

# CASE STUDY: BELLEVILLE FLANGE WASHERS RESOLVE HEAT EXCHANGER LEAKS AT REFINERY

## INDUSTRY CHALLENGE



Field engineers at an oil refinery in Indonesia were working to resolve issues with leaking heat exchangers. The heat exchangers serve a variety of crude oils and are subject to periodic high and low temperatures.

Certain industries that utilize piping flange joint assemblies, such as petrochemical, dictate a low tolerance for leaks, or fugitive emissions. Areas subject to high temperatures and thermal cycling can cause stress to flange joints, causing the bolted connections to lose tension and leak fugitive emissions.

## SOLUTION



The team approached Solon Manufacturing Co. about live loading Solon® Flange Washers, or Belleville springs with higher loads designed to be used in flange applications, onto the gasket in order to maintain sufficient bolt tension and resultant gasket stresses.

Flange washers made of H-13 tool steel are an excellent spring material option for heat exchanger applications because they withstand high temperatures and are corrosion resistant. The risk of failure fatigue is negligible due to the change in stress during temperature cycles being relatively small. The maximum heating and cooling rate are unlimited as well, since the flange acts as a heat sink, there is no change in temperature that could damage the springs.

## RESULTS



H-13

Solon Flange Washers

17

Heat exchangers live loaded in the field

ZERO

Leaks & emissions reported

92%

*of gasket leaks are caused by insufficient bolt preload*



**BEFORE:** LEAKING HEAT EXCHANGERS



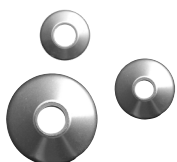
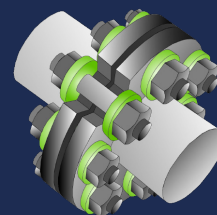
**AFTER:** LIVE LOADED GASKETS WITH SOLON FLANGE WASHERS

## SOLON® FLANGE WASHER ADVANTAGES

- ✓REDUCE FUGITIVE EMISSIONS
- ✓MAINTAIN BOLT INTEGRITY
- ✓MADE IN THE USA
- ✓ECONOMICAL
- ✓LOW MAINTENANCE



Solon® Flange Washers



For additional information, please contact Solon Manufacturing Co.  
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