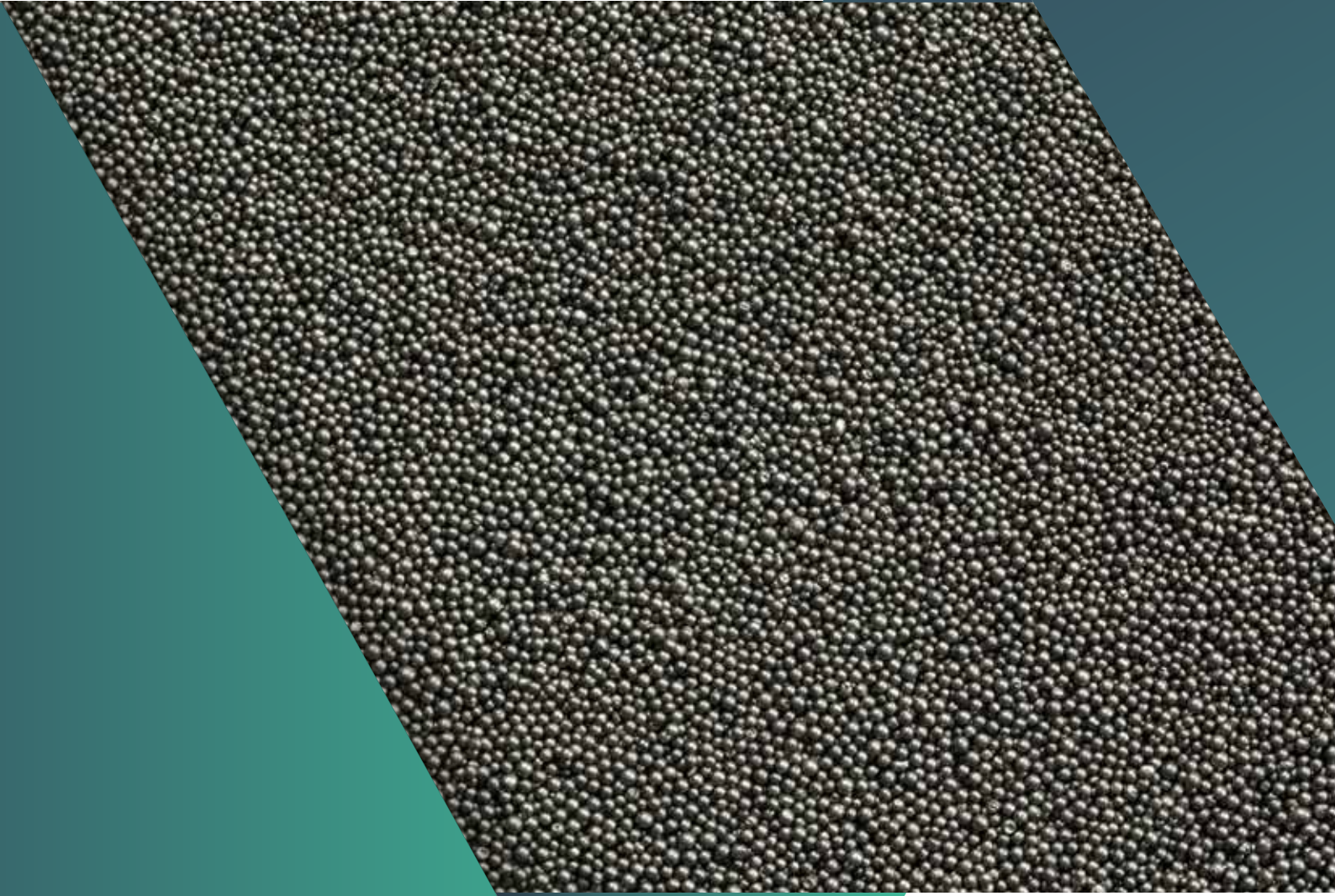




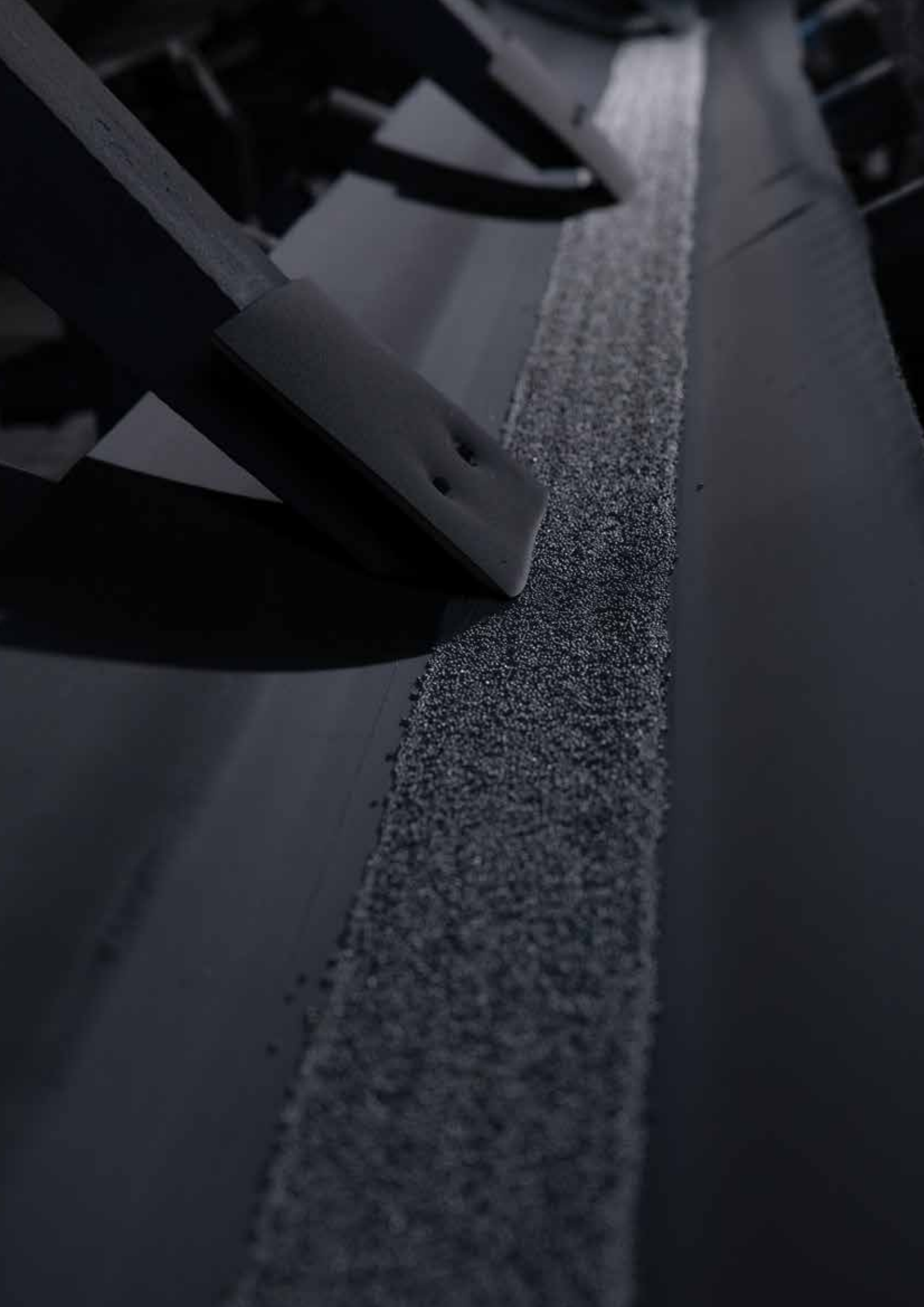
**TOSÇELİK** Granül



Tosçelik  
Granül

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ENG





**TOSÇELİK** Granül



## TOSYALI FOR A SUSTAINABLE LIFE

As Tosyalı, we strengthen our position in the steel industry not only through product quality but also sustainability-focused efforts. By declaring "Tosyalı for a Sustainable Life" we commit to green steel and decarbonization initiatives, demonstrating our dedication to environmental responsibilities.

Our responsible production and consumption approach includes the use of eco-friendly technologies, and the generation of energy from renewable sources ensures that our production maintains a low carbon footprint. At the same time, our production with a high scrap ratio contributes to the circular economy.

With the start of the Solar Power Plant (SPP) project across our facilities, we are proud of having the world's largest rooftop Solar Power Plant. Therefore, we not only reduce our energy costs but also contribute to making our steel production facilities among the cleanest and greenest in the world. Through SPP investments planned for self-consumption, we will soon be able to meet a significant portion of our electricity demand from renewable energy.

At our R&D Center, we focus on sustainability-driven projects, constantly reducing our carbon footprint through process improvements. In addition, we are pursuing the use of hydrogen as an alternative to fossil fuels in production. Through innovation and technological advancements, we pave the way for environmentally friendly methods in steel production.

With a high rate of waste recycling and a commitment to the principles of the circular economy, we strive to leave a sustainable world for future generations. At Tosyalı, we take maximum effort to ensure a livable world for tomorrow. By taking steps today for a sustainable future, we play a pioneering role in the steel industry and maintain our determination to minimize environmental impacts.

# GREEN STEEL



# TOSYALI FOR A SUSTAINABLE LIFE

Steel is in life today, at the forefront of change and transformation tomorrow, and at the center of life in the future.

