

# STEEL STRIP FOR THE HOUSEHOLD-APPLI- ANCE INDUSTRY

Your partner for innovative solutions



Christoph Angeli, Customer service

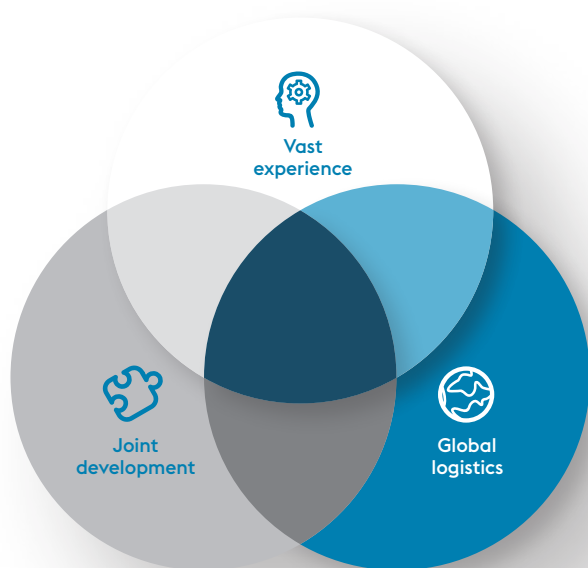
voestalpine Steel Division  
[www.voestalpine.com/steel](http://www.voestalpine.com/steel)

voestalpine

ONE STEP AHEAD.

# WE GIVE OUR ALL FOR A PERFECT HOUSEHOLD APPLIANCE

Your partner for innovative solutions



**More than just the mere sum of the individual parts.** voestalpine is a central supplier to various household appliance manufacturers renowned throughout the world. **Vast experience** stands for unique expertise accumulated for more than 60 years and found in our end products, manufacturing technologies and the household-appliance industry. **Joint development** stands for the ability of voestalpine as one of the most innovative and research-intensive companies in the steel industry to set new industry standards in collaboration with our customers. **Global logistics** is synonymous with reliable and globally active logistics. You will learn more from the following pages about our unique product range!





Find out more about our solutions for the household-appliance industry by visiting us at [www.voestalpine.com/stahl/en/Segments](http://www.voestalpine.com/stahl/en/Segments)



Vast experience



Joint development



Global Logistics

# SEE FOR YOURSELF WHAT OUR PRODUCTS CAN DO!

Steel strip for the household-appliance industry



**The household-appliance industry has always been a market segment of strategic relevance to voestalpine.** Many renowned manufacturers have enjoyed much more than a sixty-year partnership with voestalpine. Highly skilled technical and market experts at voestalpine continue to work very closely with customers on high-quality and efficient solutions that are setting the market standards of tomorrow. Sophisticated service and logistics solutions are combined with a highly professional overall package that has proven to be effective for many manufacturers. Convince yourself!

voestalpine supplies solutions to the following areas in the household-appliance industry:

- » Dishwashing
- » Laundry
- » Cooling
- » Drying
- » Cooking



 Vast experience

 Joint development

 Global Logistics

# PRODUCT OVERVIEW



## MAIN PRODUCTS

### Highest-quality steel strip and heavy plate. Wide range of processing options

#### **colofer®**

##### **Organic-coated steel strip**

colofer® HOME, the organic-pre-coated steel strip for the household-appliance industry, optimally meets individualized customer requirements with perfect surface properties. Our products have been completely free from chromate since 1998.

#### **isovac®**

##### **Electrical steel strip**

As a European market leader, voestalpine has just the right product for every customer that requires non-grain-oriented electrical steel. The range of products includes fully processed and semi-processed electrical steel strip.

#### **corrender**

##### **Hot-dip galvanized steel strip**

The range of products includes classical hot-dip galvanized steel strip (Z), hot-dip galvanized steel strip Galvannealed with a zinc-iron coating (ZF) and corrender (ZM) hot-dip galvanized steel strip with a zinc-magnesium-aluminum coating.

#### **Electrogalvanized steel strip**

The product spectrum of electrogalvanized steel strip ranges from ultra-mild to ultra-high-strength steel grades. Electrogalvanized steel strip can be zinc-coated on one or both sides.

#### **Enamenable steel strip**

The special chemical composition permits fields of application ranging from simple structural components to complex pressed parts that meet the highest forming requirements. Enamenable steel strip is available in hot-rolled or cold-rolled condition.

#### **Cold-rolled steel strip**

Cold-rolled steel strip made by voestalpine feature best surface quality, excellent processability and a high level of consistency in mechanical properties.

