

isovac®

ELECTRICAL STEEL FOR E-MOBILITY

Shape the future –
with isovac® by voestalpine



voestalpine Steel Division
www.voestalpine.com/isovac

voestalpine

ONE STEP AHEAD.

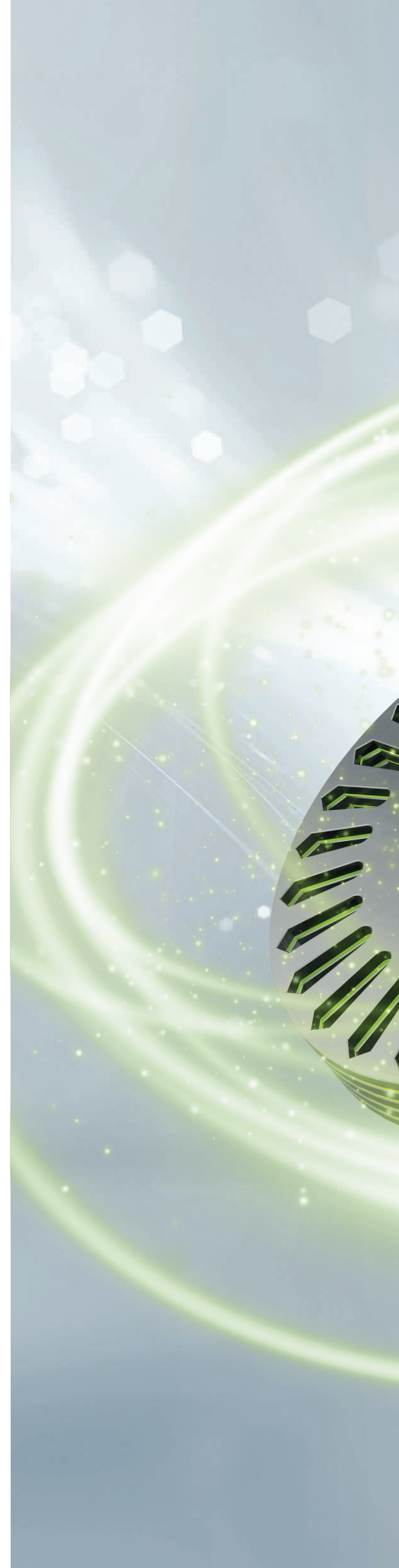


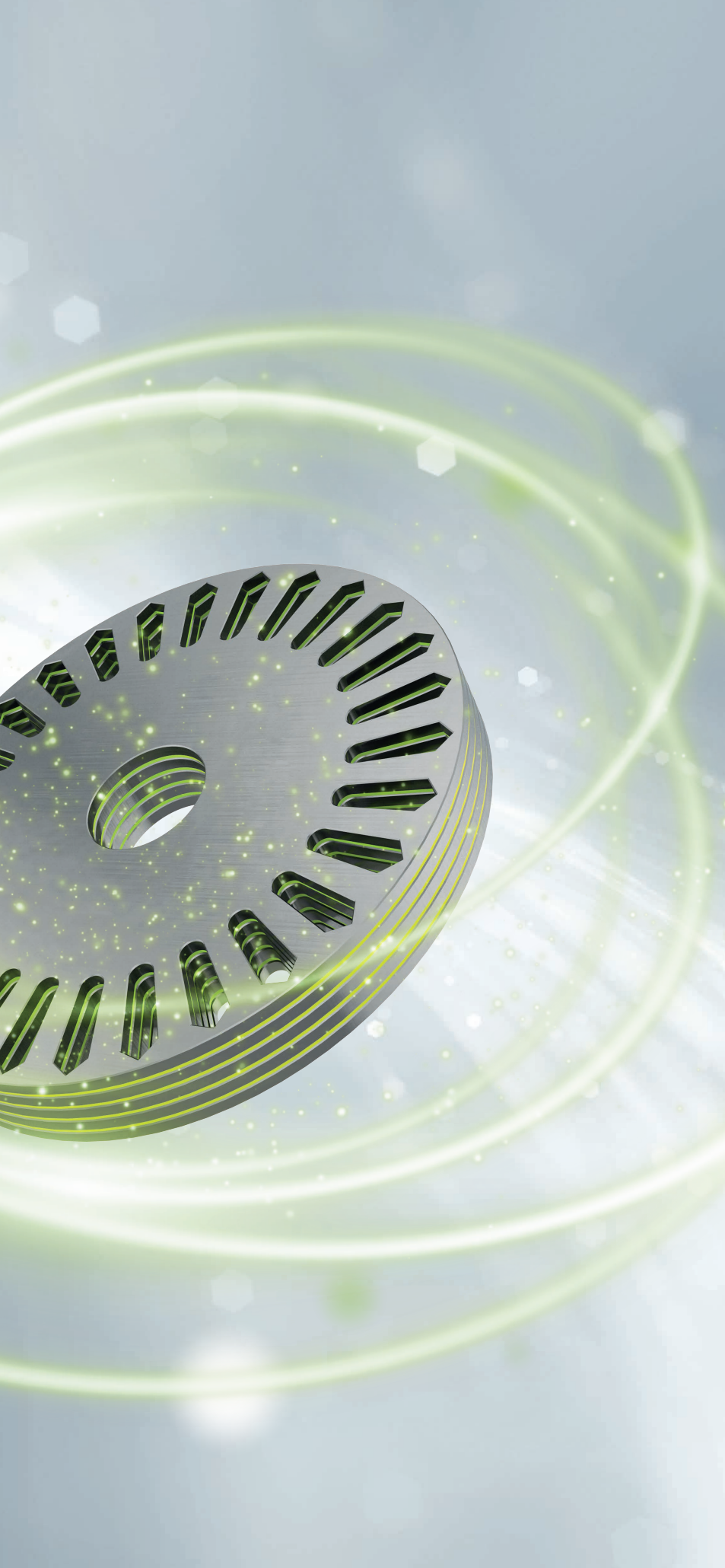
isovac®

MORE THAN JUST ELECTRICAL STEEL

Electrify Tomorrow

Successful drive systems are one idea ahead of the competition, one idea faster, one idea more frugal, one idea more environmentally compatible and one idea more efficient. Customized