## Leader in Green Steel for Today and Tomorrow

-  Türkiye's steel producer with the lowest carbon footprint
-  Partnership with world giants in circular economy
-  Sustainability-oriented R&D projects and investments
-  Leading the steel industry in the use of renewable energy sources



### About Us

Toscelik Granül plant was established in 2006 in line with the mission of meeting global steel shot demand taking the advantage of most advanced technological equipment in order to produce a high quality steel shot using top quality scraps.

Capacity of our plant was increased to 50.000 tons with our second investment made in 2010. We are the biggest steel shot producer in Turkey and one of the top two global low carbon steel shot producers in the world.

We took the road with the belief that low carbon steel shot is not appraised as it should be within the global steel shot market. We also consider that the advantages of low carbon steel shot in comparison with the high carbon product are not sufficiently recognized and exploited by users.

We introduced KOTAR, a product developed as a result of our successful R&D studies, to our customers in 2017. As we witness the successes we have achieved with KOTAR, we work harder to develop products with higher added value and offer the best service to our customers.

We feel the pride of exporting KOTAR steel shot to more than 30 countries in 5 continents as of 2023 aiming to achieve further growth and improvement each coming year.

### Our Vision

Securing our global position in the steel shot market within the top tier thanks to our quality and technical support and becoming the world's most recognized brand.

### Our Mission

- Becoming a brand that engages in quality and environmental-oriented production from raw material to finished product in steel shot production, enhances the added value of its products through R&D studies and reaching all regions in the world where steel shot is used.
- Improving the quality of technical service provided with its customers through new technologies and initiatives and working in customer-oriented manner.
- Being regarded as a transparent, reliable and ever-growing brand by steel shot users.