#### **Hot-rolled steel strip**

Hot-rolled steels are supplied in a wide range of grades and qualities. A variety of alloys and rolling programs provide our customers with just the right steel for their specific applications.

---

#### OUR BRANDS

**colofer®**  
**isovac®**  
**corrender**



## ADDITIONAL TREATMENTS

### Extension of functionality of main products

#### **multiface®**

##### **Anti-fingerprint system**

multiface® is a multifunctional, nearly invisible protective coating with excellent anti-fingerprint properties.

#### **direct-e®**

##### **Directly enamelable forming coating**

Cold-rolled steels for enameling made by voestalpine in combination with direct-e® make it possible to apply enamel directly following the forming process.

#### **Forming aids**

Forming coatings made by voestalpine provide a thin and transparent surface layer, excellent lubrication and forming properties while simultaneously providing a high level of temporary corrosion protection.

---

### OUR BRANDS

**multiface®**  
**direct-e®**



## FURTHER PROCESSING

### Wide range of processing options

#### **Slit strip**

Our three ultra-modern slitting lines produce high-quality slit strip precisely to customer specification. The continuous technical and qualitative further development of our production lines forms the foundation for perfect final products.

#### **Cut sheets**

State-of-the-art multi-blanking lines precisely cut sheets with various surface finishes to dimensions specified by the customer.



## MAIN PRODUCTS

# MORE THAN JUST ORGANIC-COATED STEEL STRIP

colofer® is an inspiring product that creates added value for customers, which translates into superior quality and performance along the entire value chain. Continual research and further development, inline quality control and optimized production systems ensure that voestalpine provides only the best product quality to its customers. The colofer® production facilities have been free of chromates since 1998, long before the RoHS directive came into effect.

Competent technical specialists have been working closely together since 1992 with renowned household-appliance manufacturers and can point to numerous success stories. Our Steel Service Center will be happy to provide you with support with comprehensive possibilities of further processing, for example of slit strip or cut sheets. colofer® HOME provides unique solutions and sets new standards in the field of household appliances, and voestalpine is your reliable partner.

### colofer® HOME is available with the following substrates:

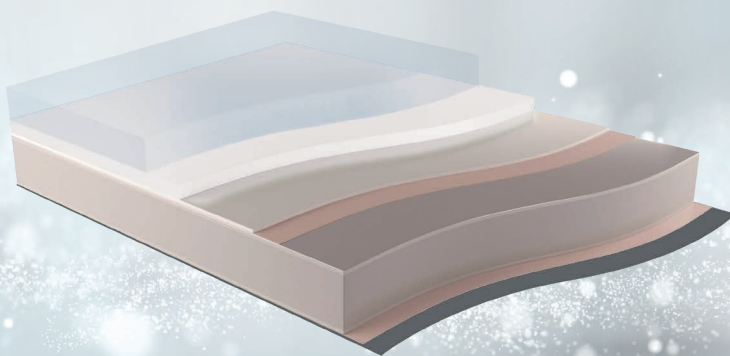
- » Cold-rolled steel strip
- » Electrogalvanized steel strip
- » Hot-dip galvanized steel strip

### The advantages of colofer® as compared to powder coating technology

- » Availability of various designs
- » Flexible support amidst changing requirements, avoidance of bottlenecks
- » Compliance with RoHs regulations, REACH requirements and environmental management standards
- » Excellent corrosion resistance
- » Logistics simplified through bundling of all required steel products
- » Flexibility in meeting requirements such as new dimensions, components or product series



Our **technical support** consists of a large pool of experts who will be happy to assist you with all your inquiries.



- Protective film
- Cover coat
- Primer
- Pre-treatment
- Protective metallic coating
- Substrate
- Bottom-side coating





**colofer® HOME CLASSIC**  
Classical design in white.

In the areas of washing, refrigerating, drying or cooking, colofer® HOME CLASSIC is convincing in every application with continuously high product quality and can be adapted precisely to individual customer requirements in shades of white, degrees of gloss and many other details. You can choose between smooth and structured surfaces.



**colofer® HOME COLOR**  
Cool design shows its colors.

Individuality through subtle color accents! colofer® HOME COLOR offers you an extremely wide range of standard and metallic colors that can be used to differentiate yourself from the competition and give a very personal touch to your final products. colofer® HOME COLOR is available in various colors and gloss levels.



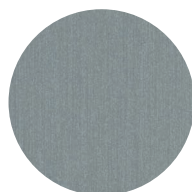
**colofer® HOME SILVER**  
Diversity in glittering silver.

