BAY UNION
北聯研磨科技

Gear Grinding

GEAR GRINDING SOLUTION

成形研磨中你最安心的合作夥伴

www.bayunion-tech.com

2024.07

北聯研磨科技
股份有限公司

BAY UNION ABRASIVE TECHNOLOGY CO., LTD.

We believe that helping partners achieve their goals makes the world a better place.

我們相信，成就彼此能讓世界更美好。

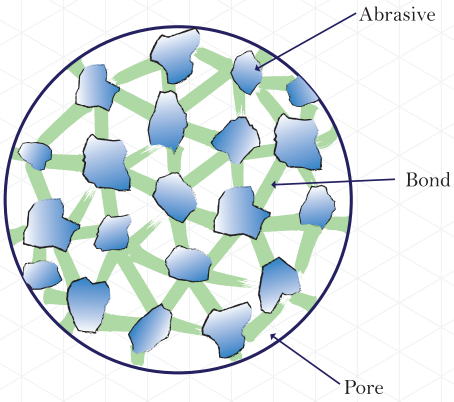
Bay Union Abrasive Technology Co., Ltd. was founded in 1987. We have focused on producing vitrified bonded grinding wheels for many years. Bay Union has advanced vitrified bonds and special self-developed equipment, so we can supply high quality grinding wheels in a very fast and steady way.

HIGH PERFORMANCE, HIGH-QUALITY STABILITY, and FAST DELIVERY are our strength, and that is why we can expand very fast in the internal grinding market at the beginning.

In order to satisfy customers' needs, Bay Union is promoting standard series whether for applying Surface Grinding, Cylindrical Grinding or Internal Grinding, we can have a faster way in selecting suitable products for you accordingly. For all product series, we have ready stock in corresponding wheels for replacement with more value.

Three Key Elements of Grinding Wheels

Grinding wheels are commonly used tools for grinding, and the performance and grinding parameters are often highly related to three important factors: Abrasive, Bond, and Pore.



Abrasive

Abrasives are the cutting edges in a grinding wheel. The choice of abrasive directly impacts the wheel's grinding performance and efficiency. The type of abrasive, its crystal shape, volume percentage, and uniformity all play crucial roles. Uniform distribution of abrasives ensures consistent cutting edge distance, and adjusting this distribution can achieve different grinding effects.

Bond

Bond is another crucial element of a grinding wheel. It affects the wheel's hardness, strength, and grinding behavior. Common bonds include vitrified bond, resin bond, and metal bond (sintered or electro-plated). Choosing the right bond for specific application conditions ensures stability and longevity of the grinding wheel.

Pore

In a grinding wheel, besides the space occupied by abrasives and bonds, the remaining space consists of porosity. The pores in a grinding wheel help expel metal debris, allow grinding fluid to reach hot spots, and improve heat dissipation. An appropriate increase in porosity can also enhance the grinding feed rate.

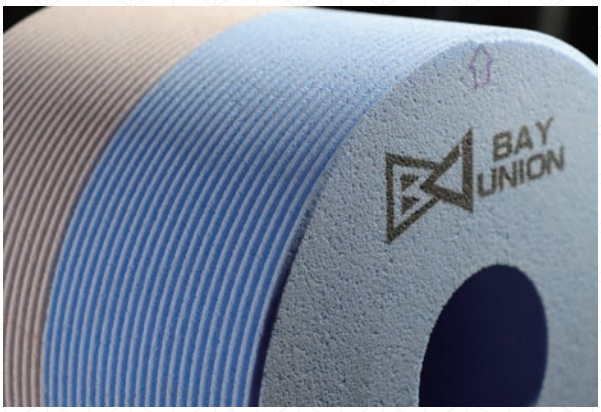
Generally, only vitrified bonded wheels develop natural porosity due to the high-temperature sintering process that burns off organic materials. Metal bonded wheels can introduce some porosity through the addition of vitrified bond and pore-forming agents, while resin bond and electroplated wheels do not typically have pores.