Environmentally-friendly



Global company



Sustainability



Innovative



Experienced Staff



Productivity-Oriented



Industry Leading

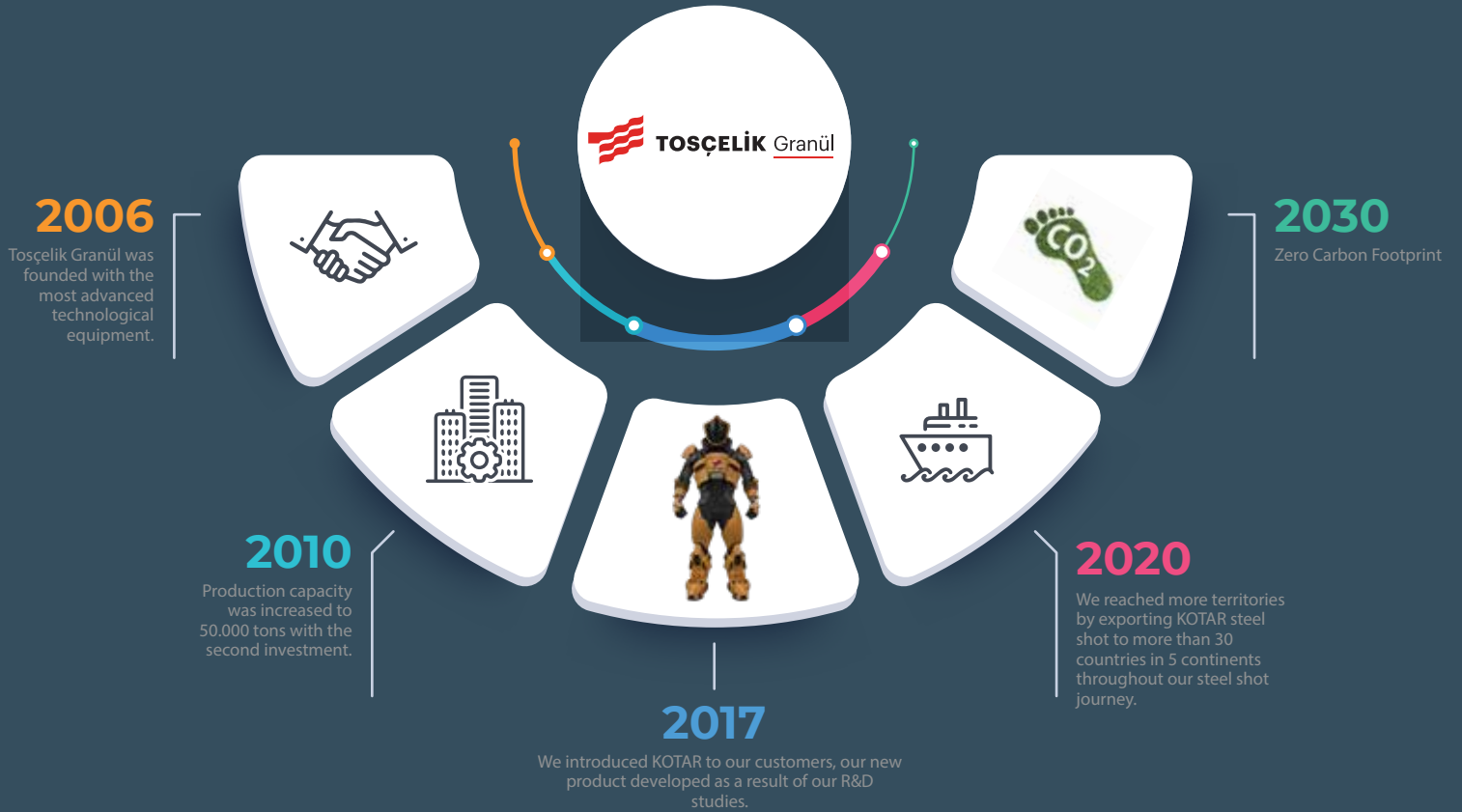


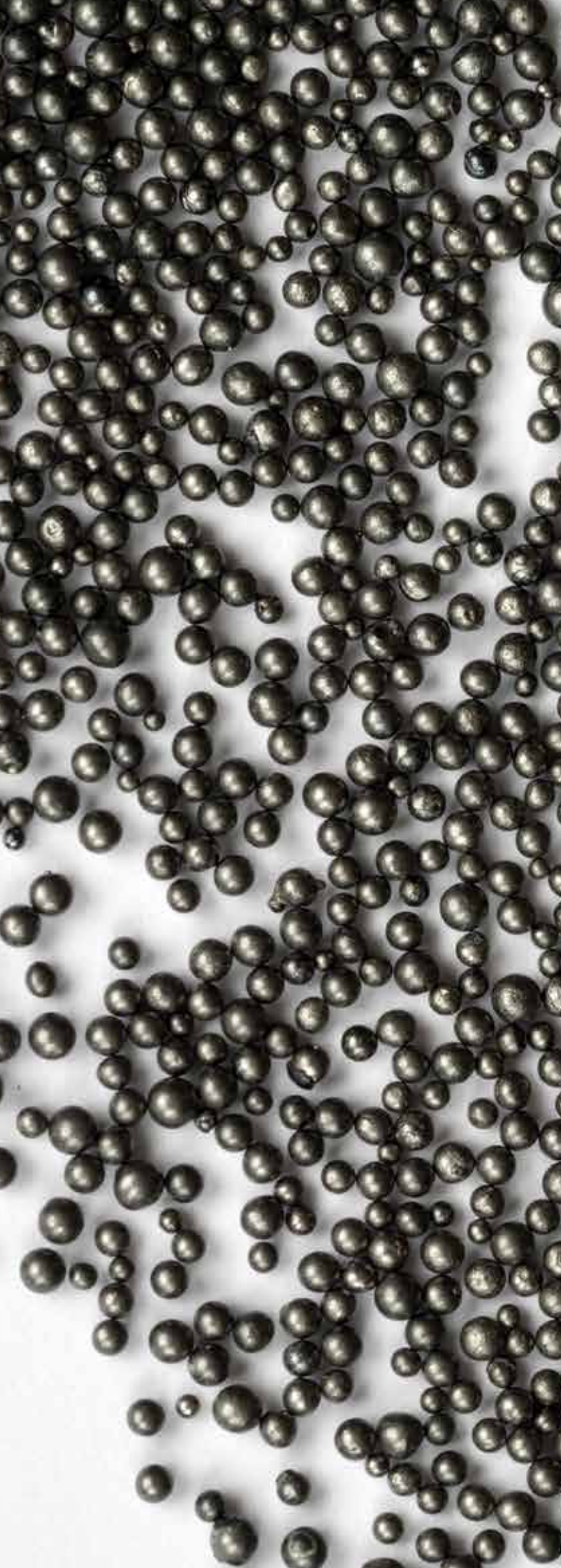
## Tosçelik Granül

We introduced KOTAR, a product resulting from our successful R&D studies, to our customers in 2017. As we witness the successes we have achieved with KOTAR, we are even working harder in order to develop products with higher added value and offer the best to our customers.

We feel the pride of exporting KOTAR steel shot to more than 30 countries in 5 continents as of 2025 aiming to achieve further growth and improvement each coming year.

As Toscelik Granül, we set the goal of **'Zero Carbon Footprint'** in line with the vision of **'Green Steel'** and we restructured not only our production processes but also the chemical content of our product with the awareness of this responsibility.





INDUSTRY

INDUSTRY

QUALITY

QUALITY

INVESTMENT

INVESTMENT

PRODUCT DIVERSITY

PRODUCT DIVERSITY

PRODUCTION

PRODUCTION

KOTAR

KOTAR

LOW CARBON

LOW CARBON

HIGH PERFORMANCE

HIGH PERFORMANCE

LONG LIFETIME

LONG LIFETIME

SUSTAINABILITY

SUSTAINABILITY

STEEL

STEEL

ECO-FRIENDLY

ECO-FRIENDLY

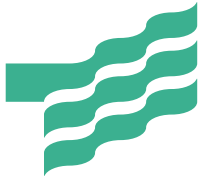
GREEN STEEL

GREEN STEEL

ZERO CARBON

ZERO CARBON





# The Contents

 KOTAR	10
 Size Distribution of KOTAR Shot	14
 Production	16
 Technical Specifications	18

## KOTAR, BEYOND THE TALENT...

Meaning “Talent” and “Wise” and being equivalent to the mythological Greek God Hephaestus, KOTAR is a smith, engineer, architect and inventor God who supplies weapons to the Gods besides constructing and furnishing the palaces.

