及以下五因子



Display Method of Grinding Wheel Specifications (JIS) 砂輪規格的表示方法 (JIS)

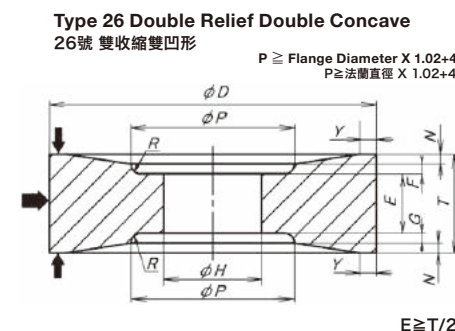
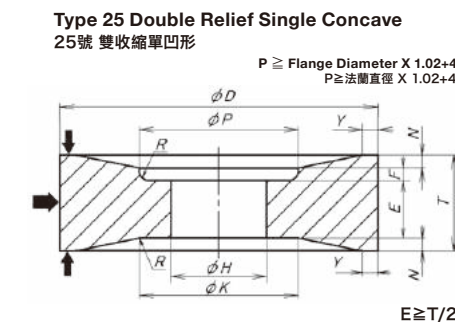
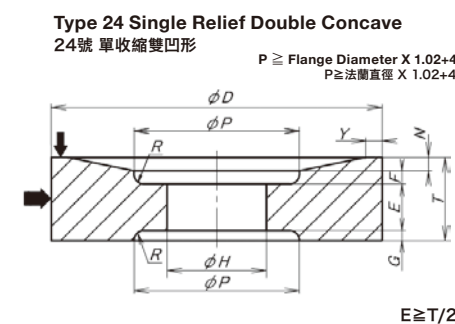
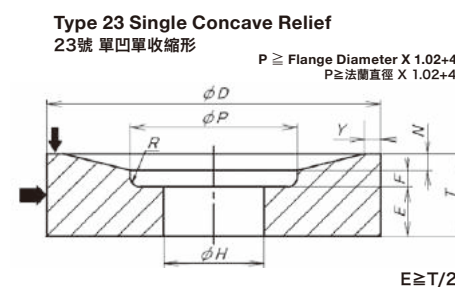
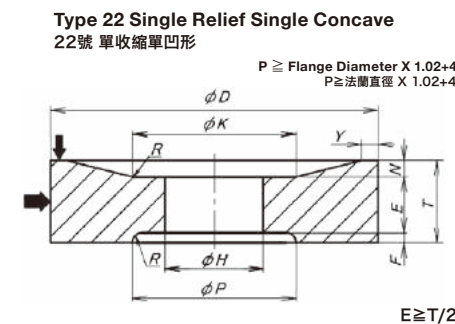
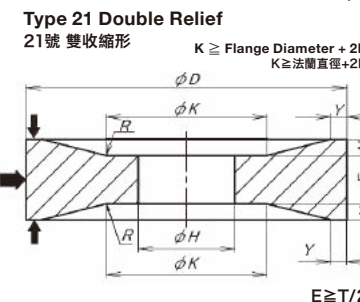
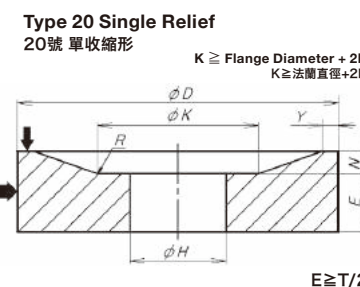
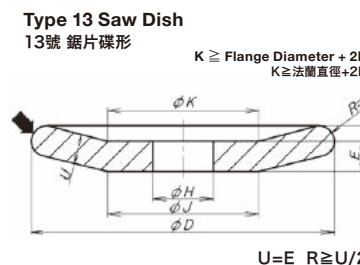
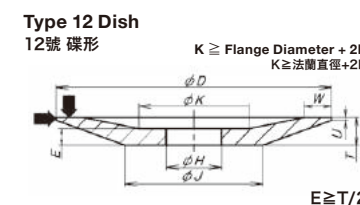
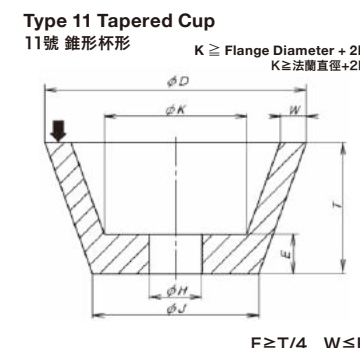
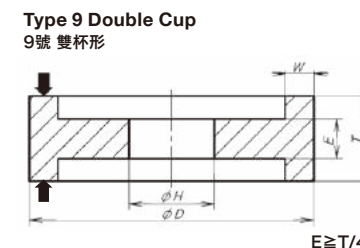
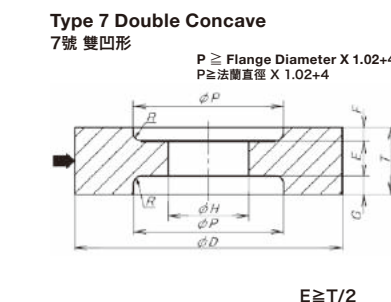
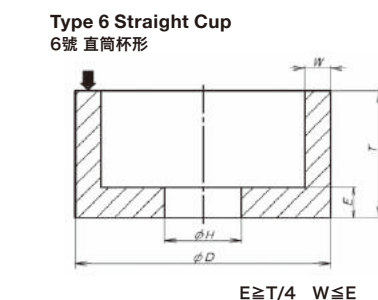
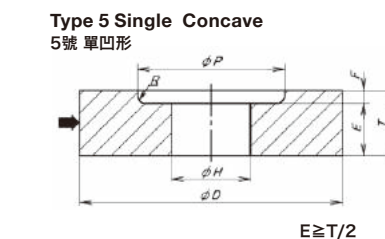
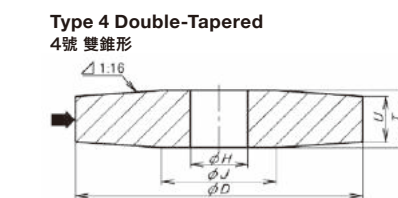
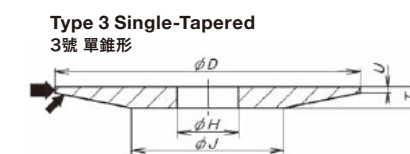
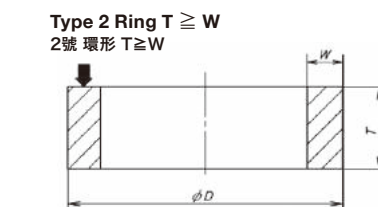
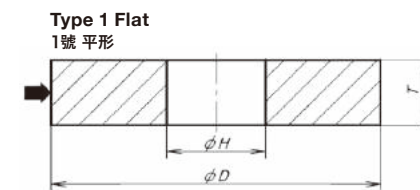
Examples 示例	Type 1 Flat 1號 平形	B	305×25×127	W	A	60	K	6	V	8J	33m/s	
	shapes	Profiles	Dimensions	Type of abrasives	Abrasives	Grit sizes	Hardness grades	Structure	Nature of bond	Type of bond	Maximum operating speed	
Type 1 1號	Flat 平形	A	Outer Diameter x Thickness x Hole Diameter	Abrasive Grain Size Classification Symbols	A	F4	F230	#240	A	0	V : Vitrified Bonds 陶瓷結合劑	25
Type 2 2號	Ring 環形	C	Type 3 Single-Tapered and below require detailed dimensions or drawings	磨料的細分符號 Examples 示例	C	F5	F240	#280	B	1	B : Resinoid Bonds and Other Thermosetting Organic Bonds 樹脂結合劑及其他 熱固性有機結合劑	30
Type 3 3號	Single-Tapered 單錐形	D	外徑×厚度×孔徑 從3號單錐形起需要細部尺寸或圖紙		Z	F6	F280	#320	C	2	Dense 密	33
Type 4 4號	Double-Tapered 雙錐形	E		G		F7	F320	#360	D	3	↑	35
