Diamond belts, films and strips

ROLL GRINDING & FINISHING

KGS
Swiss Diamond Technology®

FAST AND ACCURATE!

Diamond tools for rolls and cylinders

Belts, strips and lapping films for grinding, removing and polishing of cylinders with hard coatings. Flexible diamond tools are easier to use, require less operators skills, for more consistent and predictable results!

Proud Manufacturers of
SWISS DIAMOND TECHNOLOGY®
Innovators since 1952

KGS DIAMOND (GUANGZHOU) CO., LTD
G1-329, South China Advanced Materials Innovation Park. No.31 KeFeng Road, Science City, Guangzhou,CHINA
Tel: +86 20 3758 5369
Fax: +86 20 3758 5331
E-mail: China@kgsdiamond.com
Website: www.kgsdiamond.com.cn

Product overview

The market for thermal spray coatings and other advanced materials has taken a strong trend upwards. The restriction on the use of hexavalent chrome, increasing efforts in corrosion, thermal, and wear resistance control have accelerated the introduction of thermal spray coatings.

These hard to grind materials require engineered flexible diamond abrasive solutions in order to keep productivity at the right pace, costs under control, and service within expectations.

INDUSTRY

Pulp, paper & printing industries, hot rolling mills, earthmoving equipment, oil, gas, mining, drilling industry and water engineering.

MAIN APPLICATIONS

For wet grinding and polishing of cylinders with hard coatings, especially those used in the pulp, paper & printing industries. Including chrome replacement with HVOF Tungsten Carbide. Hydraulic and shock absorbers plus rolls and cylinders used for hot rolling in the metal industry

TYPE OF GRINDING MACHINES

Centeress grinding machines
Tool post grinding machines

PRODUCT TESTS

PROCESS PARAMETERS

Application Engineering Test Equipment (R&D Test Centre Holland)
Roll grinding with Flexible Diamond Belts - Thermal Spray Coatings

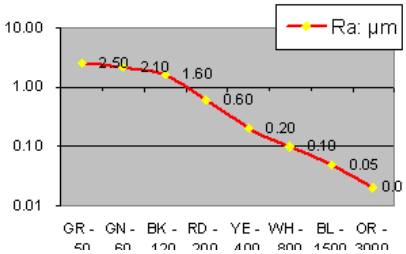
- LEH III/F: Tool Post Grinder on variable speed lathe
- Head: Fixed for Hard Coating Removal & Grinding
  Floating for fine finishing and polishing
- Belt: Size - 2,000 x 50 mm (78¾x2 Inches)
- Cutting Speed: 42 m/sec (8,200 SFPM)
- Pulley: Smooth & Incompressible - Hardness Shore 90
- Coolant: Water with 5% Shell Metalina D for belt grinding
- HVOF Cylinders: ø50 mm @ 600 rpm (2" Diameter @ 600 rpm)
- Traverse Rate: 0.6 mm per rotation (360 mm/min or 1.2 SFPM)

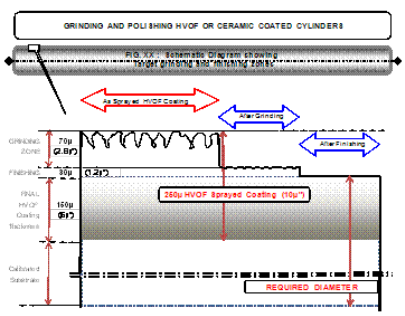
TEST RESULTS

Tungsten Carbide (HVOF)

Surface finish results per Grit Mesh			Thickness of WC material removed per pass		
Colour - Mesh	Ra: µm	Ra: µin	Pulley	Micron	Thou
GN - 60	2.10	84.0	Fixed	65.0	2.56
BK - 120	1.60	64.0	Fixed	41.0	1.61
RD - 200	0.60	24.0	Fixed	23.0	0.91
YE - 400	0.20	8.0	Floating	3.5	0.14
WH - 800	0.10	4.0	Floating	1.5	0.06
BL - 1500	0.05	2.0	Floating	0.6	0.02
OR - 3000	0.02	0.8	Floating	0.2	0.01

Finish Achieved with KGS TELUM CH Belts
HVOF Tungsten Carbide Cylindrical Parts



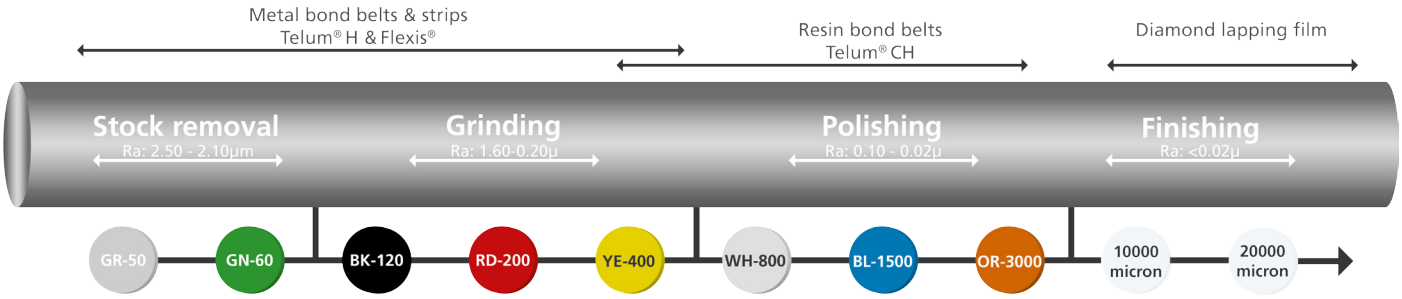


CONCLUSIONS

- Same results every time
- Not only grinds fast - can polish too
- Hard pulley gives high calibration
- A straight forward, low cost solution
- Lower grinding force needed than wheels
- Much lower capital investment needed

