Reducing gas flaring to cut CO_2 emissions

Environmental benefits

- Reduced CO_2 emissions
- Reduced flaring of sour gas
- Reduced risk of toxic sour gas emissions
- Reduced risk of mercury emissions

Using SKF sour gas compressor bearings in a vapor recovery unit could cut CO_2 emissions by as much as 24 000 tonnes over 12 years.

SKF sour gas compressor bearings slash CO_2 and SO_2 emissions from gas flaring

Every year, the oil and gas industry "flares" – that is, burns or vents – an estimated 150 billion cubic meters (5.3 trillion cubic feet) of waste gases*. That's equivalent to 25% of annual US natural gas consumption or 30% of the EU's. Along with SO_2 that causes acid rain, gas flaring emits about 400 million tons of CO_2, or about 1.2% of all annual global CO_2 emissions.

Much of this flared gas can be captured by vapor recovery units (VRUs) and then be used or re-injected. But doing so reliably is a serious challenge, as the harsh process gases can cause VRU compressor bearings to wear out and fail in six months or less. When bearing failures cause unplanned compressor downtime, gas recovery stops and emergency gas flaring restarts.

By significantly extending compressor service life, SKF sour gas compressor bearings can cut the frequency of gas flaring dramatically. Proven to withstand exposure to sour gas and other process gases, SKF sour gas compressor bearings can deliver 6-10 times the service life of conventional bearings. Over a typical, 12-year compressor lifecycle, this extension of bearing uptime would enable a savings of 8 000 – 24 000 tonnes of CO_2 emissions, depending on compressor capacity.

SKF BeyondZero solutions can help reduce CO_2 emissions, preserve limited resources and protect the environment from the use and spread of toxic substances. For more details, including documentation of reduced environmental impact, visit www.beyondzero.com

*Source: The World Bank, Global Gas Flaring Reduction Partnership, 2013: http://go.worldbank.org/425VOGDYS0

SKF sour gas compressor bearings

Operational benefits

- 6-10 times longer service life than conventional bearings
- Increased compressor reliability and productivity
- Small footprint and simplified compressor installation
- Highly reliable and low CAPEX VRU installations
- Reduced compressor operating costs
- Reduced energy requirement vs. hydrodynamic bearings

Operational features

- Super-tough, high-nitrogen stainless steel rings
- Glass fiber-reinforced polymeric PEEK cages
- Silicon nitride ceramic balls and rollers

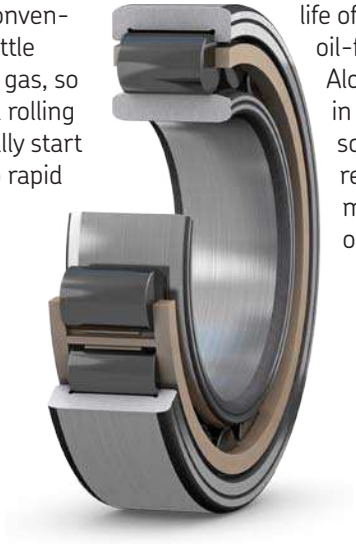
References and design conditions

- First sour gas pilot in 2004
- Used in SSC NACE/ISO, region 3 inlet conditions
- 40 mol% H_2S and 35 mol% CO_2 combined
- 100 mol% H_2S and CO_2 combined
- Hydrogen-rich gases

The screw compressor challenge

Across gas plants, offshore platforms, oil field separators and refineries, the use of oil-flooded screw compressors for vapor recovery units (VRU) is on the rise. Their relative low cost, small footprint and performance flexibility make them a good fit for the application. Screw compressor reliability, however, is a challenge – a particularly costly one when the VRU is located near a well in a remote location.

The problem? Sour gas (H_2S), condensing water and acid gases in the compressor are in direct contact with the bearings and may attack them very aggressively under fluctuating process conditions. Conventional bearings offer little resistance to the sour gas, so bearing raceways and rolling elements will eventually start to flake, then undergo rapid bearing failure.



The SKF sour gas solution

Developed as a robust alternative to conventional steel bearings with brass cages, SKF sour gas compressor bearings feature several high performance materials. These include high-nitrogen stainless steel rings, glass fiber-reinforced polymeric PEEK cages, plus silicon nitride ceramic balls and rollers.

This combination of materials enables excellent resistance to sulfide and hydrogen stress cracking, poor lubrication, corrosion, and electrical arcing from variable frequency drives. The ultimate result: SKF sour gas compressor bearings offer 6-10 times the service life of conventional bearings in oil-flooded screw compressors. Along with significant reductions in CO_2 emissions, this SKF solution is enabling sharp reductions in compressor maintenance demands and operating costs.

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