solutions are indispensable in a dynamic market marked by a wide variety of individual demands. With respect to compact engine design and high efficiency, we have just the product for each customer. isovac® is our non-grain-oriented electrical steel and stands for the highest energy efficiency in electromobility.

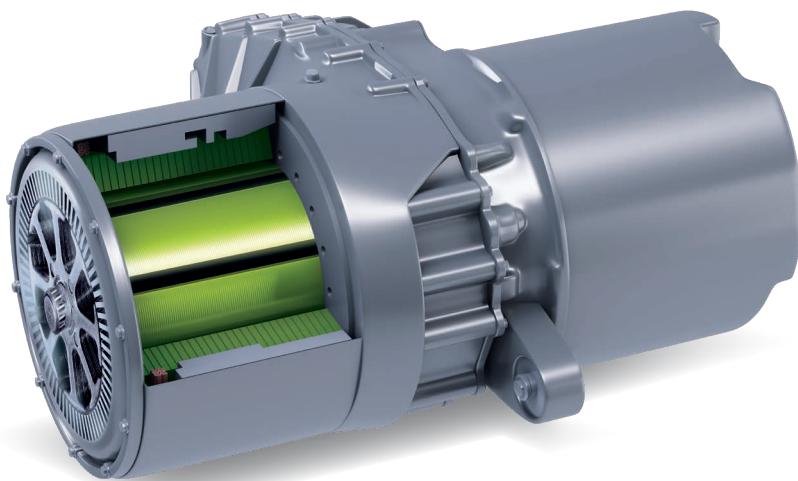




To find out more about isovac®
visit us on our website at
www.voestalpine.com/isovac/en

SEE FOR YOUR- SELF WHAT isovac® CAN DO!