Type 5 5號	Single Concave 單凹形	F		H		F8	F360	#400	E	4	BF : Fiber-Reinforced Resinoid Bonds 帶纖維增強的樹脂結合劑	40
Type 6 6號	Straight Cup 直筒杯形	G		P		F10	F400	#500	F	5	帶纖維增強的樹脂結合劑	45
Type 7 7號	Double Concave 雙凹形	H		W		F12	F500	#600	G	6	R : Rubber Bonds 橡膠結合劑	50
Type 9 9號	Double Cup 雙杯形	I	Indicates the shape of the outer peripheral end face	32		F14	F600	#700	H Soft 軟	7 Medium 中	RF : Fiber-Reinforced Rubber Bonds 帶纖維增強的橡膠結合劑	57
Type 11 11號	Tapered Cup 錐形杯形	J	表示外圓端面的形狀			F16	F800	#800	I ↑	8 ↓	MG : Magnesia Bonds 氧化鎂結合劑	60
Type 12 12號	Dish 碟形	K				F20	F1000	#1000	J ↑	9 ↓	E : Shellac Bonds 蟲膠結合劑	63
Type 13 13號	Saw Dish 鋸片碟形	L				F22	F1200	#1200	K ↑	10 ↓	PL : Thermoplastic Organic Bonds 熱塑性有機結合劑	72
Types 16-19 16~19號	Plug 插塞形	M				F24		#1500	L Medium 中	11 ↓	熱塑性有機結合劑	80
	Cone 錐形	N				F30		#2000	M Medium 中	12 Coarse 粗		100
Types 20-26 20~26號	Relief 收縮形	P				F36		#2500	N ↓	13		
	Concave 凹形					F40		#3000	O ↓	14		
Types 27,28 27,28號	Offset 偏置形					F46		#4000	P ↓	15		
Type 31 31號	Segment Wheel 分段式砂輪					F54		#6000	Q ↓	16		
Type 35 35號	Disk with Adhesive or Mechanical Mounting 圓盤形接合或機械安裝					F60		#8000	R Hard 硬	17		
Type 36 36號	Disk with Nut 帶螺帽圓盤形					F70			S	18		
Type 37 37號	Ring with Nut 帶螺帽環形					F80			T	19		
Type 38 38號	Single Dovetail 單燕尾形					F90			U	20		
Type 39 39號	Double Dovetail 雙燕尾形					F100			V	21		
Type 41 41號	Flat Cutting Wheel 平形切削砥石					F120			W	22		
Type 42 42號	Offset 偏置形					F150			X	23		
	Cutting Wheel 切削砥石					F180			Y	24		
Type 52 52號	Mounted Wheel 帶輪砥石					F220			Z	25		
Type 54 54號	Honing Wheel 珩磨砥石											
Type 90 90號	Hand Grinding Wheel 手工砥石											