Trendy and timeless are not contradictory terms! colofer® HOME SILVER provides a highly modern design and elegant appearance. With a nearly inexhaustible selection of various silver shades, colofer® HOME SILVER makes it possible to meet the most individual customer requirements.



**colofer® HOME ILLUSION**  
Phantasy knows no bounds.

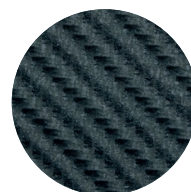
Impressively genuine! A wide variety of different surfaces are made impressively true to life by colofer® HOME ILLUSION, for example stainless steel, brushed aluminum or carbon. At the same time, the product is highly flexible in function and boasts the highest levels of material quality.



Stainless steel



Aluminum



Carbon

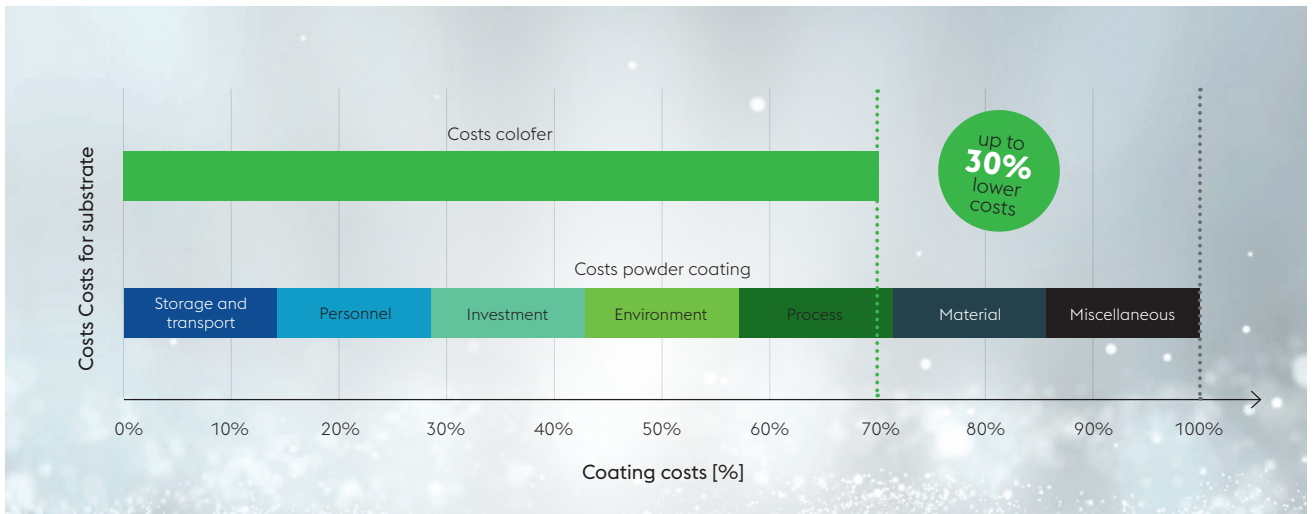


# MAIN PRODUCTS

## colofer® OR POWDER COATING? COST ADVANTAGES OF UP TO 30%

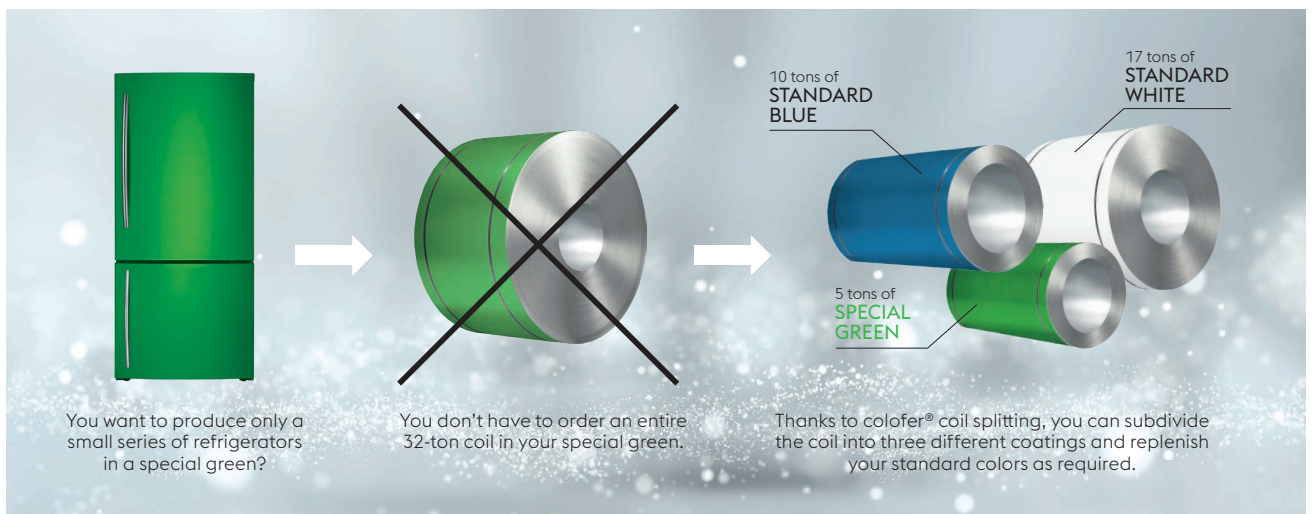
**With colofer®, you not only increase quality, you also save costs!**