### About the Product

*KOTAR came into life as a result of many R&D studies based on the years of experience. One of the most critical parameters for shotblasting operations is hardness. It is known that the hardness value is a highly important factor in the adjustment of shotblasting times. With this awareness, we have initially built our fund of knowledge and R&D studies upon our capability to increase the hardness value as much as possible without sacrificing the quality of our existing low carbon steel shot product.*

*We developed our KOTAR product which can function without breakage, maintaining its spherical shape during the cleaning operation in this journey that we started with the goal to manufacture “a product that is lasting very long as a low carbon steel shot and hard as a high carbon steel shot”. Starting the cleaning operation with the hardness values of 43 – 44 HRC, our product reaches the hardness values of 49 – 50 HRC in a short period of time with the contribution of its chemical contents and maintains this hardness value until it becomes inactive.*

*Produced at the hardness of a high carbon steel shot, KOTAR products perform the same job in a much shorter time than its competitors without breakage inside the machine thanks to the high energy transmitted on to the contact surfaces. During shotblasting operation, low carbon shot particles get smaller by being peeled in thin layers like an onion throughout 80% of its service life due to the abrasion.*

*Shotblasting machine and spare part wear substantially reduces because of its breakage free operation and low rate of pulverization. KOTAR products clean more parts in a shorter period of time with less shot in comparison with other high carbon steel products which leads to a great efficiency. It proved its contributions to longer shotblasting machine and spare parts lifetimes through practical trials performed initially at our test centre and later in various cleaning operations performed by our customers.*



# LOW CARBON



Second priority in our R&D studies, on the other hand, was to improve the cleaning efficiency through an operation mix that is stable for a long period of time. Keeping the homogeneity of the operation mix with the contribution of regular product insertions in shotblasting machine maximizes the effective cleaning performance.

Especially in foundries, casting parts with different geometrical shapes are generally cleaned by only one size of steel shot in a single machine. Using only one shot size makes it difficult to clean each detail of these casting parts with a different geometry at the same quality level. In order to remove this disadvantage, KOTAR products are developed using new sieve distribution always in compliance with SAE standards.

Our KOTAR products initially provide the operation mix that is needed in shotblasting machines and maintain its sieve distribution throughout the shotblasting process. In this way, coverage of a larger area on the workpiece is achieved with more shot particles in terms of unit time and unit volume. Thus, more effective and efficient cleaning is achieved on the parts with different geometries.

Our KOTAR products are tested in our shotblasting machine available at our factory under real operating conditions and they are also compared against other steel abrasives at the market through performance tests.

### Areas of Usage

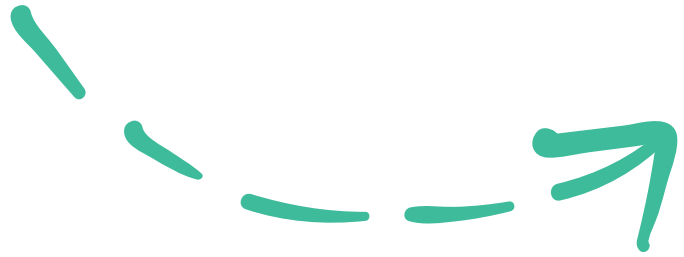
Being a Tosçelik Granül brand, KOTAR steel shot delivers an excellent performance in rust, sand and burr removal processes, surface preparation and stress relief operations thanks to its long service life and high level of hardness. It is ideal for use at foundries, steel plants, rolling mills and in machine production, steel industry, automobile, ship, airplane and structural steel industries..