Note*: At the Manufacturer's Discretion
註*製造商可自由選擇

(JIS R 6242: 1996 and others)
(JIS R 6242: 1996 及其他)

Grinding Wheel Shape Codes and Names (JIS R6242) [↑ Usage Surface 使用面]

砂輪的形狀代號及其名稱 (JIS R6242)

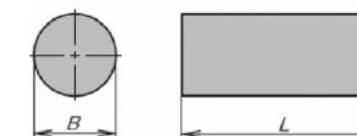
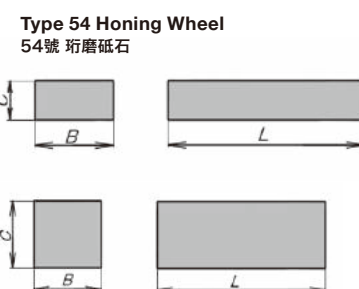
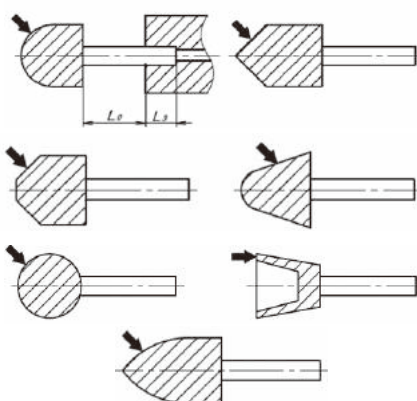
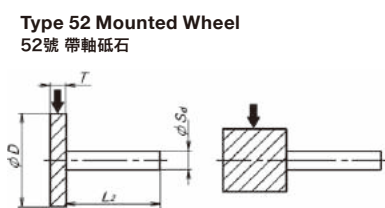
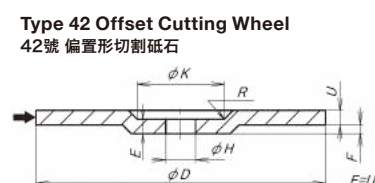
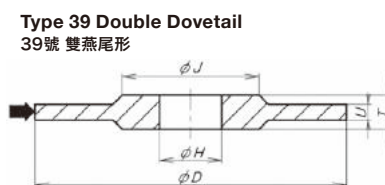
