

Process Solutions:

The demands expected of ball production have become significantly more stringent in recent years. There are numerous reasons for this trend, the main factor being the enormous pressure to reduce costs particularly in the roller bearing industry which expects more efficient production methods. Greater environmental awareness and protection require complete control of materials used which can only be realised by the use of up-to-date technology. Ultimately, it is the stringent quality demand expected of roller bearings and precision balls which is responsible for the ever increasing use of innovative tools and machining processes. In the future, solutions to the highly specialised grinding problems can only be found by close co-operation of all parties involved in the ball manufacturing industry.

The development of our new **ATLANTIC – Ball grinding wheels** and **ATLANTIC – Ball fine grinding wheels** is the result of working closely with specialists from other areas:

- **Industriefen-& Anlagenbau GmbH**,
Specialists in the field of hardening equipment
- **SMS GmbH**,
Flashing, grinding, and lapping machines
- **Rexroth Guss GmbH**
Cast plates for flashing, grinding and lapping machines
- **ML Lubrication GmbH**,
Coolant lubrication specialists
- **Sortening solutions Ltd.**,
Specialists for ball sortening equipment



Our **ATLANTIC – Ball Grinding Wheels** and **ATLANTIC – Ball Lapping Wheels** are supplied as original equipment for the special-purpose machine tool manufacturers Spezialmaschinenfabrik Schonungen GmbH! Together with our partners, we optimise your grinding and lapping processes, thereby supporting your company in an innovative manner to meet the ever increasing demands of the ball manufacturing industry.



Ball material:	Si ₃ N ₄
Charge:	300 pcs
Stock removal:	180 µm
Grinding time:	3,5 h
Stock removal rate:	51 µm/h
Pressing plate:	steel
Coolant:	honing Oil EMOL® - O - HON 920 NV
Shape deviation:	< 0,5 µm

Grinding wheel 200 x 25 x 30 mm in 65D 91-V00 B XA 100

More informations about our new development - **ATLANTIC Ball grinding wheels for grinding ceramic balls** - can be found in an additional flyer!

creative & dynamic

► Short information

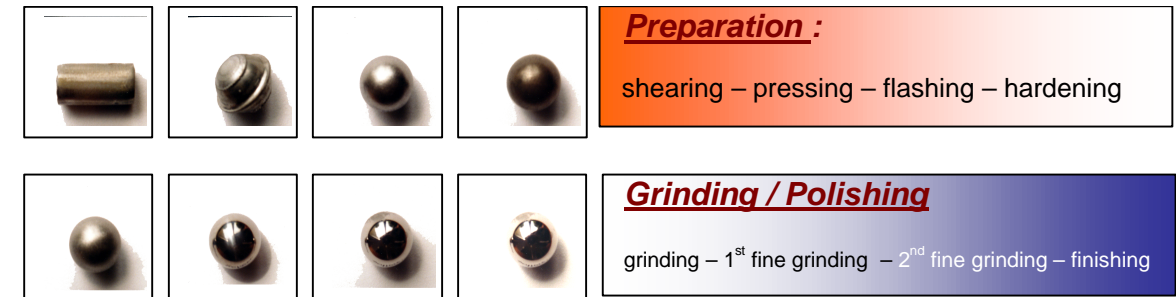
Ball grinding and ball fine grinding wheels for the bearing industry

Balls:

The possibilities for the application of balls are very diverse on account of their geometry. In addition to their more traditional applications in bearings and machine spindles, balls are extensively used throughout industry. Be they manufactured from bearing steel, stainless steel, optical glass, ceramics or plastics, they all have one thing in common – they must pass through a multitude of technological production processes. The final processes involve grinding and finish lapping to give the balls their final properties to suit such specific applications.

Quality grading and ball classification are controlled according to DIN 5401 and ISO 3290 .

Production steps of ball manufacture: (Balls for bearings)



shearing:	Cutting the material from the coil
pressing:	Forming the ball by cold or hot pressing
flashing:	Cold rolling process to remove the burrs
hardening:	Heat treatment to obtain the required strength
grinding:	Process to obtain roundness and surface finish
1 st fine grinding:	Obtaining a ball grade of G16
2 nd fine grinding:	Obtaining a ball grade of G10
finishing:	With "Stone to Stone" G5, with lapping paste G3

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Ball Grinding Wheels

Vitrified bonded wheels in silicon carbide for grinding after hardening
ATLANTIC – Ball Grinding Wheels are used together with pressure plates made of nodular cast iron (GG).

