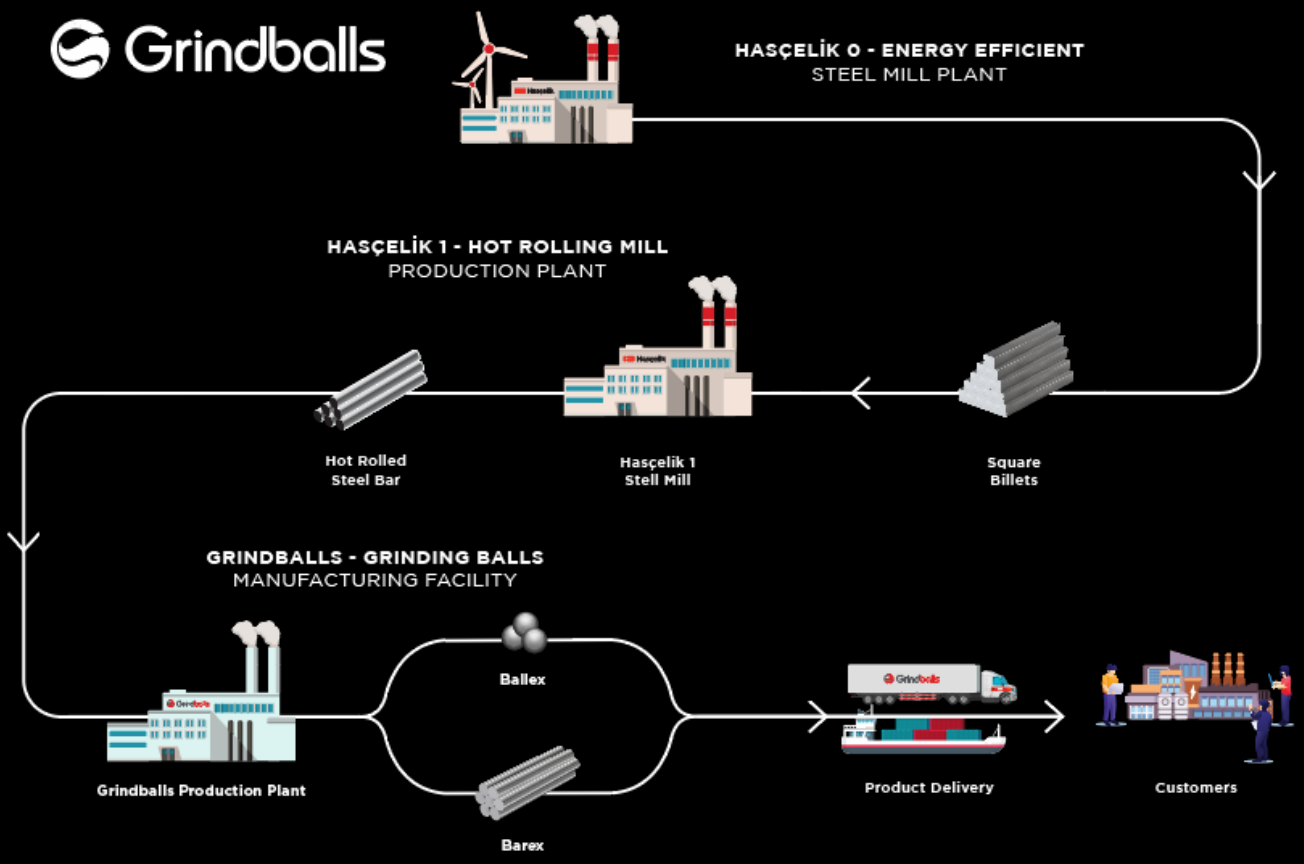
Grindballs
grindballs.com

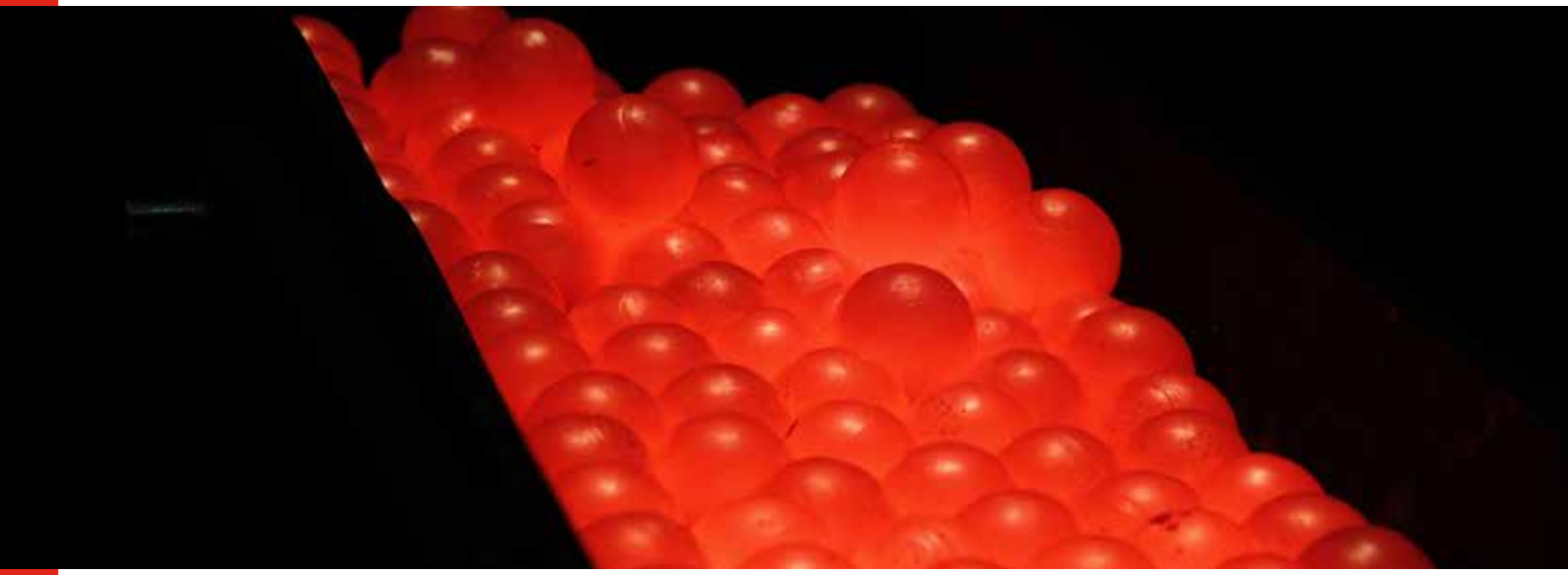
Grindballs

ballex® | barex®


Grindballs
HASÇELİK 0 - ENERGY EFFICIENT
STEEL MILL PLANT
HASÇELİK 1 - HOT ROLLING MILL
PRODUCTION PLANT
Hot Rolled
Steel Bar
Hasçelik 1
Stell Mill
Square
Billets
GRINDBALLS - GRINDING BALLS
MANUFACTURING FACILITY
Ballex
Grindballs Production Plant
Barex
Product Delivery
Customers

Grindballs

ABOUT



T US

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. AŞ** 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.

