



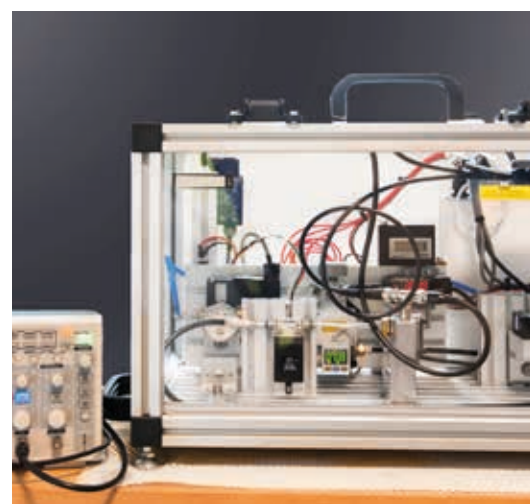
# INNOVATION AND R&D OUR FUTURE

We are your partner for special requirements,  
at your side developing together.

At voestalpine Precision Strip AB we always accept a challenge. Our Innovation initiatives are moving our business into new product areas and markets. Redefining the limits of what is possible.

The R&D department in Munkfors ensures continuous enhancements in the product and process areas. We are your preferred partner for your special requirements, at your side supporting your product development. Our strength lies in the combination of the latest technologies and our experienced workforce.

As part of the voestalpine Group, we control all essential quality parameters, starting from the specific selection of steel grades which perfectly suit your applications. Whenever new demands for new applications require it, we can develop project-specific alloys together with our customers.



With the latest technologies and equipment we can offer product specific:

- » Impact fatigue testing
- » Fracture studies
- » Wear profiles and angles
- » Full material analysis
- » XRD and SEM studies

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PRODUCT FOLDER  
FLAPPER VALVE  
STEEL

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# MEETING HIGH DEMANDS ON LIFE TIME

voestalpine Precision Strip AB offers flapper valve steels meeting the challenging demands on material properties such as high ultimate tensile strength, flatness, surface finish and steel cleanness.

**The flapper valve** is the heart of the compressor. During its lifetime, it has to open and close billions of times without failure and without maintenance, which places challenging demands on material properties.

**Customers are** mainly the stampers but also the compressor manufacturers and the OEM white goods and car manufacturers.

Martensitic hardened and tempered steels exhibit the ultimate material characteristics when superior fatigue performance is required.

**The flapper valve** is subject to bending as well as impact stresses making the fatigue strength of the hardened steel of highest importance. The properties and the precision manufacturing of the flapper valve steel create the reliability and performance of the flapper valve, enhancing the efficiency and the lifetime of the compressor.

The precision strip steel and its heat treatment provide the prerequisite for an excellent fatigue performance of the valve.

The surface finish and the metallurgical cleanness secure the required performance. A reliable operation and a long lasting service life of the compressor are the results, with consistent quality.

**The valve design** and manufacture are critical too. To satisfy all our clients' requirements our flapper valve steel program comprises martensitic steels in both high carbon and stainless grades, all meeting the stringent demands of the flapper valve.

**Inspection and selection** of raw materials and subsequent operations are carried out with the greatest care and precision. Special inspection lines ensure a consistent and superior quality of the strip steel. A uniform and high strength is achieved through accurate and controlled heat treatment.

The superior surface finishing eliminates potentially dangerous imperfections and stress raisers. The flatness delivers the guarantee of perfect valve sealing.



## FLAP-X



**Size range, thickness:** 0.076 – 0.60 mm  
**Size range, width:** 6 – 310 mm  
**Ultimate Tensile Strength, R<sub>m</sub>:** 2100 MPa  
**Elongation at break, A<sub>50</sub>:** ≥6 %

Flap-X has been developed in close cooperation with leading flapper valve manufacturers and compressor OEM's, and has shown the highest fatigue strength among all flapper valves steels, both in reverse bending and impact mode.

It has proven superior performance compared to any other flapper valve material available, in internal and external testing.

### DESCRIPTION

Flap-X is a martensitic stainless steel developed for the highest demanding applications of flapper valves in compressors.

### ADVANTAGES

- » Superior impact and bending fatigue life
- » Improved loss factor / damping at compressor operating temperatures
- » High tensile strength



## UHB SS716



**Size range, thickness:** 0.076 – 1.00 mm  
**Size range, width:** 6 – 310 mm  
**Ultimate Tensile Strength, R<sub>m</sub>:** 1810 MPa  
**Elongation at break, A<sub>50</sub>:** 4 - 6 %

UHB SS716 is a martensitic stainless steel grade designed where toughness and impact fatigue strength are essential, even at temperatures as high as 400°C.

It has been used as the flapper valve material by the world leading compressor manufacturers for many years. The reliability and the performance is proven by decades of usage in the market.

### DESCRIPTION

UHB SS716 is a martensitic stainless steel designed for the medium and thinner range of flapper valve components in compressors.

### ADVANTAGES

- » Exceptional impact and bending fatigue strength
- » High toughness and service life time
- » Reliable and proven performance



## UHB 20C



**Size range, thickness:** 0.076 – 1.00 mm  
**Size range, width:** 6 – 340 mm

UHB 20C is a 1% carbon steel with high tensile strength and is often the standard choice for the medium and thinner range of flapper valves. It is hardened and tempered to a fine martensitic structure providing the highest fatigue strength in high carbon steels.

UHB 20C is an excellent choice for applications where corrosion resistance is not so critical and economical volume production of flapper valves is the main criteria, compared to our stainless flapper valve steels. It is frequently used in segments such as automotive air conditioning, refrigerators and household air conditioning.

### DESCRIPTION

UHB 20C is a 1% carbon steel developed for flapper valves in compressors.

### ADVANTAGES

- » Highest fatigue strength among all carbon steels
- » Consistent and reliable quality with proven performance