Tailored solutions for
individual demands



isovac® grades can be used in a wide variety of applications. Companies who provide their customers with the highest quality standards must also monitor their partners for best performance. We set new standards with isovac®, an innovative electrical steel with excellent properties that lead to high performance and unsurpassed sustainability.

On the following pages you will find out more about isovac®, our electrical steel for electric mobility. Discover what added value it can bring to your business in the following fields of application.

- » Cars
- » Delivery trucks
- » Buses
- » Bicycles
- » Motor scooters
- » Trains
- » Airplanes
- » Aircraft tugs



100% Performance



100% Green Power



0% Troubles

isovac[®]

PRODUCT RANGE

For a wide range of requirements, especially for e-mobility . Electromobility is an industrial sector that is growing dynamically worldwide and is marked by high individual demands with respect to efficiency and performance. With isovac[®], we fulfill the demands of high permeability, low loss, high strength and quick development cycles for electrical and hybrid technologies.

NO

isovac[®] NO – The specialist for electromobility

The alloy design of isovac[®] NO grades, its high-precision microstructure and its sheet thickness of ≤ 0.35 mm make it especially suitable for applications in the high-frequency range and for motors with high rotational speeds. isovac[®] NO grades strike an optimized balance between magnetic and mechanical properties, making new structural designs possible in the automotive industry

- » Reduced energy consumption when used in motors with highest rotational speeds
- » High strengths while maintaining low losses make the material highly suitable for rotors and stators.
- » Coatings with innovative electrical steel insulation systems upon request: Predestined for use in combination with Backlack

HP

isovac[®] high-perm – The specialist with the highest permeability

The optimum adjustment of textures increases magnetizability and reduces core losses. This increase in efficiency makes it possible to maintain the same level of performance while reducing component size and saving material, weight and costs. This means that a higher level of performance can be achieved with the same component size.

- » Increased performance achieved by increasing torque based on higher magnetizability
- » Cost optimization through less material usage, less weight and less space requirement resulting from downsizing while maintaining the same level of performance.

HF
isovac® high-frequency – The specialist for high frequencies

The use of isovac® HF (high-frequency) grades guarantees optimum utilization of machinery at higher frequencies. High-precision adjustment of the microstructure and adaptation of the alloy content make it possible to keep losses low in the high-frequency range.

- » Application in fast-turning machines with low core loss at high rotational speeds.
- » Greater freedom of design and motor size optimization based on higher strengths

HS
isovac® high-strength – The specialist for high mechanical requirements

Both magnetic and mechanical properties play an important role in many modern high-speed motors or large electric machinery. The electrical steel in the rotor is especially subject to high mechanical stress, which requires the use of high-strength material. isovac® HS (high-strength) grades combine good magnetic properties with high strengths. We can supply the kind of material our customer requires.

Our isovac® HS grades can be customized for higher strength and a higher degree of core compactness with highly innovative Backlack.

- » Reduced air gap between rotor and stator as a result of higher strength or reduced rotor ridge widths in permanent synchronous motors
- » Larger freedom of design in electric machinery
- » Possibility of partial subsequent annealing treatment in order to improve magnetic properties, e.g. in the stator

Selected grades for your e-mobility		Core loss at 400 Hz ¹⁾ 1.0 T / P10 [W/kg]	0.2%-Yield strength R _{p0.2} [MPa]
HP	isovac HP NO30-15	13.2	425 ²⁾
	isovac HP NO30-19	14.0	320 ²⁾
HS	isovac NO35-22 HS	18.0	490
	isovac NO35-26 HS	24.0	530
HP	isovac HP 210-35 A	15.2	430 ³⁾
	isovac HP 235-35 A	15.8	445 ³⁾
	isovac HP 250-35 A	17.6	340 ³⁾
	isovac HP 270-35 A	18.7	360 ³⁾
	isovac HP 330-35 A	21.8	280 ³⁾
HF	isovac 330-35 A HF	19.1	370

1) Magnetic sample direction: longitudinal + transverse, typical values (single-sheet measurement)






