



Grindballs



www.grindballs.com





Grindballs is a company of Faydasıçok Holding which consists of world-wide known special steel manufacturer companies and sales & distribution networks. Grindballs Çelik Bilya San. ve Tic. A.Ş. with an extensive experience in mining industry, develops and manufactures high quality steel balls and bars widely used for grinding of minerals such as gold, silver, copper, zinc, aluminium, lead, iron, chromium, cement and aerated concrete. Grindballs' products are well-known for their superior hardness and durability.

Grindballs uses advanced production technology and has high production capacity. Through fully automated production lines controlled by Siemens S1200 PLC and via its well-trained personnel, Grindballs provides its customers sustainable, high quality "Ballex" branded grinding balls and "Barex" branded grinding bars. Ballex and Barex's raw materials are provided from IATF 16949 certified HASÇELİK hot rolling mill which is a company of Faydasıçok Holding.

Our Aim is;

- To become the most preferred grinding media supplier in world mining industry,
- To be capable of fulfilling quality standards and reliable with its quality,
- To adopt a customer-oriented and trust-based approach in order to move towards becoming a well-known supplier around the world.

Our Vision;

We aim to be among the most preferred suppliers for our global clients by delivering superior service and customer satisfaction.

Our Mission;

Supplying high quality, innovative products to all its customers and being a sustainable supplier for mining industry.



Grinding Ball Products

Ballex, with its solid and homogeneous microstructure, has advanced mechanical properties gained through extensive heat treatment.

High durability and wear resistance, improved hardness, high impact toughness and low fracture ratio are essential properties of Ballex and form the basis of high productivity.

Ballex products are well-known for their long life-time.

All Ballex raw materials are provided from OEM focused IATF 16949 certified HASCELİK Special Steel Hot Rolling Mill.

**World's Largest
Manufacturing Range**

BALLEX BALLS (ØDIA, MM)	ALLOY CODE	HARDNESS
16 - 20 - 25 - 30 - 35 - 40 - 50 - 60 - 70 - 80 - 90 - 100 - 110 - 120 - 125 - 140	Ballex Eco - Ballex 200 - Ballex 300 - Ballex 400	56-65 HRC

BASIC PARAMETERS				
Dia	Weight	Quantity	Quantity	Surface Area
mm	Kg/Piece	Piece/Ton	Piece m ³	cm ²
16	0.026	38.461	109.820	10.056
20	0.033	30.409	137.276	12.57
25	0.064	15.569	70.284	19.64
30	0.111	9.010	40.673	28.27
35	0.176	5.674	25.312	38.48
40	0.264	3.802	17.159	50.27
50	0.514	1.949	8.785	78.54
60	0.888	1.126	5.084	113.1
70	1.413	709	3.202	153.94
80	2.109	475	2.145	201.06
90	2.999	333	1.505	254.47
100	4.111	243	1.098	314.16
120	7.120	140	562	452.38
125	8.048	124	542	483.05
140	11.750	110	607	541.05

BALLEX PRODUCTS CHEMICAL COMPOSITION			
Carbon	0.57%-0.95	Manganese	0.60%-1.90
Silicium	0.10%-0.40	Copper	max. 0.20%
Chromium	max. 1.50%	Sulphur	max. 0.04%
Molybdenum	max. 0.10%	Phosphorus	max. 0.04%
Nickel	max. 0.40%		

BREAKAGE GUARANTEE

During the first 1000 hours of working period, except the case of empty running more than 10 minutes;

0 - 3% : Acceptable in range.

3% - 10 : Breakage quantity of grinding media is provided by free of charge.

10% : Over breakage of this value;

Grinding circuit shall be controlled and measured by authorized person.

According to measurement and controlling result, the operating conditions of grinding circuit is evaluated again.

Free of charge product quantity is specified after the meeting between supplier and manufacturer.

HARDNESS CONVERSION TABLE							
BRINELL	VICKERS	ROCKWELL	TENSILE	BRINELL	VICKERS	ROCKWELL	TENSILE
HB	HV	HRC	N/mm ²	HB	HV	HRC	N/mm ²
(513)	540	51.7	1775	-	690	59.7	-
(523)	550	52.3	1810	-	700	60.1	-
(532)	560	53.0	1845	-	720	61.0	-
(542)	570	53.6	1880	-	740	61.8	-
(551)	580	54.1	1920	-	760	62.5	-
(561)	590	54.7	1955	-	780	63.3	-
(570)	600	55.2	1995	-	800	64.0	-
(580)	610	55.7	2030	-	820	64.7	-
(589)	620	56.3	2070	-	840	65.3	-
(599)	630	56.8	2105	-	860	65.9	-
(608)	640	57.3	2145	-	880	66.4	-
(618)	650	57.8	2180	-	900	67.0	-
-	660	58.3	-	-	920	67.5	-
-	670	58.8	-	-	940	68.0	-
-	680	59.2	-	-	-	-	-

Raw materials of Ballex products are only accepted after a very strict entry control mechanism.

Induction heated steel bars are rolled with fully controlled and homogeneous heat distribution.

Sensitive ball rolling mechanism paves the way for a continuous and homogeneous microstructure.

Heat control, vital for a high level quality heat treatment process, is applied by heat automation systems which enable to manage all processes under supervision.

Heat treatment enables our engineers to achieve desired microstructure and hardness levels which consequently ensure sustainable durability features.