Availability:

Grain type:	Dark silicon carbide (SC7)
Grit size acc. to FEPA:	F150, F180, F220, F280, F400
Hardness:	Z
Structures:	00 to 29
Bond type:	307, 22

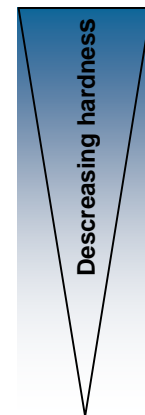
Hardness graduation:

Specifications

SC7 180-Z00 V 307
 SC7 180-Z01 V 307
 SC7 180-Z02 V 307
 SC7 180-Z03 V 307

SC7 180-Z04 V 307
 SC7 180-Z05 V 307
 SC7 180-Z06 V 307
 SC7 180-Z07 V 307

SC7 180-Z29 V 22
 SC7 180-Z27 V 22



optimal ball diameter

$D_w \leq 6 \text{ mm}$

$6 \text{ mm} > D_w \geq 16 \text{ mm}$

$D_w > 16 \text{ mm}$

Available wheel dimensions:

Outer diameter (D) [mm]	Thickness (T) [mm]	Hole (H) [mm]
300	from 30 up to 80	30; 50
400		30; 50; 150
600	from 60 up to 120	203; 290; 450
720		203; 290; 350; 450
820		300; 350; 420; 450
920		420; 450

Example: Ball grinding wheel: 820 x 100 x 300 mm

SC7 150-Z02 V 307

D_{ball}	6,47 mm
Ball material:	Bearing steel, hardened
Pressure plate:	GG
Coolant:	Emulsion
Number of ball charges ground:	40
Weight per charge:	400 kg
Grinding time per charge:	14 hours

Ball fine grinding wheels

Hot-pressed, synthetic wheels with white fused aluminium or silicon carbide for fine grinding (first and/or second fine grinding and finishing). **ATLANTIC – fine grinding wheels** are used together with pressure plates made of cast nodular graphite iron or by the „Stone to Stone“ process (pressure plate in the same quality as the fine grinding wheel). Balls in the G5 quality grade can be produced when the wheels are used in conjunction with the appropriate filtration.

Advantages associated with the use of ATLANTIC – Ball Lapping Wheels

- No loose lapping compound required
- Short set-up times, bonded abrasive grain for fine grinding wheel widths of up to 80 mm
- Drastic reduction of the fine grinding cycle time, particularly when using the „Stone to Stone“ process
- Extremely low wear rate of the cast iron pressure plates
- Grinding costs are reduced due to the elimination of cost intensive cleaning processes
- Environmentally friendly due to grinding residues being minimised
- Generally oil, alternatively emulsion can be used as coolant (REZ)

Availability:

Grain type:	White fused aluminium (EK1), dark silicon carbide (SC7), green silicon carbide (SC9)
Grit size acc. to FEPA:	From F240 up to F2000
Hardness:	Z
Structures:	25
Bond type:	REH, REZ (special bond for finishing)

Available wheel dimensions:

Outer diameter (D) [mm]	Thickness (T) [mm]	Hole (H) [mm]
100	30	30
200		30; 50
300		30; 50
400		30; 50; 150
600		205; 302
720		175; 280
820		300; 350; 420; 450
920		450

Example:

Ball fine grinding, soluble oil, charge size 400 Kg

1st fine grinding:

K1 320B-Z25 R REZ
 resin bonding
D = 820 mm
T = 80 mm

2nd fine grinding:

stone to stone
EK7 1200-Z25 R REZ
 resin bonding
D = 820 mm
T = 40 mm

Finishing:

stone to stone
EK1 2000-Z25 R REZ
 resin bonding
D = 820 mm
= 40 mm

Stock removal:	12 µm	5 µm	3 µm
removal rate:	2,5 µm per hour	1 µm per hour	0,6 µm per hour
grinding time:	5 hours per charge	5 hours per charge	5 hours per charge
wheel wear:	~ 1,5 mm	~ 0,15 mm	~ 0,02 mm