2) Mechanical sample direction: Longitudinal, typical values

3) Mechanical sample direction: Transverse, typical values

isovac®

RANGE OF SUPPLY

As individual as the customer. Our isovac® product range includes conventional international standards as well as special grades with special properties. Customer-specific widths and thicknesses can be quickly produced and supplied without any complications with the help of our integrated production process and high-performance logistics. Supply possibilities depend on the steel-grade-specific dimension limits.

isovac®		 Wide coil (non-slit)	 Slit strip (slit)	 Cut-to-length sheets	Insulating varnishes	
					C-5	Backlack
Thickness	[mm]	0.3–1.0	0.3–1.0	0.3–1.0		
Width	[mm]	1,000–1,600	19–1,600	300–1,550		
Length	[mm]			300–5,000		
Inner diameter	[mm]	approx. 600	508 or 610			
Outer diameter	[mm]	max. 2,000	max. 1,900			

Indicated values are standard references. Limitations are possible depending on thickness.



Note

Our electrical steel is generally supplied pursuant to the conventional standards (EN 10106, EN 10303, IEC 404-8-4, JIS C2552, GOST 21427.2, ASTM A677, AISI, IS 648, GB/T2521). The precise limit dimensions available for each grade are found in the respective data sheet.



Technical consultation

Do you have special requirements? Our technical experts will be happy to assist you with all of your concerns and work with you in developing customized solutions.

INSULATING VARNISH SYSTEMS

Additional treatment to extend the functionality of our electrical steel. We offer the highest quality in our insulating varnish systems. In close cooperation with leading European varnish producers, we supply insulating varnishes that meet specific customer requirements. The varnishes do not contain any toxic, carcinogenic or mutagenic substances.

C-5

Inorganic/organic
insulating varnish
system

Backlack for efficiency in electrical steel packages

Best weldability and
resistance to annealing
(under protective gas up to
850 °C).
Excellent suitability for
pressure die casting.

Backlack technology is an innovative joining technique used in the production of electrical steel packages. A controlled chemical process is used to cleanly and compactly join coated laminations. The technology is characterized by a number of efficiency and processing advantages when compared to conventional joining techniques.



Especially suited to
e-mobility applications.



Our recommendation for the highest demands in e-mobility applications.

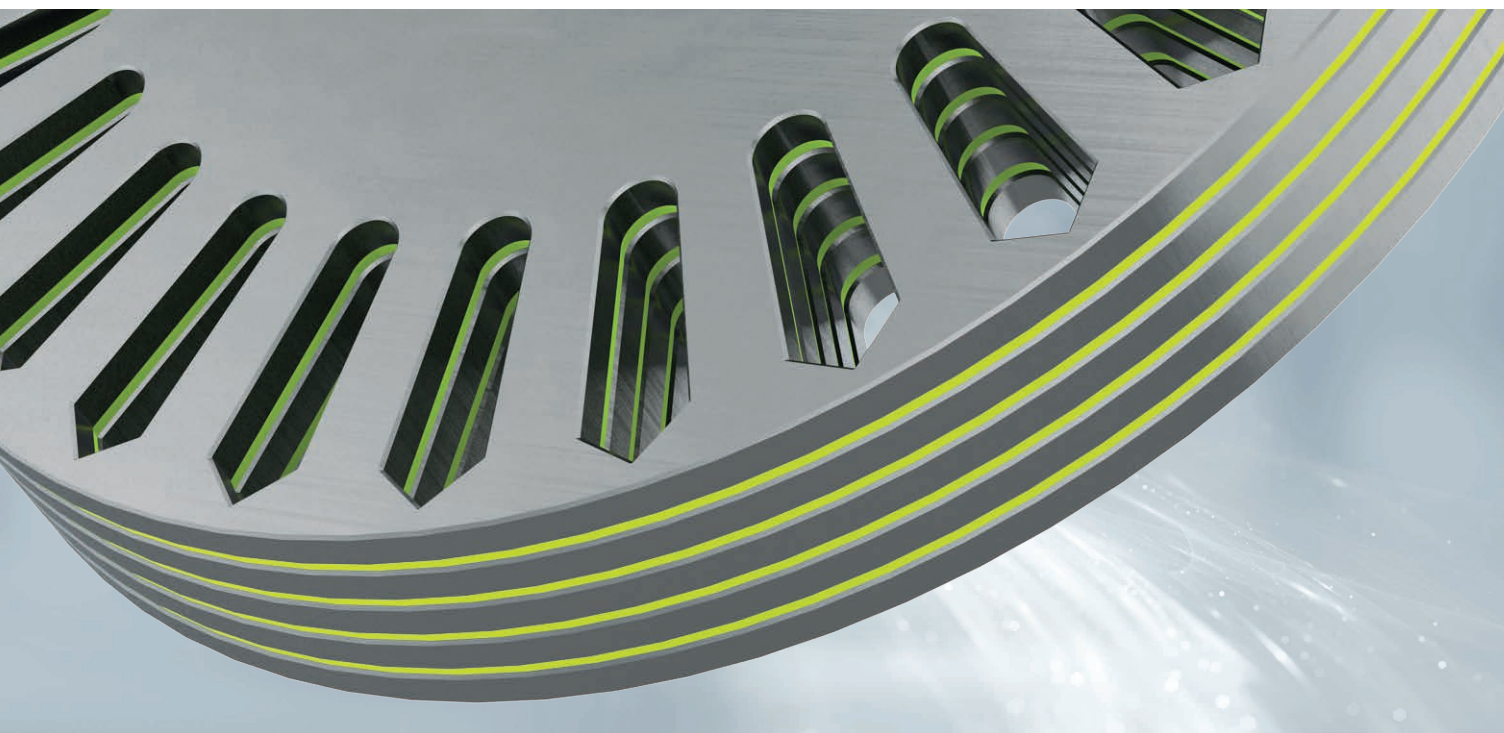
See the isovac® data sheets
for further information