Analyses show potential savings of up to 30%.



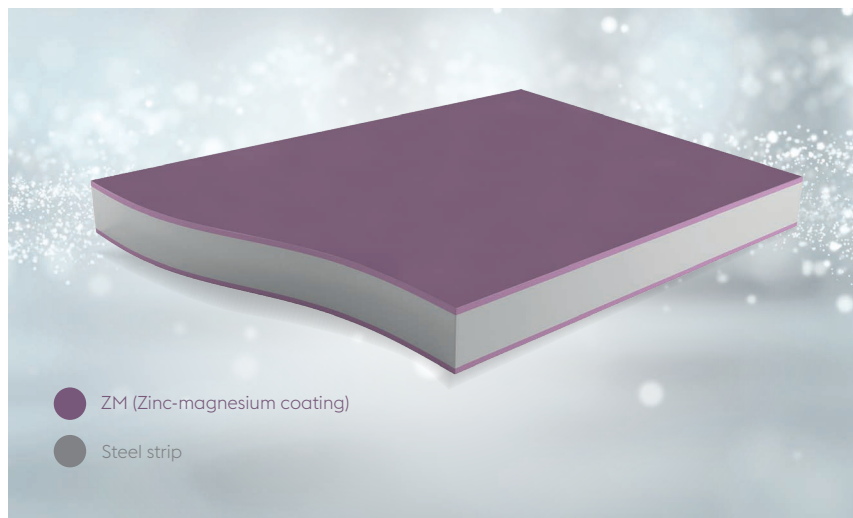
## colofer® COILSPLITTING: UP TO THREE COATINGS PER COIL

**Flexible and aesthetic like no other product!** Did you know that thanks to colofer® coil splitting almost all desired colors can be displayed, even in small quantities? This makes colofer® HOME an ideal choice when it comes to design and flexibility.



# corrender – HOT-DIP GALVANIZED STEEL STRIP WITH ZINC-MAGNESIUM COATING

**Not visible, but of enormous importance.** corrender is the next step in the evolution of hot-dip coated products. A powerful protective layer with numerous advantages is created through alloying small amounts of magnesium and aluminum in the zinc bath. The coating has numerous advantages in processing.