Grindballs

VISION

M

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

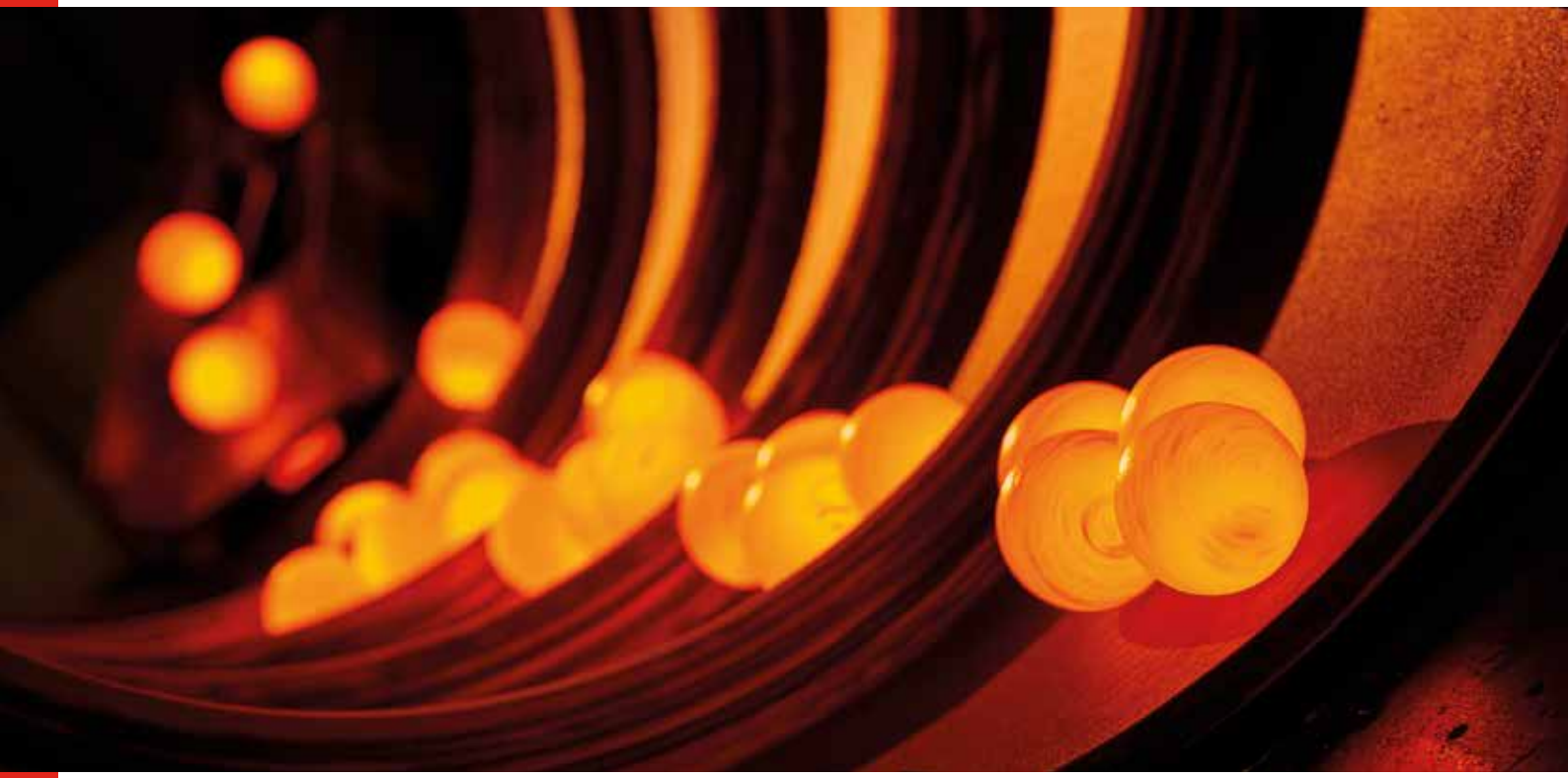
We aim to be among the most preferred suppliers for our global clients by delivering superior service and customer satisfaction.

MISSION

Our Mission

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

GRINDIN



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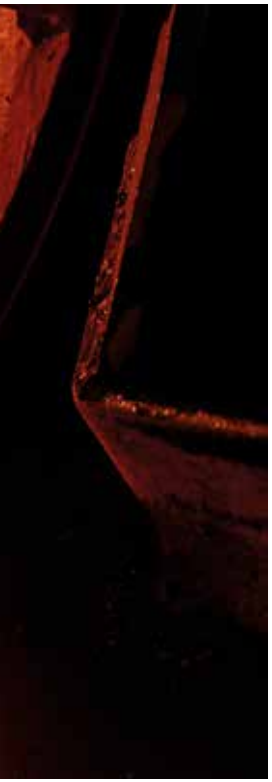
IG BALL



World's Largest Manufacturing Range

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 **HASCELIK** Special Steel Hot Rolling Mill.

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IGBALL

World's Largest Product Range in Cement Industry

Ballex 300 CMNT Grinding Ball Products

'Ballex300 CMNT' balls, produced with our own know-how for the cement industry, have been optimized and developed to meet the needs of cement production.

Even at temperatures of 120 degrees Celsius inside the mill, demonstrates outstanding performance and becoming the best in their class while ensuring high energy efficiency.

Successfully completing tests against equivalent balls containing high chrome commonly used in the industry, **Balex300 CMNT** enhances wear resistance thanks to its special formulation and operates with maximum benefit in grinding processes within the mill.

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BALLEX BALLS (Ø DIA, 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 - Ballex 300 CMNT	56 - 65 HRC

BALLEX PRODUCTS CHEMICAL COMPOSITION			
Dia	Weight	Quantity	Surface Area
mm	kg / piece	piece / ton	m^2 / piece
16	0.0168	59.524	0.000804
20	0.0329	30.395	0.001257
25	0.0643	15.550	0.001963
30	0.1110	9.009	0.002827
35	0.1760	5.682	0.003848
40	0.2630	1.946	0.005027
50	0.5140	1.949	0.007854
60	0.8880	1.126	0.011310
70	1.4130	708	0.015394
80	2.1090	474	0.020106
90	2.9990	333	0.025447
100	4.1110	243	0.031416
120	7.1200	140	0.045239
125	8.0480	124	0.049087
140	11.7500	85	0.061575

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%	Phosporus	max 0.04%
Nickel	max 0.40%		

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.