www.voestalpine.com/isovac/en/Download/Datasheets



100% Green Power

We offer insulating varnish systems free from chromium and formaldehyde. We guarantee freedom from chromium using our new high-resolution and quantitative verification method for electrical steel insulation systems. We comply with all pertinent EU directives (RoHS Directive 2011/65/EC).



100% Performance



100% Green Power



0% Troubles



MORE THAN JUST CUSTOMER SOLUTIONS

Our electrical steel grades are produced in the steelmaking plant based on the individual order placed by the end customer. This makes it possible to implement and monitor customer-specific specifications in the early stages and to guarantee the continuously high quality of our electrical steel.

Customer-specific process assistance

- » Pre-production consultation with respect to specifications
- » Comprehensive chemical analysis in an effort to reduce fluctuations in alloying elements
- » Testing of material properties in as-delivered condition based on customer specifications in an accredited testing laboratory

Continuous process monitoring

- » Permanent, comprehensive monitoring of parameters in all production lines
- » Permanent measurement of strip dimensions
- » Automated and manual surface inspections

Most modern plant engineering

- » New plant systems for higher standards in the production process
- » Regular maintenance and modernization of existing plant systems

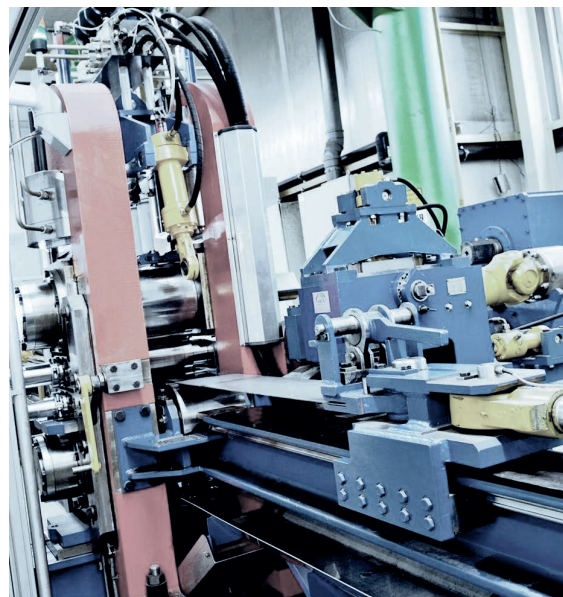
Highly qualified employees

- » Product-specific expert knowledge
- » Employees with many years of experience with the production process
- » Regular continuous education and training
- » Continuous safety training