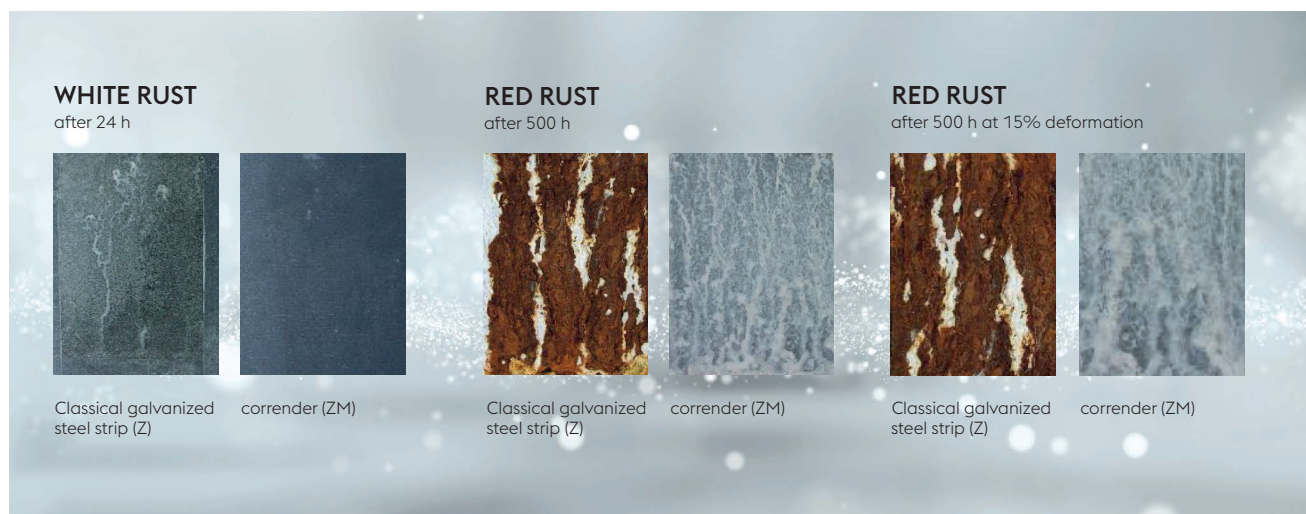


- » Outstanding protection
- » Reduced coating layer thickness
- » Lower zinc abrasion
- » Larger processing window during deep drawing.
- » Reduction of forming aids
- » Energy savings
- » Lower noise level
- » Reduced abrasion in component manufacturing
- » No process changes



Our **technical support** consists of a large pool of experts who will be happy to assist you with all your inquiries.

## CONVINCING RESULTS IN THE SALT SPRAY TEST





## MAIN PRODUCTS

# isovac® – ELECTRICAL STEEL ELECTRIFY TOMORROW

Energy efficiency is the decisive success factor of the future. Electrical steel of the highest is required for the production of household electrical appliances with the highest degree of efficiency. Make your dreams come true with innovative isovac® electrical steel made by voestalpine for household appliances that meet the highest standards.

Because of its excellent property profile, isovac is a leading product worldwide in the field of semi-finished and full-finished grades.

- » Material homogeneity
- » High magnetic polarization and permeability
- » Customized product properties
- » Coatings free of chromium and formaldehyde
- » Backlack technology
- » Technical consultation and support



Our **technical support** consists of a large pool of experts who will be happy to assist you with all your inquiries.

### isovac®

semi-finished

standard

high-perm

HE

high-efficiency

CRML

full-finished

standard

high-perm

HS

high-strength

HC

high-conductivity

HF

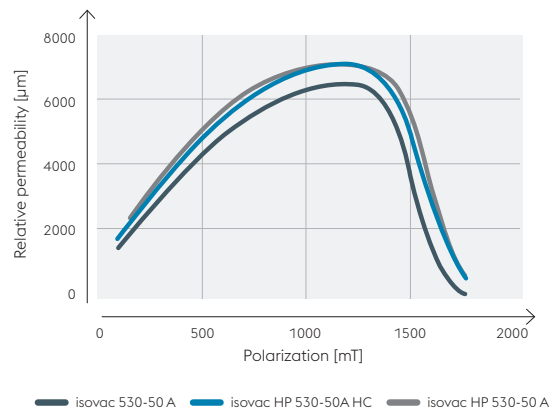
high-frequency

insulating varnish

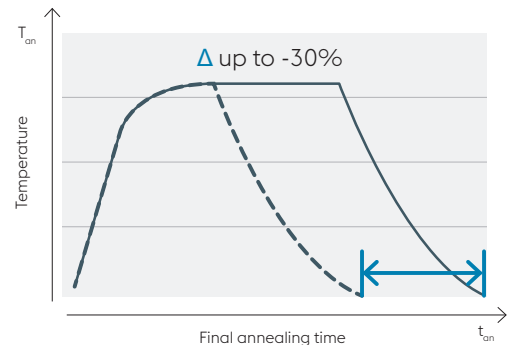
# isovac® PRODUCT SPECTRUM COST SAVINGS THROUGH INNOVATION

With isovac®, in combination with our unique services, we offer you the best overall package of innovative materials. isovac® grades convince customers worldwide with their excellent property profiles and the possibility of substantial cost savings.

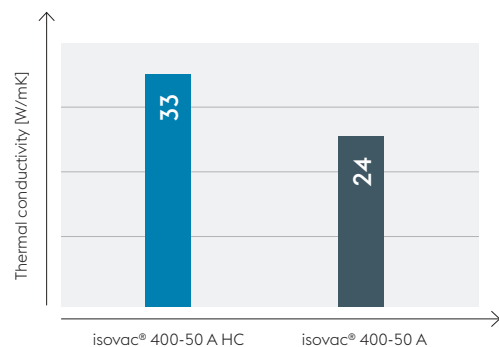
- HP** **isovac® HP (high-perm)**  
The specialist with the highest permeability
  - » Cost savings from reduced material usage
  - » New designs based on low space requirements



- HE** **isovac® HE (high-efficiency)**  
The specialist for shorter final annealing times
  - » Cost savings from shortened final annealing times by up to 30%
  - » Productivity hikes based on increased material throughput
  - » Lower emissions based on shorter final annealing time