Ballex products, depending on customer specifications, can be manufactured with different chemical compositions within a range of 16 mm to 140 mm diameters.



Grinding Bar Products

Manufactured in fully automated production lines, Barex products have tight and solid grain structure with homogeneous distribution.

Barex products are manufactured by high reduction ratios and have high impact resistance and impact toughness. Moreover, Barex products have long lifetime because of its high durability and low fracture ratio.

All Barex raw materials are provided from IATF 16949 certified HASCELIK Special Steel Hot Rolling Mill

A photograph of a hot metal grinding bar being processed in a factory. The bar is glowing bright yellow-orange from heat. It is being held by a large, dark metal roller. The background shows other industrial equipment and a grid floor.

**Homogeneous
Volumetric Hardness**

	ALLOY CODE	HARDNESS
BAREX Steel Bar (50 mm - 120 mm)	SAE/AISI 1060-1065-1070-1080-1090	27-32 HRC, 266-304 HB

BALLEX AND BAREX PRODUCTS CHEMICAL COMPOSITION			
Carbon	0.57%-0.95	Manganese	0.60%-1.90
Silicium	0.10%-0.40	Copper	max. 0.20%
Chromium	max.1.50%	Sulphur	max. 0.04%
Molybdenum	max.0.10%	Phosphorus	max. 0.04%
Nickel	max.0.40%		

HARDNESS CONVERSION TABLE							
BRINELL	VICKERS	ROCKWELL	TENSILE	BRINELL	VICKERS	ROCKWELL	TENSILE
HB	HV	HRC	N/mm ²	HB	HV	HRC	N/mm ²
(513)	540	51.7	1775	-	690	59.7	-
(523)	550	52.3	1810	-	700	60.1	-
(532)	560	53.0	1845	-	720	61.0	-
(542)	570	53.6	1880	-	740	61.8	-
(551)	580	54.1	1920	-	760	62.5	-
(561)	590	54.7	1955	-	780	63.3	-
(570)	600	55.2	1995	-	800	64.0	-
(580)	610	55.7	2030	-	820	64.7	-
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(608)	640	57.3	2145	-	880	66.4	-
(618)	650	57.8	2180	-	900	67.0	-
-	660	58.3	-	-	920	67.5	-
-	670	58.8	-	-	940	68.0	-
-	680	59.2	-	-	-	-	-

Raw materials to be used for Ballex product's manufacturing are only accepted after a very strict line entry control.

Raw material billets are heated by way of homogeneous and controlled operations in walking beam furnaces.

With controlled descaling process, any possible surface problems are avoided.

Products manufactured in fully automated lines with high reduction ratios have perfect homogeneous microstructure.

Rolled products are inspected in terms of diameter, cross section, and length and then prepared for shipment. Barex products can be manufactured based on customer specifications with different chemical compositions.



Between 50 mm. – 120 mm.
Grinding Bar Manufacturer

SAG MILLS (SEMI AUTOGENOUS GRINDING)

SAG mills are type of grinding carried out with a small amount of ball charge and with the help of bigger parts crumbling the smaller parts of ore. In addition to being preferred in gold, copper, platinum and silver mines, SAG MILLS are preferred in mines such as lead, zinc, alumina and nickel.

SAG mills are usually primary or first stage mills.

SAG mills are characterized by large diameters and short lengths compared to ball mills.

Advantages and Features;

Crushing, grinding and washing are made together in the machines with the highest reduction rate. It offers a much smaller reduction ratio than the size reduction done by the three-stage crushing process.

Wet and dry grinding.

High capacity.

They have the ability to grind materials up to 400 mm to 75 microns.

In the grinding mills, between 8% and 21% of the ball charge is used. SAG Mill grinding ball diameters are 100-140 mm.

BASIC PARAMETERS				
Dia	Weight	Quantity	Quantity	Surface Area
mm	Kg/Piece	Piece/Ton	Piece m ²	cm ²
100	4.111	243	1.098	314.16
120	7.120	140	562	452.38
125	8.048	124	542	483.05
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DROP TEST

Free drop test is designed to measure the durability of grinding balls against sudden impact. Test device impact floor is made of plates having higher hardness than the balls.

Dropped grinding balls are tested based on customer specifications.

WHY DROP TEST?

- In order to measure and evaluate the impact tolerance of the product.
- To determine the effects of grinding media in the mills.
- To understand product design accuracy.



QUALITY

Our quality policy is to create high quality products fully fulfilling customer expectations and needs.

Grindballs meets the needs of its clients with products having TS EN 10060, TS EN 10083-2 ve ASTM-E18-15 quality certifications.

Quality is at the center of all our operations. Quality awareness and development trainings form the basis of our quality management.

Constant quality improvements are monitored and controlled. Following these principles, Grindballs included "Drop Test" into its portfolio.



PACKAGING OPTIONS

Two metal containers are placed on proper wooden pallets, secured and locked.

METAL CONTAINERS							
METAL CONTAINERS	Container Size (mm)		Wooden Pallet Size (mm)			Net Product Weight (kg)	Pallet (kg)
	Dia.(mm)	Height(mm)	Width (mm)	Length(mm)	Height(mm)		
Wooden Pallet	600	900	600	1200	200-220	850-900 kg	Avrg. 20 kg

BIG BAG PACKAGING

Based on client demands 70 cm x 70 cm x 55 cm size big bags are used for shipments





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