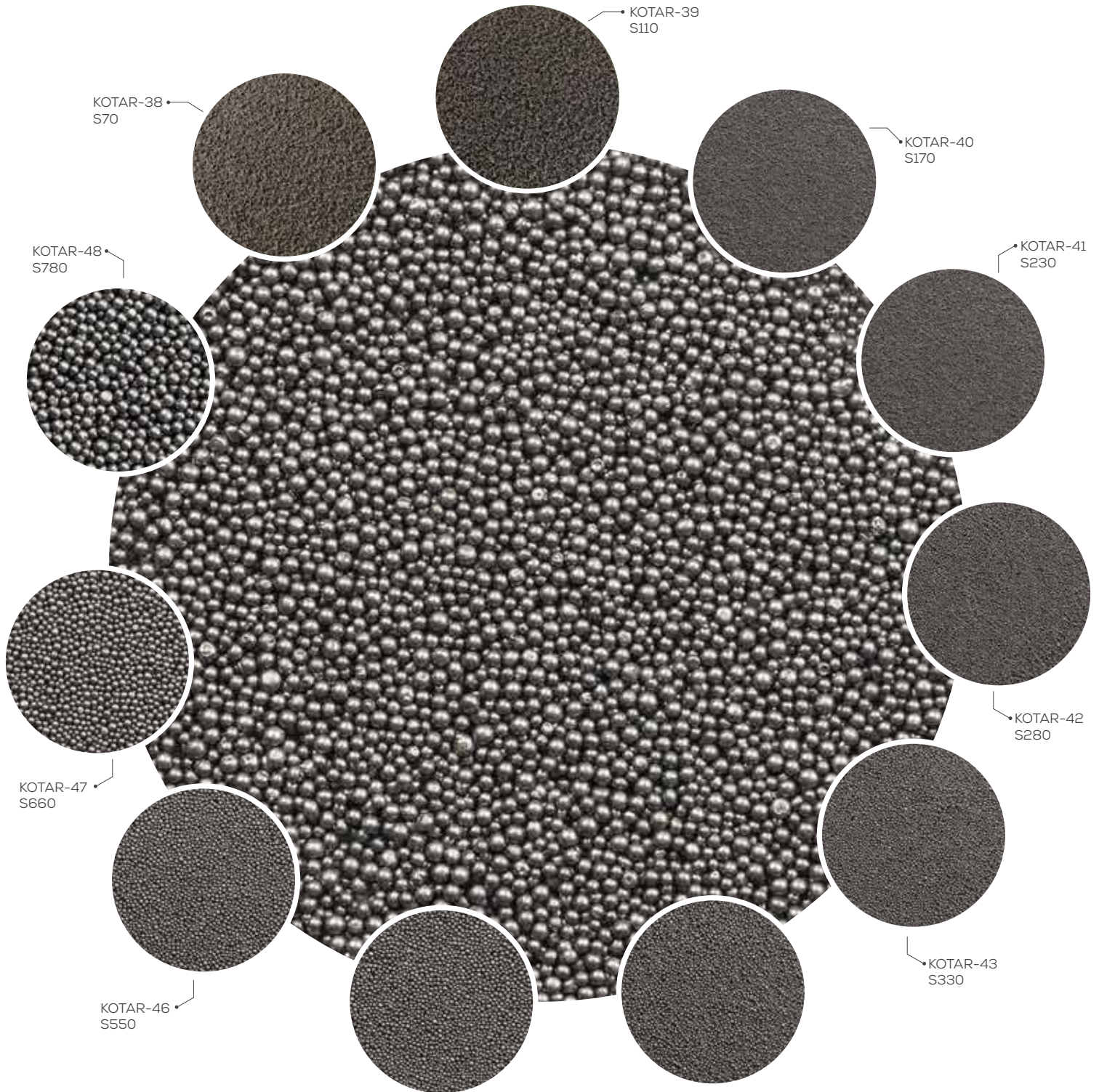
# HIGH PERFORMANCE





## Tosçelik Granül Products





## Size Distribution of KOTAR Shot



Designed with a wider sieve range in comparison with the products with standard sieve distribution, KOTAR ensures a more effective coverage on the surface of parts to be cleaned.

Parts with different geometries are generally cleaned using only one shot size in a single shotblasting machine particularly in foundries.

We developed our KOTAR products with new sieve distribution in compliance with the SAE standards for the purpose of improving cleaning efficiency by keeping the operation mix stable for a long period of time.

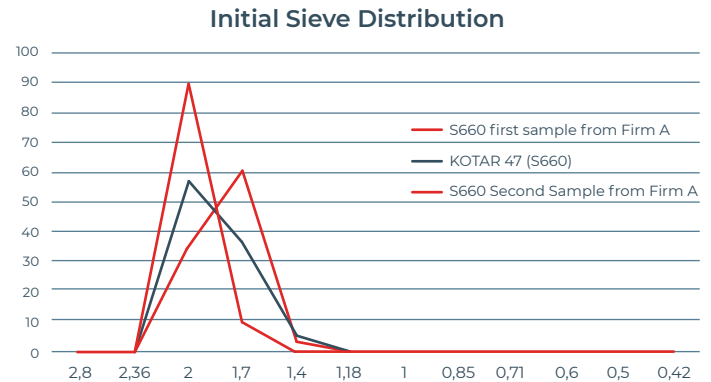
	Sieve Size												
SAE Sieve No	mm	inch	KOTAR48 S780	KOTAR47 S660	KOTAR46 S550	KOTAR45 S460	KOTAR44 S390	KOTAR43 S330	KOTAR42 S280	KOTAR41 S230	KOTAR40 S170	KOTAR39 S110	KOTAR38 S70
6	3,35	0,132	—	—	—	—	—	—	—	—	—	—	—
7	2,8	0,111	0%	—	—	—	—	—	—	—	—	—	—
8	2,36	0,094	—	0%	—	—	—	—	—	—	—	—	—
10	2,00	0,079	min 85%	—	0%	0%	—	—	—	—	—	—	—
12	1,70	0,066	min 97%	min 85%	—	max 5%	0%	—	—	—	—	—	—
14	1,40	0,056	—	min 97%	min 85%	—	max 5%	0%	—	—	—	—	—
16	1,18	0,047	—	—	min 97%	min 85%	—	max 5%	0%	—	—	—	—
18	1,00	0,039	—	—	—	min 96%	min 85%	—	max 5%	0%	—	—	—
20	0,85	0,033	—	—	—	—	min 96%	min 85%	—	max 10%	0%	—	—
25	0,71	0,028	—	—	—	—	—	min 96%	min 85%	—	max 10%	—	—
30	0,60	0,023	—	—	—	—	—	—	min 96%	min 85%	—	0%	—
35	0,50	0,0197	—	—	—	—	—	—	—	min 97%	—	max 10%	—
40	0,42	0,017	—	—	—	—	—	—	—	—	min 85%	—	0%
45	0,35	0,014	—	—	—	—	—	—	—	—	min 97%	—	max 10%
50	0,30	0,012	—	—	—	—	—	—	—	—	—	min 80%	—
80	0,18	0,007	—	—	—	—	—	—	—	—	—	min 90%	min 80%
120	0,12	0,005	—	—	—	—	—	—	—	—	—	—	min 90%
200	0,075	0,003	—	—	—	—	—	—	—	—	—	—	—



## Size Distribution of KOTAR Shot



Sieve (mm)	S660 First sample from Firm A	S660 second sample from Firm A	KOTAR 47 (S660)
2,80	0,00	0,00	0,00
2,36	0,00	0,00	0,00
2,00	35,96	89,74	57,45
1,70	60,49	9,80	36,67
1,40	3,50	0,34	5,62
1,18	0,05	0,07	0,26
1,00	0,00	0,05	0,00
0,85	0,00	0,00	0,00
0,71	0,00	0,00	0,00
0,60	0,00	0,60	0,60
0,50	0,00	0,00	0,00
0,42	0,00	0,00	0,00

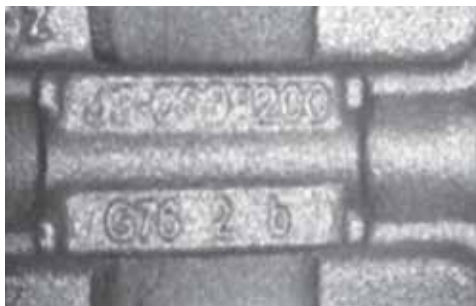


**Figure – A :** The graphics shown in the figure represent KOTAR 47 (S660) and S-660 samples produced by Firm A on different dates.

With KOTAR, we made the sieve distribution more homogenous which generally concentrated on a single sieve size still within the limits set by SAE standards (Figure – A).

