



CASE STUDY

INDUSTRIAL HEAT EXCHANGER

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BOLTING ISSUE

A heat exchanger in service for about 20 years, with bolted flange connections and an end cap which have always been notorious “leakers”. Before this installation, this heat exchanger would leak after every cycle. Thermal cycling and limited offline downtime are factors here as well. Faulty heat exchangers can cause expensive, dangerous problems to occur, such as:

- + **Environmental hazards via spillage of low to mid-levels of toxic pollutants.**
- + **Reduced airflow issues and inadequate pressure.**
- + **Expensive damage to machinery, such as cracks and microfractures.**
- + **Dangerous heat loads and high temperature fluctuations from faulty heat transfer.**
- + **Damage to seals.**
- + **Accelerated corrosion due to reduced service life.**
- + **Slowed operations from restricted flow.**
- + **Microbiological growth.**



OUR SOLUTION

Install studs utilizing [Valley Forge SPC4® Load Indicating Technology](#) instead of standard conventional fasteners. This gave the installation team the opportunity to tighten and re-tighten connections using the advantage of direct tension measurement:

- + **Reading tension (or elongation) directly on each stud as torque was applied.**
- + **Perfect load on each fastener was achieved before putting the heat exchanger back into operation.**
- + **Rechecks were performed after all fasteners were loaded and ones out of range were tightened back into range.**

VALLEY FORGE

Valley Forge has proudly manufactured both standard and custom fasteners in the mining industry for over 40 years. Our patented solutions are manufactured in the USA including well-known technologies like the **Maxbolt®**- our visual load indicator in each fastener, which has long set the standard for bolted joint load-indicating solutions around the world.

Our innovative ideas are directed by continuous improvement, the simplification of the installation of fasteners, and the resulting improvement in productivity and safety for our customers.

AS SEEN IN

BIC Magazing, E&MJ, Oil & Gas Engineering, POWERMAG, Windower Magazine, North American Clean Energy and more.



RESULTS

After 22 thermal cycles on this exchanger, unit does not leak anymore! In the 20 years prior to load indicating fastener installation, there had not been a single cycle without leakage. The cost* of fixing this leak issue on exchanger resulted in the amount of approximately \$213,000 savings.

*The savings was measured over previous 4-5 year time period. The loss over the entire 20 years was not extrapolated, neither were maintenance costs.

Fig. 1

120E-503 Regeneration Heater Data

	Shell Side	Tube Side
Process Fluid	Isobutane/Olefin Feed	600# Superheated Steam
Design Temperature	400°F	750°F
Design Pressure	410 psig	650 psig
Normal Flow (when online)	3560 BPD	6350 LBH
Temperature when hot	390°F	650°F
Temperature when cool	145°F	Amb.

**Exchanger runs at the hot cycle for 7-8 hours every 3 days.

	Tubesheet to Shell	Channel Cover
Current Bolting Material	SPC4 Headed Studbolt B7	SPC4 Headed Studbolt B7
Number of Bolts	20	24
Bolt Diameter	3/4"	3/4"
Washers	4 belleville per nut	4 belleville per nut
Current Gasket	CorruKamm 3/32" thk. CS	CorruKamm 3/32" thk. CS

Bundle is integral to channel.

Recently increased thickness of channel cover and flange to prevent cupping.

Fig. 1 - The installation method and solutions applied

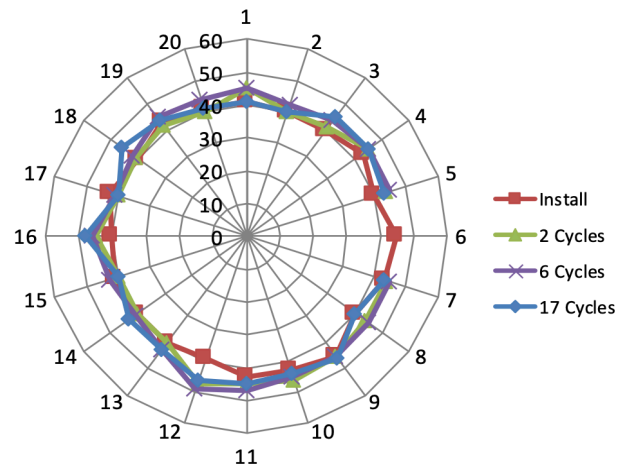
Fig. 2 - Shows where heat was leaking from the exchanger

Fig. 3 - Spider graph showing tension during cycles

Fig. 2



Fig. 3



COMPLEX SOLUTIONS ARE OUR SPECIALTY

Are fastener issues costing you? In the 20 years before load indicating fasteners were installed, there had not been any cycle in this heat exchanger without leaks. When introducing SPC4™ Load Indicators, the exchanger completed 22 cycles leak free. Our technical experts have solved complex issues around the world in a variety of applications ranging from Oil & Gas to Railway.

[> Learn More](#)

TALK TO A TECHNICAL EXPERT

Technical experts are available in your industry to chat. We source solutions to some of the world's most complex fastening issues. Inquire today to learn more about our custom and standard solutions or visit us online at vfbolts.com.

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