Continuous Generating Grinding

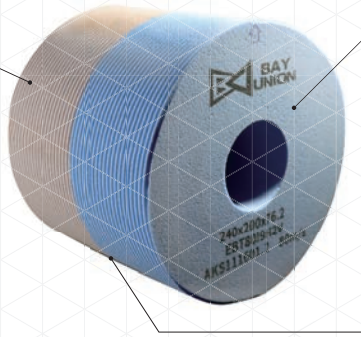
連續創成研磨

The advancement of continuous generation grinding technology has enabled a high degree of automation and digitalization in gear manufacturing. This ongoing development not only has a profound impact on gear manufacturing processes but also directly enhances the performance and reliability of mechanical transmission systems.

Bay Union utilizes high-quality microcrystalline abrasives to design the EBT/BFW/GFW series of continuous generation grinding wheels. These wheels are capable of overcoming challenges associated with surface hardening treatments on gears. They enhance gear grinding efficiency, reduce wheel wear, and extend tool life. The stability of gear profiles achieved with these wheels results in significant improvements in transmission performance, including reduced friction losses, higher transmission efficiency, and longer service life.

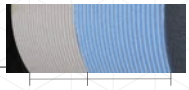


Fine grinding Use a special abrasive with cutting ability suitable for semi-polishing to achieve a surface roughness of Ra 0.15 um or less.



Coarse grinding EBT uses rod shaped abrasives, which allows for quick completion of work when there is a substantial amount of material to be removed.

The thickness ratio of rough and fine grinding wheels can be customized according to customer specifications to achieve maximum efficiency. The standard ratio is 2:1 for rough to fine grinding.



EBT80/EBT120

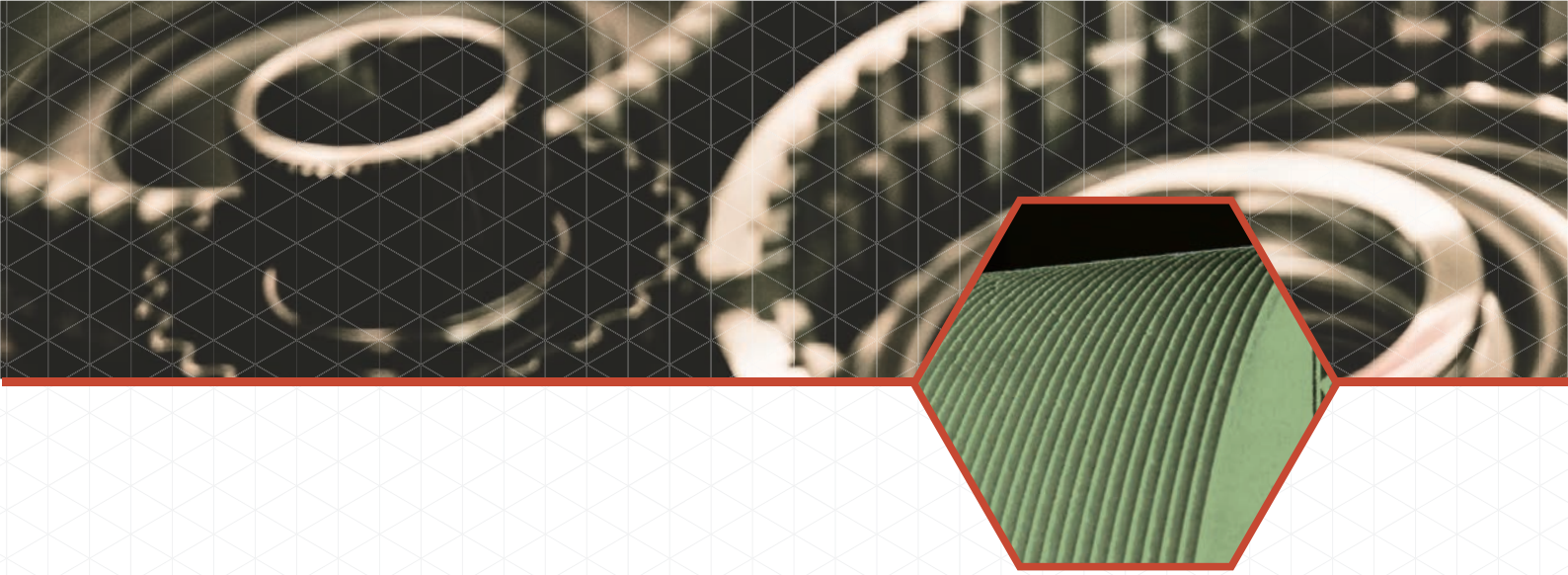
Pore : H2/H4/H6
(S) (M) (L)