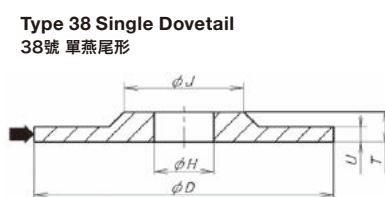
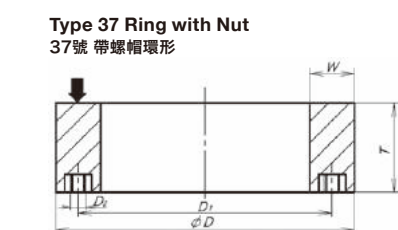
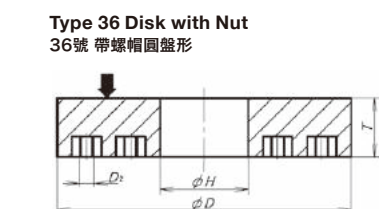
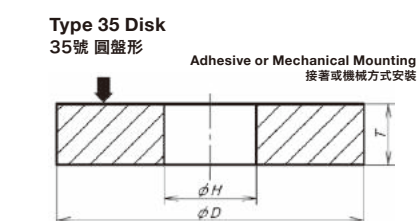
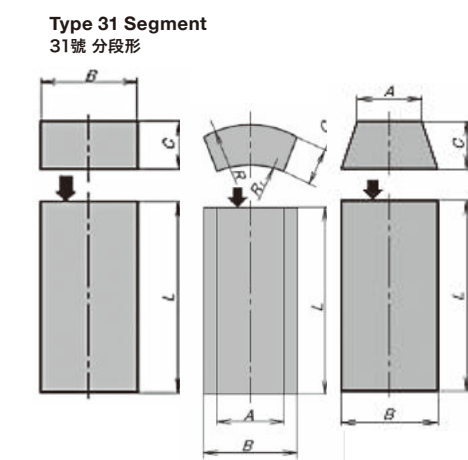
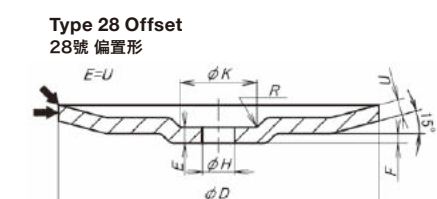
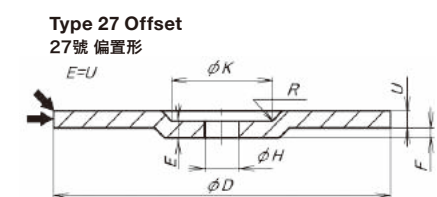


Basics of Grinding Wheel

砂輪的基礎知識

MITSUI HIGH PRECISION GRINDING WHEEL

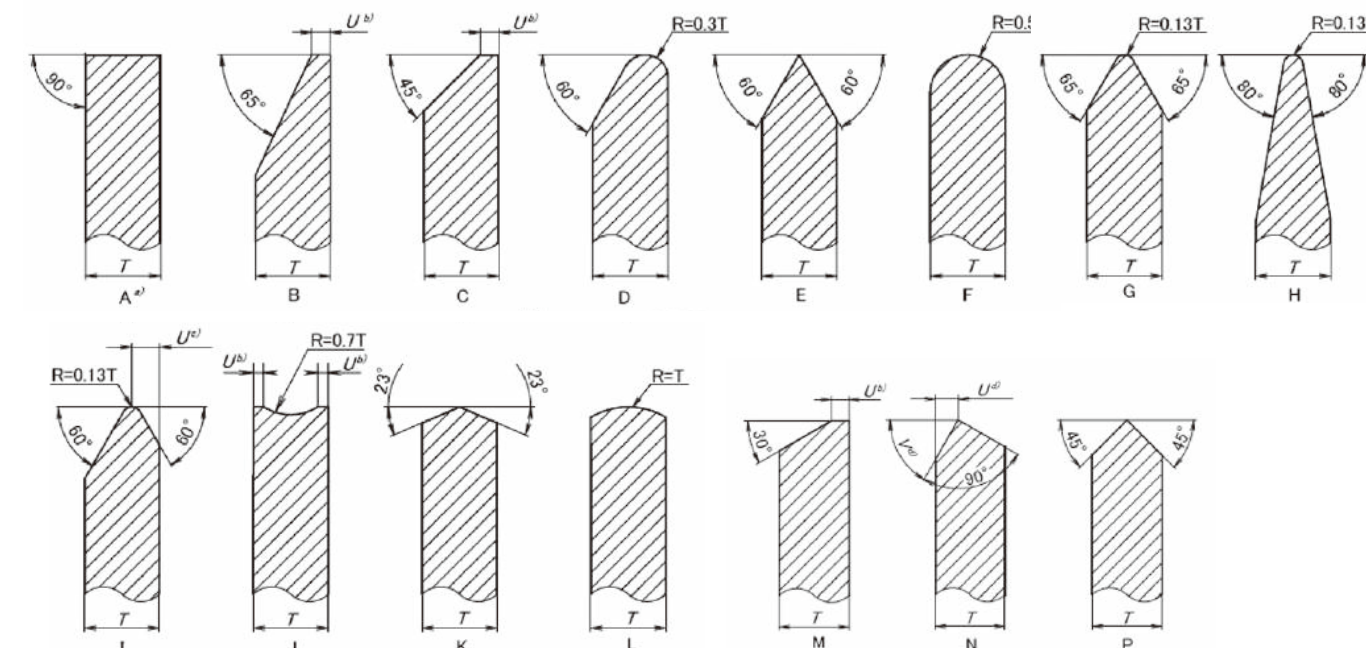
Grinding Wheel Shape Codes and Names (JIS R6242) [↑ Usage Surface 使用面]