In general, steel shot which is produced within the scope of SAE J444 and has the same product code can vary in itself. Final product can be packaged based on a smaller sieve or bigger sieve in different times (Figure – A). However, our KOTAR branded steel shot is produced with the broader sieve distribution still within the limits of international standards are packaged so that the product content will be homogenous.

High number of bigger shot particles in the product distribution can damage the details such as brand and writings placed on the parts during the shotblasting process whereas high number of small shot particles affect the shotblasting time and surface quality negatively. Proven after many tests and trials, having a homogenous distribution instead of concentration on a single sieve size brings the advantage of shotblasting the parts with mixed geometries at desired level, eliminates the necessity for a second shotblasting and makes the brand, writings or other indications more visible.



**Figure A :** Casting piece shotblasted with standard S-660 product



**Figure B :** Casting part shotblasted with our KOTAR 47 product



Figure 1: KOTAR

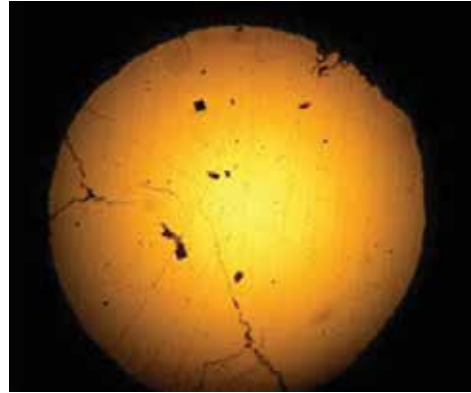
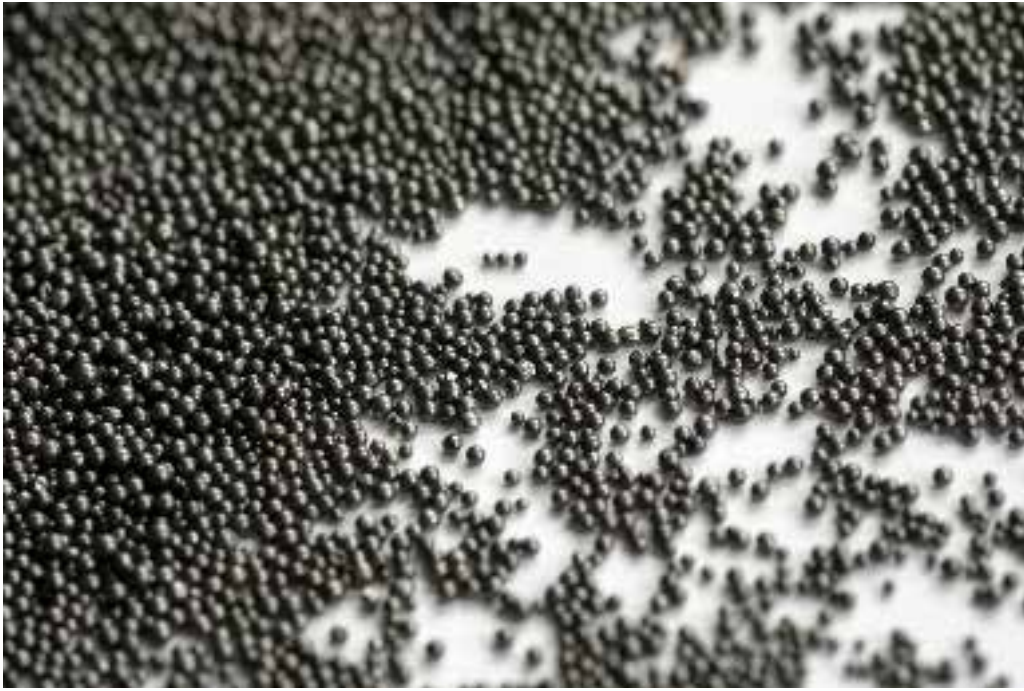


Figure 2: High Carbon Steel Shot

These images are taken under a microscope.

Feature	KOTAR	Standard Low Carbon Steel Shot	High Carbon Steel Shot
Material	Low carbon, low phosphorus, low sulphur, special alloying and specially selected scrap	Low carbon, low phosphorus, low sulphur specially selected scrap	Made from all types of scrap
Heat Treatment	No secondary heat treatment; bainitic structure, crack-free	No secondary heat treatment; bainitic structure, crack-free	Mandatory secondary heat treatment; cracks exist
Hardness (HRC)	Initial: 43–44; hardens up to 50 during operation	Initial: 40–41; hardens up to 46–47 during operation	Very high: 50+ due to martensitic structure
Shot Size Distribution	Homogeneous, optimized (fine, medium, coarse mix)	Uneven distribution	Uneven distribution
Surface Coverage	Very good – effective cleaning on all surfaces	Moderate – limited coverage, insufficient in detailed areas	Moderate – limited coverage insufficient in detailed areas
Cleaning Time	Fast -due to optimum surface coverage and hardness-	Slow -due to lower hardness-	Fast - but lower surface coverage-
Durability	Crack-resistant, long-lasting	Crack-resistant, long-lasting	Brittle, prone to breaking
Shape Retention	Maintains spherical shape, only shrinks	Maintains spherical shape, only shrinks	Hardens and becomes angular, breaks easily
Machine Wear & Maintenance Cost	Low	Low	High – causes high wear and replacement costs
Operation Mix	Offers the ideal initial mix and maintains distribution throughout the shotblasting process, ensuring stable quality on all part surfaces. Even after long use without adding new material, KOTAR retains a balanced mix of fine, medium, and coarse particles inside the machine	Due to non-homogeneous size distribution, the operational mix tends to converge to nearly a single particle size during use, requiring frequent additions of new material to maintain effective distribution.	Due to non-homogeneous size distribution, the operational mix tends to converge to nearly a single particle size during use, requiring frequent additions of new material to maintain effective distribution. It also wears out quickly, so very frequent additions are necessary.

**KOTAR** is consumed (about 20%) less than high carbon shot thanks to its longer lifetime.  
Meaning “less shot >> more outputs >> consumption of less natural resources” **KOTAR** also represents less energy consumption, less labour force use and low level of wastes.



### KOTAR - High Performance

The fact that the initial hardness of **KOTAR** products (43-44 HRC) is high and that this value can reach the level of 50 HRC during the operation ensures an obvious improvement in the cleaning performance. Standard shot might be insufficient in complete cleaning of the angular parts with variable geometries; however, we achieve the desired surface quality in the shortest period of time on the surfaces to be cleaned thanks to our **KOTAR** products which are developed with the sieve distribution that ensures the best coverage on the surface.