- HC** **isovac® HC (high-conductivity)**  
The specialist in high thermal conductivity
  - » Cost savings through scrap avoidance with alternative engine construction concepts
  - » Less cooling is required because of increased thermal conductivity





## MAIN PRODUCTS

### ELECTROGALVANIZED STEEL STRIP

Electrogalvanized steel strip is a product with the highest level of surface quality and offers high corrosion protection and excellent workability in spite of low zinc layer thickness. The product spectrum of electrogalvanized steel strip ranges from ultra-mild to ultra-high-strength steel grades. Our grades are characterized by excellent appearance and highest-quality exposed panels. The mechanical properties are very similar to those of cold-rolled sheet. Electrogalvanized steel strip can be zinc-coated on one or both sides.

- » High-quality surface properties
- » Excellent forming behavior
- » Zinc coating on one side is possible
- » Best paintability
- » High degree of corrosion protection
- » Excellent welding and bonding properties

### ENAMELABLE STEEL STRIP

#### Cold-rolled enamelable steels

As a result of specially adapted enameling processes, cold-rolled enamelable steels made by voestalpine can be enameled in a high-quality process on both sides. Depending on the degree of forming and the enameling method used by the customer, classical AL-killed steels or enamelable IF steels can be recommended for different applications.

Enamels can be applied in wet or powder form. Our directly enamelable forming coating for powder enamels, direct-e®, saves costs based on a reduction of process steps.

- » Narrow analysis tolerances
- » Wide strength spectrum with low amount of scatter.
- » Suitable for high surface requirements
- » Excellent fish scale resistance

#### Hot-rolled enamelable steels

These special construction steels made by voestalpine are suitable for one-sided enameling based on their composition analysis and finely tuned hot-rolling parameters. Steel grades S355CCE and S380CCE are also suitable for two-sided enameling. Enamels can be applied in wet or powder form.

## COLD-ROLLED STEEL STRIP

The excellent surface appearance of cold-rolled steels is convincing. Our continuous production process and modern H2 annealing technology allow the manufacturing of high-quality steel strip with narrow thickness tolerances.

The comprehensive steel grade program makes cold-rolled steel strip a genuine all-rounder. These materials are used in applications ranging from simple sections to complex deep-drawn parts. Cold-rolled steels are used in the household-appliance industry for appliances such as washing machines, dishwashers, clothes dryers, refrigerators, stoves and hot water tanks.

- » Excellent surface quality
- » Excellent cold formability
- » Highly uniform mechanical properties
- » Narrow thickness tolerances thanks to modern production systems

## HOT-ROLLED STEEL STRIP

Hot-rolled steel strip made by voestalpine is characterized by high product quality and is a true all-rounder. It is as versatile as its many applications.

Hot-rolled steel strip to meet every customer requirement Our products are available in both pickled and unpickled condition, as slit or wide strip in coils. Even slit steel strip or cut shapes are possible. Hot-rolled steels are supplied in a wide range of grades and qualities. A variety of alloys and rolling programs provide our customers with just the right steel for their specific applications.

- » Available in pickled and unpickled condition
- » Excellent suitability to forming processes
- » Excellent weldability
- » Customer-specific fulfillment of mechanical properties
- » Narrowest thickness and width tolerances guaranteed
- » Surface roughness adjustable in exact compliance with customer requirements





## ADDITIONAL FUNCTIONAL TREATMENT

### multiface® – THE ANTIFINGERPRINT-SOLUTION

multiface® is a multifunctional, nearly invisible protective coating with excellent anti-fingerprint properties. The coating provides excellent corrosion protection during transport and storage and very good forming properties without having to employ any additional lubricants. Components coated with multiface® can be painted or adhesive-bonded without any additional conditioning and can be processed immediately. The surface features very good adhesive properties.

- » Outstanding anti-fingerprint properties
- » Excellent corrosion protection
- » Good forming properties
- » Direct paintability
- » Excellent joinability
- » Environmental compatibility
- » Reduced down to three process steps

#### Eliminate three process steps with multiface® and direct-e®





# direct-e® – DIRECTLY ENAMELABLE FORMING AID

Cold-rolled steels for enameling made by voestalpine in combination with direct-e®, the innovative directly enamelable forming coating, makes it possible to apply enamel directly following the forming process.

The degreasing process of the formed component becomes dispensable, thus providing the customer with significantly reduced cost. direct-e® is applied in production as a subsequent surface treatment of cold-rolled enameling steels. It does not consist of mineral components and combines a series of innovative and positive effects, especially on enameled steels.

