Gas Field Policy 12: Acid Gas Application

Acid Gas Compressor Applications typically involve the compression of flare gas from oil field amine regeneration systems, but these Guidelines can be applied to any similar gas stream. Normally "Acid Gas" contains 50 - 100% H2S and CO2 with minor amounts of other common gas field gases and is saturated with water vapor. It is important to have an accurate gas analysis and definition of the full range of operation pressures and temperatures. Also see: GFP-16 Carbon Dioxide Service (With H2O) and GFP-18 Sour Gas Service.

The following guidelines must be met before a Gas Field Compressor can be offered for an Acid Gas Application.

1. All sizing and performance must be reviewed and approved by Dresser-Rand Gas Field Products Marketing prior to quoting. All applications must fall within the Guidelines specified by GFP-2.

2. Average piston speeds should not exceed 1200 FPM for lubricated units and 750 FPM for non-lubricated units. Where possible, even lower piston speeds are preferred. Non-lubricated compressors are seldom used due to their higher maintenance cost and additional downtime - and are discouraged.

3. Due to the high specific gravity of Acid Gas, rotative speeds 90% or less than design RPM are preferred.

4. Gas cooled cylinders are preferred but water cooled designs are acceptable. If a circulating water system is utilized, care must be taken to keep temperature at least 10 deg. F above inlet gas temperatures.

5. D-R standard cast iron and nodular iron cylinder materials (ASTM A278 Class 40 (Gray Iron) and ASTM A536 (Ductile Iron) Grade 65-45-12 or ASTM A395 (Ductile Iron) Grade 60-40-18 are acceptable up to rated pressures. Forged steel cylinders must use "sour gas" billets. Non-lubricated applications are limited to < 1000 PSIG max.

6. Water cooled packing cases are required for Pd > 1750 PSIG (Pd > 750 PSIG for D-VIP) for lubricated cylinders and for Pd > 250 PSIG on non-lubricated applications.

7. All pressure packing and wiper packing cases should be of purged design. Purged packing increases normal leakage rates. Distance piece vents and drains must be adequately sized.

8. Packing rings should be DW173 with CI pressure breaker and backup rings as necessary. Non-lubricated cylinders should use PEEK packing rings. All piston rings and/or rider rings should be DW173 material.

9. HOS, HOSS and BOS compressors may require an extra long distance piece. A, B, C-VIP and MOS cylinders require an added distance piece. All distance pieces must be sealed and either purged or vented to a safe area. Slingers may be provided which will require extra-long distance pieces.

10. Compressor cylinder oil should be a heavy lubricant with a viscosity of 105 SSU @ 210 deg. F minimum and fortified with compounding to prevent "washing". Compressor cylinder lubrication system should be completely separate from the frame lubrication system. Compressor cylinder lubrication system should have a provision for injecting oil into the suction of each cylinder to protect and lubricate the inlet valves. Packager to supply tubing and injection ports upstream of each cylinder. Compressor frame oil should also be carefully selected to reduce acid contamination.

11. Compressor valve springs should be Elgiloy. Where steel valve seats and guards are standard, they should be changed to stainless steel. A "Dynamic Valve Analysis" is recommended to ensure proper valve action on each application. Valve lifts reduced from standard may be required. Valve seat gaskets should be soft iron or aluminum.
12. Piston rods should be age hardened 17-4 PH stainless steel with full length TC3 coating through the packing and scraper rings.

13. VVCP, FVCP, etc. are acceptable methods of capacity regulation. Any vents should be piped to a safe place.

14. Other optional features that should be considered:
   a. Stainless steel LO piping downstream of frame LO filter.
   b. Sour gas studs and nuts for components in gas stream.
   c. Torsional analysis of compressor/motor driver system.
   d. Compressor flywheel if required by torsional analysis.

15. In addition to the compressor itself, there are many special requirements for the packaged unit components for Acid Gas Compressor Applications.