HARDNESS CONVERSION TABLE			
BRINELL	VICKERS	ROCKWELL	TENSILE
HB	HV	HRC	N / mm²
(513)	540	51.7	1775
(523)	550	52.3	1810
(532)	560	53.0	1845
(542)	570	53.6	1880
(551)	580	54.1	1920
(561)	590	54.7	1955
(570)	600	55.2	1995
(580)	610	55.7	2030
(589)	620	56.3	2070
(599)	630	56.8	2105
(608)	640	57.3	2145
(618)	650	57.8	2180
-	660	58.3	-
-	670	58.8	-
-	680	59.2	-
-	690	59.7	-
-	700	60.1	-
-	720	61.0	-
-	740	61.8	-
-	760	62.5	-
-	780	63.3	-
-	800	64.0	-
-	820	64.7	-
-	840	65.3	-
-	860	65.9	-
-	880	66.4	-
-	900	67.0	-
-	920	67.5	-
-	940	68.0	-
-	-	-	-

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.

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 specifeid after the meeting between supplier and manufacturer.

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GRINDIN

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NG BAR

Homogeneous Volumetric Hardness

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.

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BAREX STEEL BAR	ALLOY CODE	HARDNESS
50mm - 120mm	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
HB	HV	HRC	N / mm²
(513)	540	51.7	1775
(523)	550	52.3	1810
(532)	560	53.0	1845
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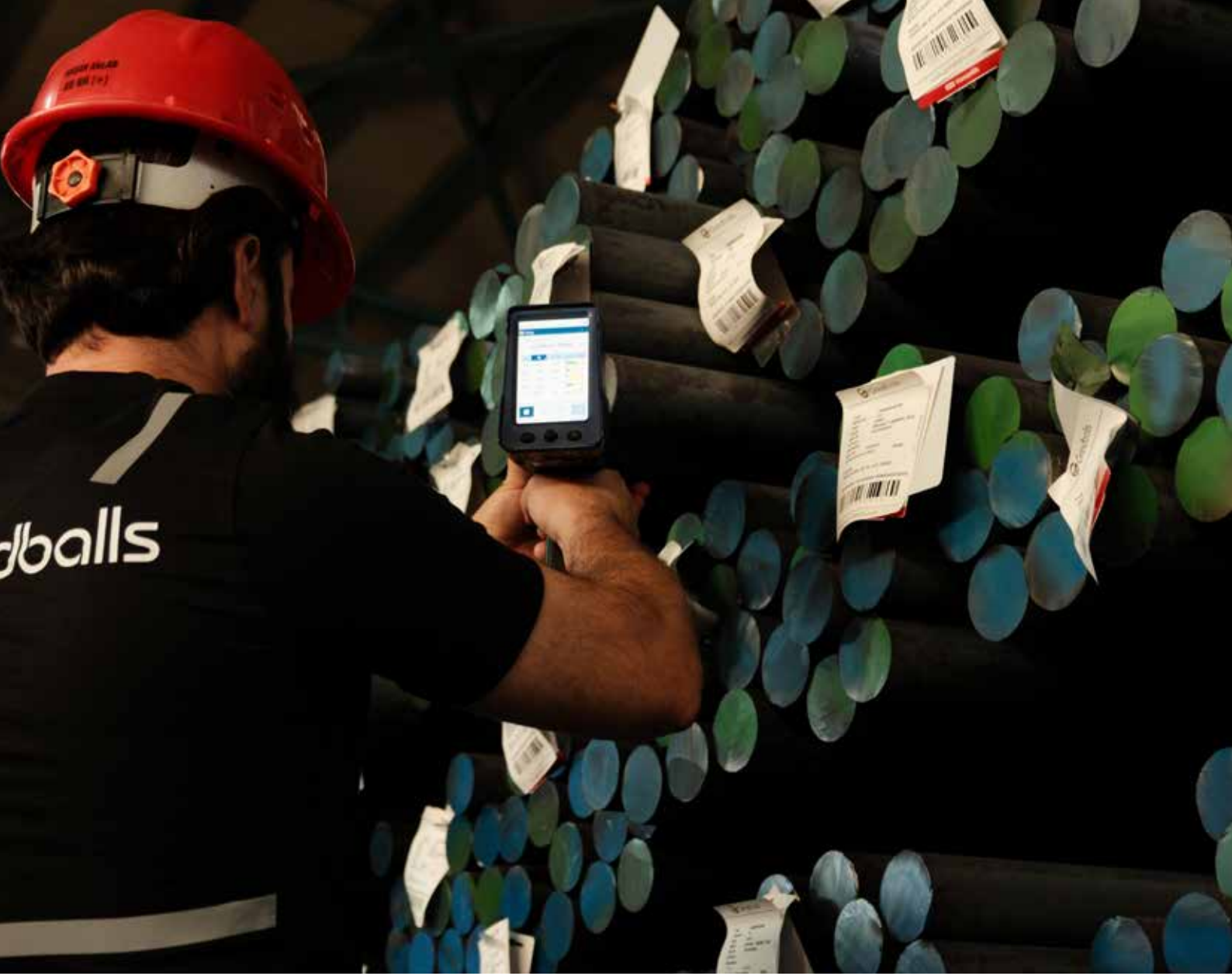
(599)	630	56.8	2105
(608)	640	57.3	2145
(618)	650	57.8	2180
-	660	58.3	-
-	670	58.8	-
-	680	59.2	-
-	690	59.7	-
-	700	60.1	-
-	720	61.0	-
-	740	61.8	-
-	760	62.5	-
-	780	63.3	-
-	800	64.0	-
-	820	64.7	-
-	840	65.3	-
-	860	65.9	-
-	880	66.4	-
-	900	67.0	-
-	920	67.5	-
-	940	68.0	-
-	-	-	-