- » Direct-enameled steels without any degreasing
- » Reduced processing costs at the customer
- » Excellent corrosion protection during storage and transport
- » Best formability
- » Outstanding weldability
- » Conservation of resources and environmental protection

	Corrosion		Processing				Environment		
	Transport	Storage	Powder enameling without the need to degrease	Powder enameling with degreasing	Forming	Weldability	Free from fluorine	Free from chrome	Free from solvents
direct-e®	++	++	++	++	+	++	++	++	++
Pre-lube oil	++	++	-	++	++	+	++	++	++
Corrosion protection oil	++	++	-	++	+	+	++	++	++

Perfectly suited    ++    +    +/-    -    Not suited

## FORMING AIDS

Our forming coating is a thin and transparent film on the surface of the material. This provides increased corrosion protection as well as the possibility of forming without any additional lubricants. This extends and improves the existing product properties and enables a clean and cost-effective deep drawing process.

- » Improved corrosion protection
- » Forming without additional lubricants
- » Clean and cost-effective deep drawing



## FURTHER PROCESSING

### SLIT STRIP AND CUT SHEETS

Seven slitting lines and six cut-to-length lines allow targeted solutions to meet the most specific product requirements such as especially difficult surfaces produced using specially adjusted and serviced production equipment.

- » Broad range of products
- » Wide spectrum of dimensions
- » In-house production routes for difficult surfaces

Slit strip		Austria	Poland	Romania
Max. tensile strength	[MPa]	1,300	750	700
Thickness	[mm]	0.3 – 8.0	0.3 – 4.5	0.3 – 4.5
Strip width	[mm]	10 – 1,650	25 – 1,750	19 – 1,750

Cut sheets		Austria	Poland	Romania
Width	[mm]	300 – 2,090 <sup>1)</sup>	150 – 1,750	300 – 1,750
Length	[mm]	250 – 18,000	280 – 6,000	250 – 4,000
Thickness	[mm]	0.3 – 2.0	0.3 – 3.0	0.3 – 4.0

<sup>1)</sup> voestalpine prematerial: Thickness of 1,750 mm max.



23 DIFFERENT voestalpine SALES AND DISTRIBUTION OFFICES IN 21 COUNTRIES ARE PLEASED TO BE AT YOUR DISPOSAL.



### Always close to you

The headquarters of the voestalpine Steel & Service Center Group is located adjacent to one of the most modern steel mills of Europe, voestalpine Stahl GmbH in Linz, Austria. Further production locations guarantee proximity to our customers: Tychy in Poland, Giurgiu in Romania and our subsidiaries in Cittadella, Italy.

● Production    ○ Sales offices





# MORE THAN JUST CUSTOMER SOLUTIONS

## **01 Along the entire value-added chain**

Functional alternative to Galfan? An aesthetic alternative to stainless steel? Or a directly paintable forming aid to save process costs? voestalpine offers solutions for all areas of application.

## **02 High level of process expertise**

The technical specialists at voestalpine who focus their entire energy on the household-appliance industry provide concrete input in the interest of optimizing processes and improving final products.

## **03 Solutions of tomorrow**

voestalpine stands for innovation. Product developers devoted exclusively to the household-appliance industry work continuously on solutions that clearly differentiate us from other suppliers.

## **04 60 years of experience**

The many years of experience of voestalpine are the foundation for our expertise in this market. The customers of voestalpine profit directly from the experience of voestalpine and are the beneficiaries of established and highly functional solutions.

# DIMENSIONS AND POSSIBLE COMBINATIONS

## An overview

	max. Width [mm]	Thickness [mm]	multiface®	direct-e®	Strip width [mm]	Thickness [mm]	Width [mm]	Length [mm]	Thickness [mm]
Organic-coated steel strip (colofer®)	1,730	0.45 – 2.50			10 – 1,650	0.45 – 2.50	210 – 1,730	200 – 6,000	0.45 – 2.50
Electrical steel (isovac®)	1,600	0.30 – 1.00			19 – 1,600	0.30 – 1.00	300 – 1,550	300 – 5,000	0.30 – 1.00
Electrogalvanized steel strip	1,600	0.40 – 2.50			10 – 1,600	0.40 – 2.50	210 – 1,600	200 – 6,700	0.40 – 2.50
Hot-dip galvanized steel strip	1,730	0.45 – 4.00			10 – 1,730	0.45 – 4.00	210 – 1,730	200 – 6,700	0.45 – 4.00
Hot-dip galvanized steel strip (corrender)	1,730	0.45 – 2.30			10 – 1,730	0.45 – 2.30	210 – 1,730	200 – 6,700	0.45 – 2.30
Enamenable cold-rolled steel strip	1,600	0.50 – 3.00			10 – 1,600	0.50 – 3.00	210 – 1,600	200 – 6,000	0.50 – 3.00
Cold-rolled steel strip	1,600	0.40 – 3.00			10 – 1,600	0.40 – 3.00	210 – 1,600	200 – 6,700	0.40 – 3.00
Enamenable hot-rolled steel strip	1,750	1.80 – 10.00			50 – 1,650	1.80 – 8.00	600 – 1,750	1,250 – 18,000	2.00 – 10.00
Hot-rolled steel strip	1,750	1.50 – 20.00			50 – 1,650	1.50 – 8.00	900 – 1,750	1,250 – 18,000	2.00 – 20.00