**KOTAR** products offer the mix that is needed in the machine at the very beginning and maintains its distribution throughout the process. The most important advantage of this for our customers is that it will ensure a stable quality of all part surfaces.

TOSÇELİK GRANÜL makes use of the scraps with optimum alloys that are obtained from its group companies in the production of KOTAR steel shot. This guarantees the sustainability of **KOTAR** quality which is largely dependent on scraps.

**KOTAR** has a high impact absorption capacity and the impact energy is evenly distributed on the shot.

Unlike high carbon shot, **KOTAR** has a longer lifetime since it does not contain micro cracks.



## Technical Specifications

## Low Carbon Steel Shot

### Chemical Composition (Molten Metal)

Carbon	: 0.10% - 0.15%
Manganese	: 1.20% - 1.50%
Silica	: 0.10% - 0.25%
Sulphur	: max 0.035%
Phosphorus	: max 0.035%

### Hardness

The hardness of KOTAR low carbon steel shot is 43-44 HRC. It starts the cleaning operation with the hardness values of 43-44 HRC and reaches the hardness values of 49-50 HRC in the machine in a short period of time.

### Density

The density should be minimum 7.0 g/cm<sup>3</sup> according to industrial standards. Density of KOTAR steel shot is minimum 7.3 g/cm<sup>3</sup>

### Microstructure

KOTAR has bainitic microstructure which ensures the combination of high hardness, long lifetime and resistance

### General View

Steel shot should be as spherical as possible. Extended, adherent, caudal and porous particles which are considered to be defective as well as broken parts and unwanted items such as slag should be at the minimum level.

### Areas of Usage

Used by foundries, steel mills, forging mills, rolling mills and machine producers that provide services with automobile, airplane, ships, structural iron and many other industries.

### Package

KOTAR steel shot is packaged in 25 kg polyethylene bags, placed on pallets so that there will be 1 ton of product on each pallet, covered with a cardboard box and shrunk. 100% recycled, environmentally-friendly materials are used in our packages. Packaging options include also bigbag and metal drum.







#### THE DIFFERENCE LEADING TO EXCELLENCE

**TOSÇELİK GRANÜL** has brought a new dimension to the surface cleaning and abrasive materials industry in terms of environment and quality thanks to its **KOTAR**.

Selection of the right raw material is one of the most critical factors in the production of high quality **KOTAR** and this is the reason of the difference offered by **TOSÇELİK GRANÜL**.

**KOTAR** has a longer lifetime because of its bainitic microstructure, is more effective and cleans fast in comparison with its high carbon equivalences.

**TOSÇELİK GRANÜL** has an energy saving and environmentally-friendly plant thanks to its production technology.

**KOTAR** >> longer lifetime >> more cleaning job with less shot >> less consumption of natural resources...





## APPRECIATION OF THE FUTURE...

Priority of KOTAR, a Tosçelik Granül brand, is to minimize carbon footprint in the nature with its sustainable characteristic.

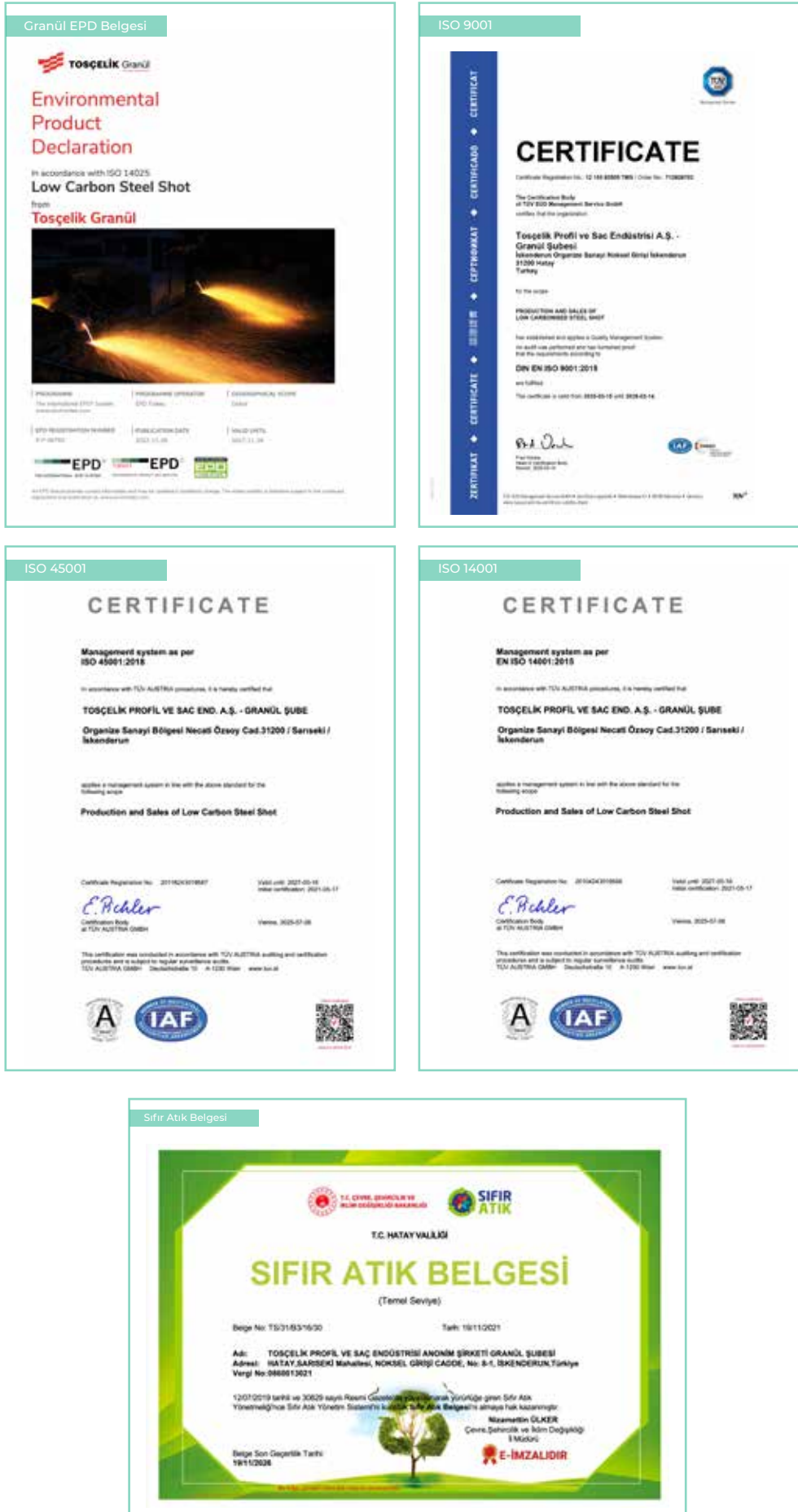
In today's world where the energy need has substantially increased, greenhouse gas emission that has increased with the use of fossil resources has irreversible negative impacts on the climate.

