

## Optimized Tightness for the iSCR Main Valve

Exhaust Flow Control Valves (EFCV, see figure 1) are used in the integrated SCR system to direct the exhaust gas flow based on different operation modes. This concept is applicable to 2-stroke marine diesel engines.

One such valve is installed to allow the exhaust gas flow to bypass the reactor, which is accommodating the catalyst elements, and thus guide the flow directly to the turbocharger. This valve is referred to as the bypass valve.

When open, this valve directs the exhaust gas flow so that the exhaust gas flow can enter the reactor bypass duct. When closed, it is also designed to provide a tight seal to the bypass duct, thus preventing exhaust gas and reducing agent from bypassing the catalyst elements. Hence, the required tightness of the valve is very high.

Due to high temperatures of the exhaust gas, a flexible sealing mechanism is required, capable of sealing any open gaps caused by thermal material expansion and the machining tolerances of the assembly. To address these issues, a flexible and pre-stressed spring sheet seal was developed.

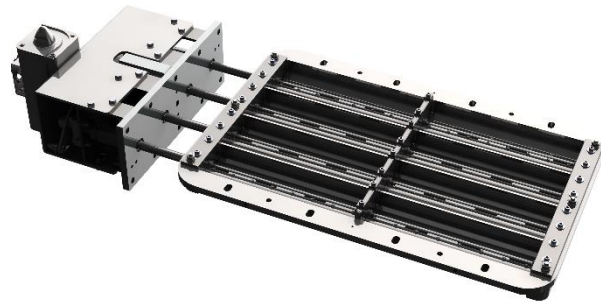


Figure 1: iSCR Exhaust Flow Control Valve (EFCV)

Moreover, it was agreed to put an effort into **the louver on louver sealing**. Vibrations and thermal expansion, can cause the contact sealing of the louver blades to unevenly close, resulting in a weakened seal. Thus, a flexible solution was required. The issue was addressed with pre-tensioned seal plates (see figure 2). The pre-tensioned plates and the flexibility of the sealing can also compensate differences within the part tolerances.

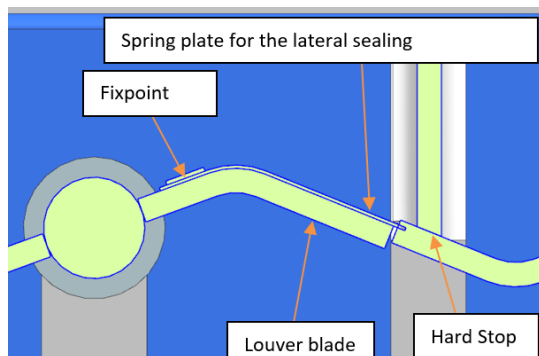


Figure 2: Louver on louver sealing

Given that the exhaust gas can reach temperatures of 550°C and moreover be of corrosive nature, the spring material needs to be designed with material properties able to sustain the integrity under these conditions. Thus, hard-wearing temperature-stable spring material ensures the function and guarantees the integrity of the pre-tensioned sealing material. Moreover, a distinct corrosion resistance is of advantage.

**The additional axial sealing of the louver** is mounted on the sides and in the centre of the valve frame (see figure 3).

The more the shaft bearings are integrated as part of the frame, the easier and more effective the sealing can be. In the new valve design, the bearings are completely integrated in the frame. This allows an uninterrupted, all-around sealing of the louvers. Moreover, the axial sealings add a beneficial centring effect to the louver blades.

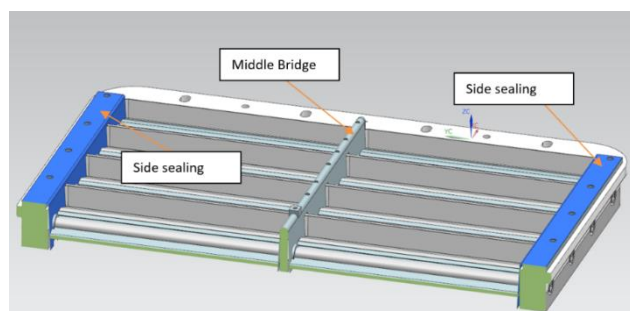


Figure 3: Axial seal plates on the valve frame