Please use the appropriate wheel in right way.

請選取和用途相吻合的砂輪

Standard profile 砂輪的標準邊緣形狀



Safety information 安全守則

Prohibitions during transport (3 rules)

1. Do not roll
2. Do not drop
3. Do not crash

Storage Precautions

1. Avoid hitting
2. Avoid too much stacking

Regulations

1. NEVER use wrong surface of the grinding wheel.
2. NEVER exceed max. speed stated by manufacturer.
3. Always mount on the proper flanges.
4. Always idle for 1 min before you actually start grinding. Idling shall be more than 3 min when the wheel is exchanged.

安全使用三原則

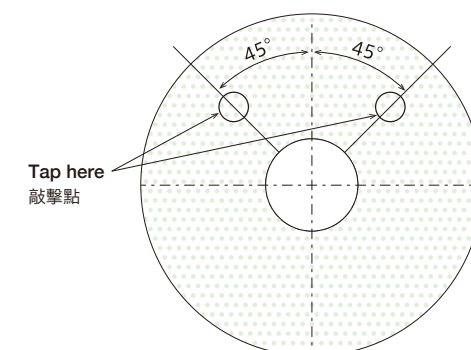
1. 不可滾動
2. 不可落下
3. 不可碰撞

保管上注意

1. 不可碰撞
2. 不可過度堆積

使用方法的守則

1. 不可使用非加工面加工
2. 不可超越最高限速
3. 使用正確的法兰盤
4. 切削作業前，需空轉1分以上，砂輪交換後，需空轉3分以上



Sound check 打音檢查方法

1. Use non-metallic hammer
2. Tap the points shown above (Tap entire circumference if possible)
3. Tapping shall be very lightly

1. 檢查時用木質錘子
2. 在上圖的打音點上全周敲擊
3. 使用所必要的最小力度敲擊

Basics of Super-abrasive Wheel

超硬磨料砂輪的基礎知識

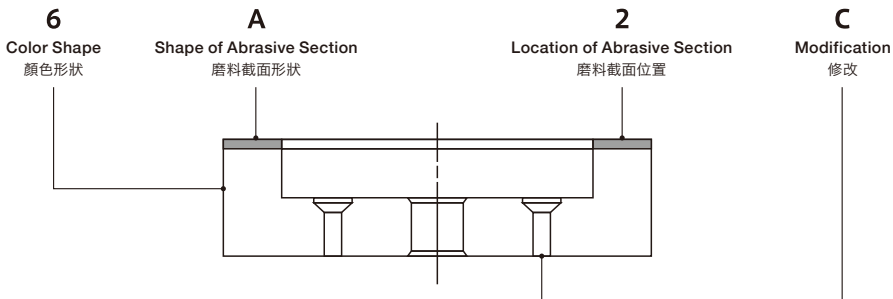
Shape code of the super abrasive wheels (JIS-B4131) CBN钻石砂輪的形狀記号表示

Shape code consists of following 4 parts.