RESEARCH & DEVELOPMENT

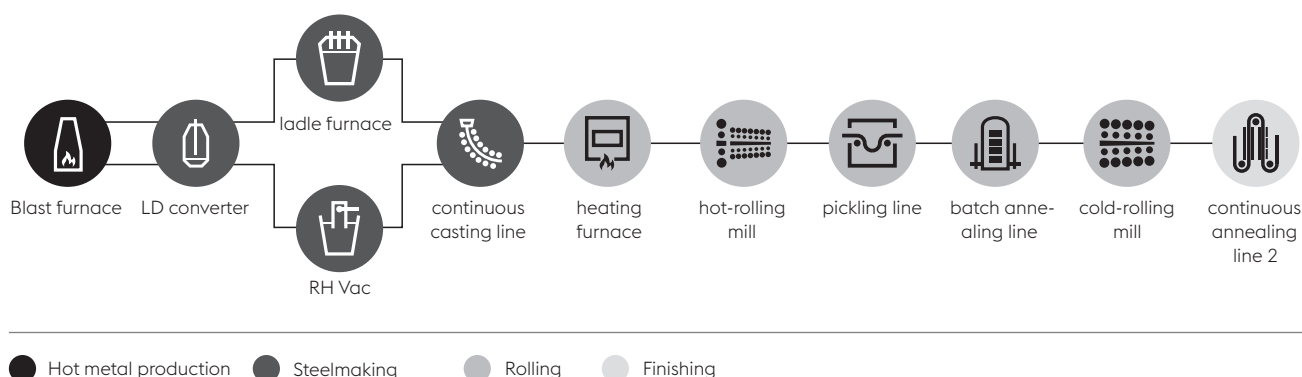
Partnerships for maximized output

Intense development, research partnerships with university organizations and market-leading car manufacturers and the most modern technologies make us one of the Europe's centers of competence for non-grain-oriented electrical steel. Industry-specific material and processing expertise, specific tests and simulations guarantee our excellent product quality.



Maximized output thanks to steelwork simulations

Customer requests can be processed and individual isovac® grades produced within a short period of time thanks to steelwork simulations. This shortens development times.



CLOSE TO THE CUSTOMER ANYWHERE IN THE WORLD

Customized and personal. With a total of 500 subsidiaries and locations in more than 50 countries, we are represented on all five continents of the world and are a global player whose highest priority is to provide personal, individualized and highly professional customer service on a local basis.

A proven track record when it comes to quality

The companies of the voestalpine Steel Division meet the highest standards of quality management and are certified pursuant to Lloyd's Register QA Ltd. in the United Kingdom as well as ISO 9001 and ISO 16949. Our high standard of quality is also underlined by numerous best supplier awards for quality performance, including awards presented to voestalpine by renowned automotive manufacturers. We focus continually on this pursued path as well as on the consistent implementation of all our quality standards.

A TOTAL OF 25 voestalpine SALES
AND DISTRIBUTION LOCATIONS
ARE AT YOUR DISPOSAL.

www.voestalpine.com/eurostahl





100% Performance



100% Green Power



0% Troubles



Please find more detailed information here
www.voestalpine.com/isovac/en/Info/International-sales





ELECTRIFY TOMORROW 100% PERFORMANCE

Are you ready for the package deal?

isovac® electrical steel for highest energy efficiency. We combine isovac® with our unique services, innovative materials, logistics, commercial advice and technical consultation in order to provide you with a comprehensive package of benefits.

BEST PRODUCT PROPERTIES FOR MAXIMUM PERFORMANCE

HIGHEST ENERGY EFFICIENCY
THANKS TO INTENSE RESEARCH
AND DEVELOPMENT



Maximum performance

Low eddy-current and hysteresis losses in electrical steel is of decisive importance in order to be able to efficiently utilize the energy used in the operation of electrical machinery. The most modern production facilities guarantee the production of electrical steel for the highest performance of electrical machinery.