PROCESS RECOMMENDATIONS

- The process benefits from very precise equipment. Generally - with an accurately calibrated metal roll - and as sprayed with 250 micron of coating. Depending on the quality of the sprayed powder, the type of gun and whether the application is by hand or by robot.
- This coating could have an Ra of around 8 micron and an Rt of around 70 micron. So at least 80 micron is removed to ensure they reach below to the continuous closed layer. The target is to remove around 100 micron to end up with accurately sized and polished roll. (in this example with a 150 micron layer) The initial grind is normally required to remove the coarse finish from spraying –say 75 micron – this is done with the red 200 grit, or coarser grit if needed. (this initial grind is more often done by Wheels today).
- The next 25 micron will normally be done with Yellow 400 grit and finer - with multiple passes - ending with the final required diameter and a specific coating thickness & Ra. (often Although some rolls require a high reflective finish)



PRODUCT OFFERING

Belts - Flexible diamond belts are easier to use, require less operators skills, for more consistent and predictable results. With small investments your existing equipment can be turned around ready for this tooling.

KGS Telum CH - Diamond Belt System grinds and polishes hard coatings fast. Engineered to replace both metal bond diamond wheels and super-finishing systems. Combines the accuracy of rigid tools (bonded wheels); with the speed, consistency & ease of use of a flexible Diamond Belt System. And for many applications, can replace the need for Diamond Film Finishing.

Strips - xx

Films - xx

For the wet grinding and polishing of cylinders with hard coatings KGS brings a metal and resin bond range.

Product	Pattern	Backing	Grits	Features
Belts	Flexis	BP2	From 60 up to 400	Excellent for roll grinding, agressive cutting with reduced loading
Belts	Telum H	BP2	From 60 up to 400	Stronger pattern, ideal for grinding on slack of belt
Belts	Telum CH	BP2	From 50 up to 3000	Superior performance with resin bond product, less pressure required compared to metal bond
Belts	Flexis	BPT	From 60 up to 400	For applications where more stiffness is required, reduced loading, aggressive cutting
Belts	Telum	BPT	From 60 up to 400	For applications where more stiffness is required in combination with connected pattern
Strips	Flexis	BYW 3	From 60 up to 800	For superfinishing applications, open pattern reduces loading, agressive cutting
Strips	Telum	BYW 3	From 60 up to 800	For superfinishing applications, premium pattern
Film				

TECH TIP

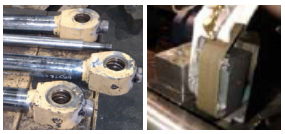
For calibration of the rolls use Green 60 grit. In case of softer steel type, use Telum CH CBN version in Green 60 grit. For finishing use Telum CH, use White 800 (sometimes Yellow 400 will be enough also) to achieve eg an RA of 0.2. Use coolant additive suited for belt grinding operations like Shell Metalina B200 or D3202 (non-solvent base), avoid oil based coolants.

CASE STUDIES

1. WC Roll for Sheet Metal Industry

Large R - Customers often require coarse Ra values as rough as 3.0 or even 4.2 Ra. This roll, which is slightly tapered,normally takes over 8 hours to finish with a diamond wheel. KGS Telum CH Diamond Belt System took less than one hour, including set-up, to achieve the requiredfinish. KEY POINT - KGS can massively shorten cycle times compared to diamond wheel grinding.

2. Hydraulic Rams - Chrome Replacement

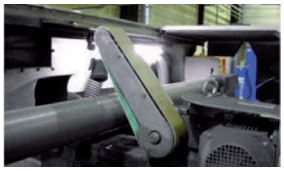


Dynabrade Belt Finishing Machine - Grinding and calibration is done with the coarse belts on an incompressible pulley. Finishing with the finer belts can be supported by the “Free Running” attachment from Dynabrade.

3. Retro-fit DBS on Wheel Grinder

Customers with large diamond wheel grinders can normally benefit from the Diamond Belt System at a very low cost, without the investment in a Tool Post Grinder - by replacing the diamond wheel with an incompressible pulley – and adding an EXTRA smaller pulley behind it. KEY POINT – This set up gave the same Ra values as the KGS R&D team, and took a fraction of the time to grind and polish both WC & CrC sprayed coatings.

4. Free Running DBS - Dry



KGS Telum CH belts are used dry on special hard coatings with a free running set-up. For one customer with Silicon Aluminium Oxide coating the advantage of KGS Telum CH over SiC belts is huge. Not only has the grinding time been decreased from 6 hours to less than 1 hour, there has also been a high cost saving in Silicon Carbide abrasive belts.