Utilizing the latest TG abrasives, the grinding wheels enhance grinding performance while maintaining a controllable surface roughness of RA0.4 or below. Compared to standard SG wheels, TG wheels also offer superior profile retention.

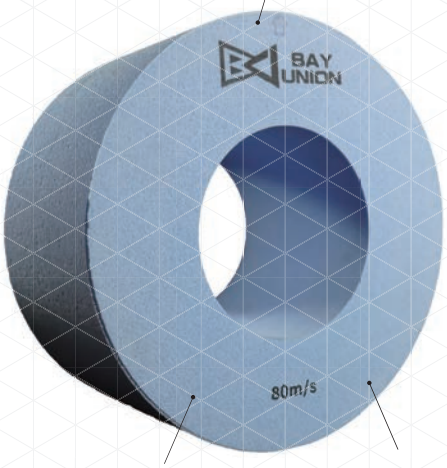
EBT-COMBO

As the demands for electric vehicle gears increase, with higher precision requirements for gear tooth profiles and finer surface roughness, standard gear grinding wheels often fall short of these standards.

When gears need to meet both substantial material removal and smooth surface finish requests, the EBT-COMBO grinding wheel offers the most effective solution. It features an efficient rough grinding entry for substantial material removal and a finishing exit that meets higher surface roughness standards, making the grinding process more efficient and effective.



SG formula is upgraded to improve grinding performance.



80M/S high speed, with grinding performance below Ra0.4um.

SG can extend the dressing interval and improve the service life.

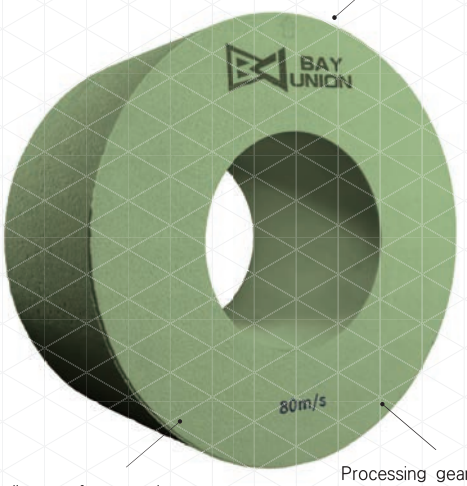
BFW High efficiency

Bay Union's BF grinding wheels use high-quality SG abrasives combined with a high-strength low-temperature vitrified bond, making them ideal for metals that have undergone heat treatment.

BFW wheels are an upgrade from the standard BF formulation, offering a 20% improvement in grinding performance. When paired with high-quality diamond dressers, they achieve higher efficiency with reduced wheel dressing frequency.

BFW wheels feature a design with increased porosity, which extends the intervals between wheel dressings and results in a longer wheel lifespan.

The most economical grinding option with wide material applicability and minimal grinding vibration.



Achieve an excellent surface roughness similar to that of bearing.

Processing gears with a module > M1.0 at speeds up to 80 m/s.
Processing gears with a module ≦ M1.0 at speeds up to 60 m/s.

GFW Economical

From the optimal formulation for grinding bearings, we have developed the most cost-effective option for gears. The GFW wheels offer superior grinding capability compared to standard pink PA wheels, while also providing longer-lasting grinding performance.

When gear grinding machines and processing parameters are optimally matched, the GFW wheels deliver excellent surface finish without burning the workpiece.