Main products

Additional functional treatment

Further processing



Our **technical support** consists of a large pool of experts who will be happy to assist you with all your inquiries.



EXPERIENCE AND  
INNOVATION

## HIGHLY INDIVIDU- ALIZED HIGH-TECH SOLUTIONS

**The power of experience, expertise and curiosity**

**Partnerships for more than 60 years!** The results of this consistent orientation are sound industry expertise, a profound understanding of customer requirements and experts specialized in the household-appliance industry.

# VAST EXPERIENCE

---

FOR MORE THAN SIXTY  
YEARS, voestalpine HAS BEEN  
A RELIABLE PARTNER TO THE  
HOUSEHOLD-APPLIANCE  
INDUSTRY.

## Specialized research and development

Did you know that the composition of mustard of the same brand can vary from country to country? voestalpine technicians know this! Specialized research and numerous testing methods developed to meet requirements in the household-appliance industry ensure that voestalpine solutions work reliably and consistently.

## Technical consultation

Are you looking for ways to optimize processes and end devices? The technicians at voestalpine have in-depth knowledge of the industry and, with their comprehensive material expertise, are at your side to provide consultation on how you can switch to new materials or optimize production routes.

## Wide range of products

The household-appliance industry is broadly diversified and innovative. Demands vary greatly depending on the range of application and manufacturer. The wide range of products supplied by voestalpine makes it possible to provide the perfect product for each area of application.



Vast experience



Joint development



Global Logistics



# MORE THAN JUST THE MERE SUM OF THE INDIVIDUAL PARTS INTERDISCIPLINARY RESEARCH

**Remarkable synergies for practical innovations**

**voestalpine focuses more on solutions than on standard products.** Emphasis is placed on an understanding of customer requirements and the development of individualized solutions. In this effort, voestalpine banks on innovation and defines new standards.



# JOINT DEVELOPMENT

---

THE POWER OF A  
HIGHLY SPECIALIZED  
NETWORK.

## **Joint product development**

Numerous examples substantiate the development expertise of voestalpine in the field of customized solutions. New organic coatings as replacements for colaminates, aesthetic and economical replacements for stainless steel, directly paintable forming aids to reduce process costs.

## **Synergies with other industries**

voestalpine has been supplying highly innovative industries, such as the automotive industry, with complex steel products for years. Customers from other industries profit one to one from the experience and expertise gained at voestalpine.

## **Innovation**

More than 700 researchers, a close-knit network of research institutions and a consistent innovation program have placed voestalpine in a position of being able to provide solutions to customers with the most complex steel grade, most innovative developments beyond the simple steel strip.





AT THE RIGHT TIME,  
AT THE RIGHT  
PLACE

HIGHLY SPECIA-  
LIZED AND  
RELIABLE

**Customized logistics strategies**

**We will never be satisfied with excellent product quality alone.**

Comprehensive services and unlimited dedication to the challenges of our customers are at the core of our philosophy.

# GLOBAL LOGISTICS

---

THE POWER OF A  
WORLDWIDE  
NETWORK.

## **Experience with worldwide logistics**

With years of experience delivering products to every part of the world, voestalpine implements all procedures necessary in international logistics to ensure the highest level of reliability. The customers of voestalpine enjoy the benefits of worldwide production sites and a globally competent partner.

## **Reliable on an international scale**

The highest degree of reliability is also taken for granted when it comes to global deliveries. voestalpine customers worldwide benefit not only from high product quality but also from the highest level of supply reliability at every location.

## **Worldwide network**

A global network of sales offices, selected partners and steel service centers make it possible for voestalpine to be highly flexible with regard to customer requirements and to customize supplies and solutions for customers in the household appliance industry.