Customized product properties

The exclusive manufacturing of prematerial in our integrated metallurgical facilities makes it possible for us to unceasingly monitor and ensure the high quality of all processing parameters. This results in a tailor-made product that meets the highest quality standards.



High magnetic polarization and permeability

Magnetic polarization and permeability are essential values in the engineering of electric machinery. Only high induction allows efficient utilization of available energies.



Material homogeneity

High process reliability and low tolerances through continuous rolling and annealing processes guarantee homogeneous material in the interest of mechanical, magnetic and geometric properties. This leads to stable material processing, low tool wear, less scrap accumulation and rejects as well as high dimensional accuracy of the stamped part.



High thermal conductivity

High thermal conductivity permits further optimization of performance. The innovative alloy design and the high chemical degree of purity of isovac® grades significantly increases thermal conductivity.



100% Performance



100% Green Power



0% Troubles



ELECTRIFY TOMORROW 100% GREEN POWER

Are you ready for a green future?

The question of sustainable conservation of resources can only be whether our world will be a livable place tomorrow. Set a new standard with our innovative isovac® electrical steel and contribute to a more sustainable and environmentally compatible future.

OUR WORLD WILL BE A **LIVABLE PLACE** TOMORROW

SUSTAINABILITY AS A
STRATEGIC PRINCIPLE



100% recyclability

Our isovac® electrical steel is 100% recyclable. When calculating costs across the entire product lifecycle, steel shows substantial advantages in eco-balance when compared to other materials.



Lowest emissions

Our optimized production processes guarantee the lowest emissions. This reduces the environmental impact and sustainably increases the quality of life for future generations.



Recycled materials

67% of all incurred recycling materials and wastes are returned to the production process. This recycling process requires few natural resources and minimizes waste.



Free from chromium and formaldehyde

In collaboration with leading European varnish manufacturers, we supply insulating varnishes that contain no toxins, carcinogens, mutagens, formaldehyde or chromium compounds. The coatings meet all applicable EU directives.



Low energy consumption

Intelligent utilization of released energy and optimized selection of process parameters in the production of isovac® leads to substantially lower overall energy consumption than in conventional manufacturing processes.



Most ecological steelmaking plant in the world

We assume holistic responsibility for our products, continually optimize our production processes and develop our environmental management systems. We see environmental protection as the responsibility of each employee.



100% Green Power



0% Troubles



ELECTRIFY TOMORROW 0% TROUBLES

Are you ready for a careless package deal?

We will never be satisfied with excellent product quality alone. Comprehensive services and unlimited dedication to your challenges are at the core of our philosophy.

WE THINK IN TERMS OF SOLUTIONS

THE FOUNDATION OF OUR
PARTNERSHIP IS BASED ON
SOLUTIONS.



Development advantages

Our experience and continued research activities make it possible for us to develop innovative steel grades that help you more effectively meet your challenges in the future and provide you with a decisive competitive advantage.



Technical consultation and support

Our experts will support you with their excellent knowledge of the industry and materials and will be pleased to answer your questions. They guarantee comprehensive technical consultation pertaining to materials and applications.



Always close to you

Our international sales organization creates a direct connection between the customer and the production companies. Our sales organizations and representatives guarantee worldwide best consultation and expert solutions from a single source.



Precisely tailored to your needs

Each of the plants required for the production of high-quality steel strip is located in our modern steel works next to related facilities and is highly integrated into the production process. This makes it possible for us to react quickly and personally to your specific product requirements and to provide you with customized solutions.



Supply-chain management and logistics

We work together with you to devise the most optimized route, the best means of transport and, where necessary, comprehensive logistics strategies in order to guarantee availability and on-time delivery at the desired destination.



Process support

We support you throughout the entire process from placement of the order to delivery of the material. Whether it be in annealing trials, the adjustment of a stamping tool or assistance in making the transition to a new grade, our highly professional employees offer their expertise to you each step of the way.

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0% Troubles

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ONE STEP AHEAD.