1. Basic core shapes
2. Shapes of abrasive cross section
3. Location of abrasive section
4. Modification

砂輪形狀記号的称呼
砂輪的形狀記号分以下4个部分

1. 基本的基体形状
2. 磨料層的断面形状
3. 磨料層的位置
4. 追加, 修整加工



1 Basic Core Shapes and Numerical Codes 基体的基本形状和其数字記号

Numerical Code 數字符號	Shape 形狀
1	
2	
3	
4	
6	

Notes

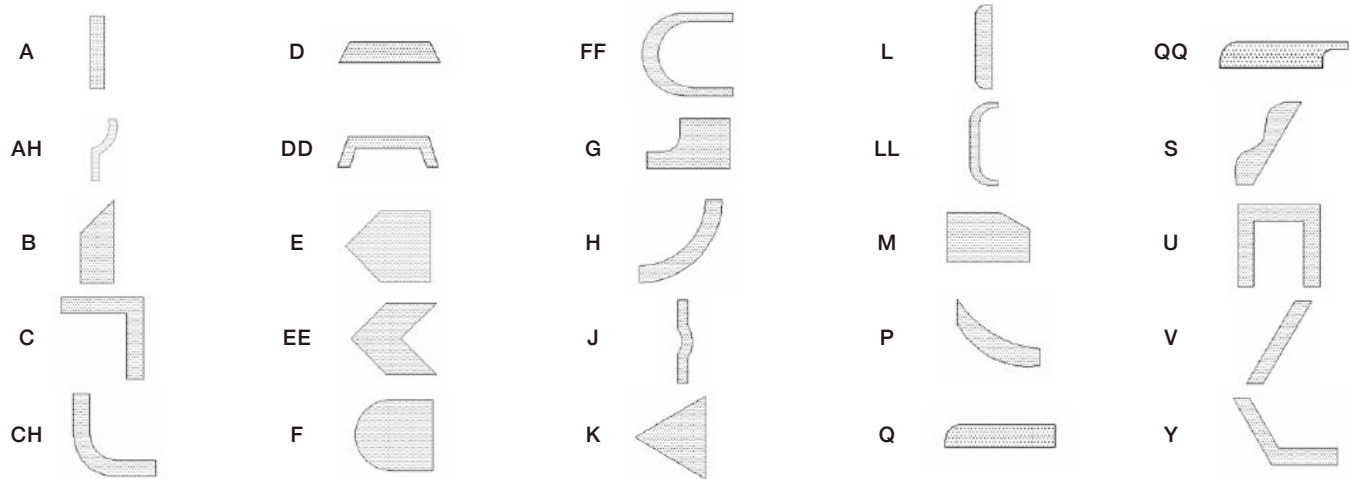
1. Basic core shapes are unrelated to the location of abrasive section or the application of the wheel.
2. Mark for basic core shape is not affected by making convex or concave on core to attach abrasive section.
3. So as recessing or necking.

Numerical Code 數字符號	Shape 形狀
9	
11	
12	
14	
15	

備考

1. 基体形狀的判断, 不受磨料位置的影响, 也不受使用方式的影响
2. 为固定磨料層而形成的基体上的凹凸不影响基体形狀的判断。
3. 基体細節上的, 为防止加工干涉而進行的階梯, 缺口設計等, 不影响基体形狀的判断

2 Cross-Sections of Abrasive Layer and Alphabetical Codes 磨料層断面的英文字母記号



3 Positions of Abrasive Layer and Numerical Codes 磨料層位置的数字記号

	Numerical Code 數字符號	Position 位置
	1	Outer Periphery 外周
	2	Side 側面
	3	Both Sides 雙側面
	4	Internal Tapered/Rounded 內側有傾斜或圓弧的形狀
	5	External Tapered/Rounded 外側有傾斜或圓弧的形狀
	6	Part of the Outer Periphery 外周的一部分
	7	Part of the Side 側面的一部分
	8	Entire 全體
	9	Corner 角
	10	Inner Periphery 內側

4 Additional Modifications and Alphabetical Codes 追加修整加工的英文字母記号

	Alphabetical Code 字母代號	Processing Description 加工內容
	B	Stepped Hole 帶台階的孔
	C	Dish Hole 碟形孔
	H	Straight Hole 直孔
	M	Straight holes and threaded holes 直孔和螺紋孔
	P	Relief on One Side 單側收縮
	P	Relief on Both Sides 雙側收縮
	S	Segment 分段形狀
	SS	Segment typw with slots 帶槽的分段形狀
	T	Threaded Hole 螺紋孔
	Q	Insertion of Abrasive Layer 插入磨料層
	V	Reverse Abrasive Layer 反向磨料層
	Y	Reverse Insertion of Abrasive Layer 反向插入磨料層