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.

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SAG

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.

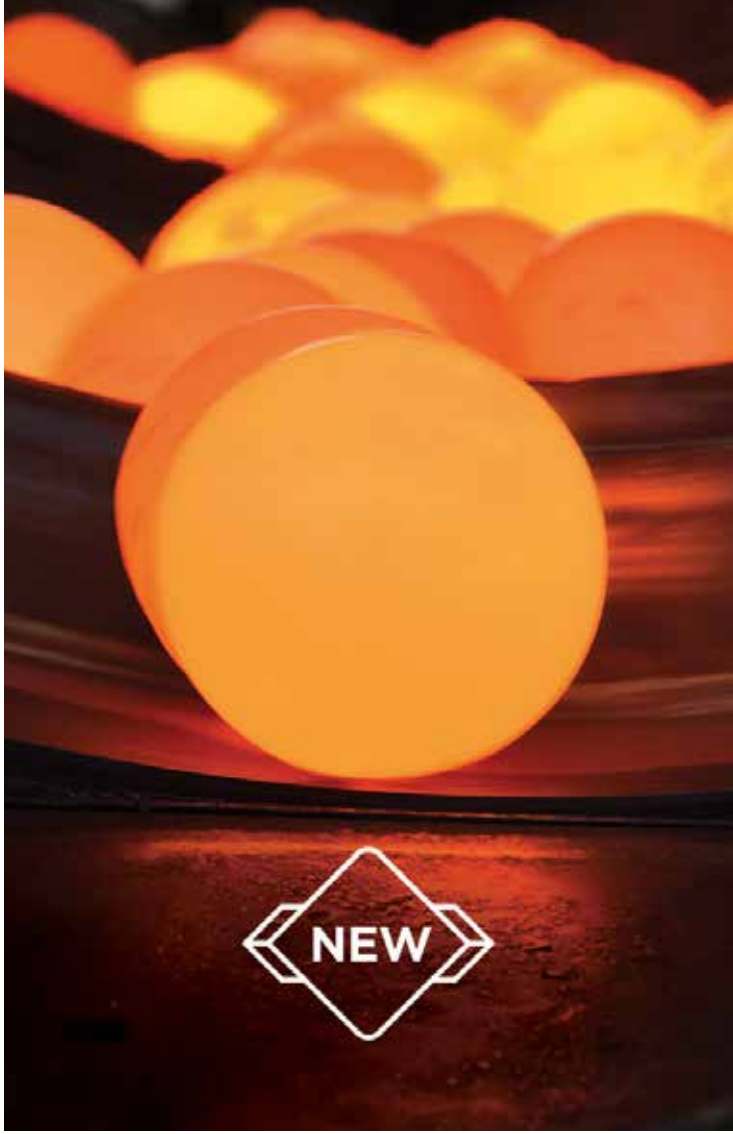
• Wet and dry grinding.

• 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	Surface Area
mm	kg / piece	piece / ton	m^2 / piece
100	4.111	243	0.031416
120	7.103	141	0.04524
125	8.048	124	0.049087
140	11.750	85	0.061575

DROP TEST

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.

Grindballs

QUALITY

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 Container	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	Avg. 20 kg

Big Bag Packaging

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

Grindballs

Grindballs

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