Gear Profile Grinding

成形研磨

CKS

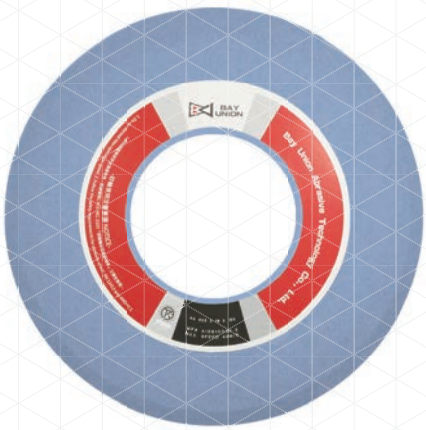
The standard formulation for profile grinding wheels utilizes highly self-sharpening abrasives, which provide excellent heat discharge for commonly used gear materials, thereby reducing the risk of tooth surface burning.

- Medium carbon steel, high carbon steel, cross steel.
- Fast grinding feed and good heat discharge.

GFV

For metals with higher toughness, sharp-edged alumina is suitable. By employing low-temperature sintering, uniform melting ensures that the GFV has greater abrasive exposure, resulting in enhanced grinding capability.

- Stainless steel SUS440 heat treated material.
- It can be equipped with large holes H2 or H4 to reduce the problem of metal chips filling.



BFV

Selecting special SG abrasives combined with a high-strength low-temperature vitrifid bond, and using a sintering process at 900° C, ensures that the SG abrasives retain their optimal microcrystalline structure, resulting in the best performance for SG grinding wheels.

- Heat treatment hardness HRC60 metal material, highest trimming interval.
- The excellent microcrystal structure of SG can reduce the amount of sand dressing in a single time.

Rotary Diamond Dresser

鑽石修整輪

Diamond dressers have a significant impact on gear grinding, with selection typically based on gear module and pressure angle, and advanced considerations involving wheel compatibility. Bay Union Grinding offers expert knowledge in wheel applications and recommends optimizing diamond dresser specifications according to the specific characteristics of different grinding wheels. This approach helps achieve maximum grinding efficiency, optimal surface finish, and extended tool life.

In addition to selecting the correct combination of diamond dressers and grinding wheels, Bay Union has a professional grinding application team that assists clients in finding the optimal grinding parameters and quickly implementing a comprehensive optimization process.




Dressing Type

修整方式

	Plunge Profiling	CNC Forming
Description	Dress the grinding wheel to the specific external shape required by the workpiece design.	The dressing wheel can be shaped into various forms according to the CNC program.
Diamond Dressing Tool	◆ Counter-mold tungsten sintering (manual arrangement) edge CVD strengthening ◆ Reverse mold nickel plating (manual arrangement/random arrangement) ◆ Positive mold nickel plating (random distribution)	◆ Counter-mold tungsten sintering (Grain diamonds arranged by hand)edge CVD strengthening ◆ Reverse mold tungsten sintering (CVD drill manual arrangement) electroplating strengthening ◆ Reverse mold nickel plating (manual arrangement/random arrangement) ◆ Positive mold nickel plating (random distribution)
Application	Fast dressing Mass production Low elasticity	Long dressing time small batch production High elasticity
Parameter	Grinding Speed v_c Dressing wheel speed v_r Speed Ratio q_d Straight feed speed f_{rd} (feed per revolution) terminal dwell time T_s	Grinding Speed v_c Dressing wheel speed v_r Speed Ratio q_d Dressing feed a_{ed} Lateral feed speed f_{ad} Overlap rate U_d

BAY UNION

BAY UNION ABRASIVE TECHNOLOGY CO., LTD.

北聯研磨科技股份有限公司

NO.239, CHENGFU RD., SANXIA DIST., NEW TAIPEI CITY, 23743 TAIWAN.

+886-2-2668-2588

+886-2-2668-1999

bayunion@bayunion.com.tw

www.bayunion-tech.com

BAY UNION