As Tosçelik Granül, we set the goal of 'Zero Carbon Footprint' and besides our production processes, we restructured the chemical contents of our product with the awareness of this responsibility.

We produce steel shot which is our finished product with special scraps that are regarded as a waste by many production plants with the use of the least energy as far as possible.

We allow users to perform the highest number of works with less steel shot based on the goal to minimize our carbon footprint at the time of usage.









## VISION GREEN

“

As Tostyalı, our vision is to contribute to building a sustainable world via ensuring environmentally production in our facilities, with the help of technology, innovation and renewable energy usage. Within our responsible ecosystem management approach, we produce green steel products in every category of the steel. We produce **less carbon emission, consume less water, focus on renewable energy resources, produce with highest efficiency and recycle all our wastes.**

We believe that a sustainable world is possible with the green transformation of the steel industry.

**Fuat Tostyalı**  
Chairman of the Board  
of Directors of Tostyalı Holding

”

Tostyalı proudly presents a new umbrella brand to represent its green steel vision in every touch point of its operations.

### Tostyalı V-Green

This is not just a brand, it is also the strongest indicator of sustainability actions those have been taking place for many years at Tostyalı and will continue by highest determination.

In all our production facilities, we focus on new generation green steel production and under the umbrella of V-Green, we introduce environment friendly products for our suppliers.

#### How we are making this vision live in Tostyalı?

We produce green steel with the help of;

- technology usage,
- innovation,
- renewable energy resources,
- recycling in every touch point production and
- operating with highest efficiency.

We aim to be the world's leading sustainable green steel producer with the lowest carbon footprint.

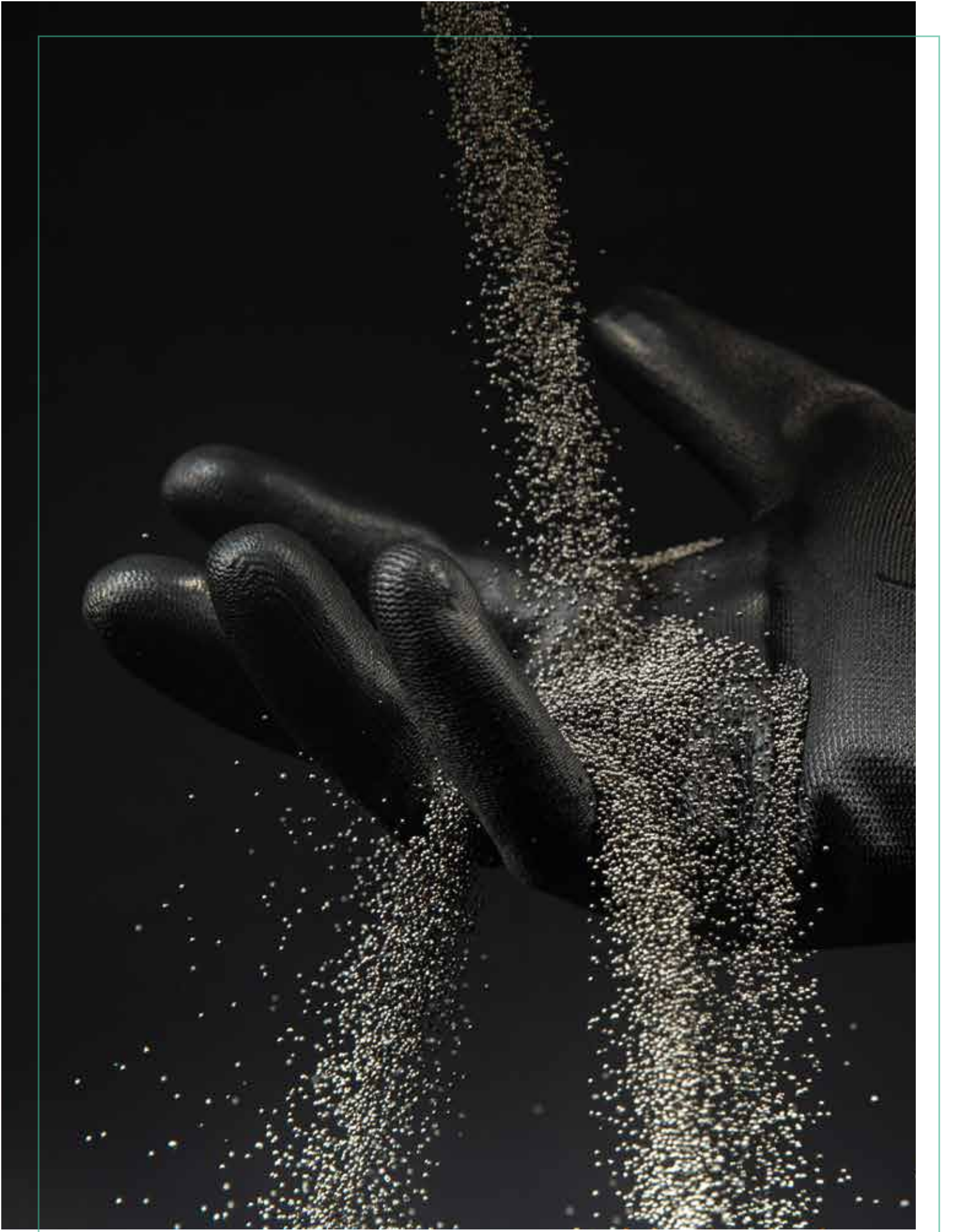
“

“V” are ready to be “Green”!

V-Green.  
Vision Green.







**TOSÇELİK** Granül





**TOSÇELİK** Granül



**TOSÇELİK** Granül

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