Haskel/BuTech/PPI

Presentation
For
Argonne National Laboratory
Products

- 100,000psi Liquid Pumps
- 37,000psi Gas Boosters
- 15,000psi Diaphragm Comp
- 4,500psi Air Amplifiers
- 150,000psi Valves, Fittings, and Tubing
- 15,000psi Sub-Sea Valves (1” orifice)
- Air Pilot Switches & Relief Valves

Hydraulic Gas Booster

Pumps, Boosters, & Diaphragm Compressors & Systems
Challenges

• Global Material Regulations
  – KHK Japan recommends A286 & 316 SS with high nickel content
  – Europe recommends 316SS
  – North America does not appear to regulate

• Global Certifications
  – CE & ATEX

• Low Inlet vs. High Outlet (Suction vs Discharge)
  – Multiple compression stages
  – Elevated temperatures

• Varying flow requirements
  – Fluctuation in vehicle fills per hour

• H2 Storage
  – Inability to store at 12ksi impacts flow requirements

• High Outlet pressure (High Discharge)
  – Seal Wear
  – Design Costs
  – Product limitations
  – Durability
RD&D Cost Reduction

• Global Material Regulations
  – Test H2 impact in compressor applications
    • Small portion of time at high pressure
    • Compressors do not store
  – Reduced embrittlement impact?
    • Reduction of material costs

• Low Inlet vs. High Outlet
  – Technologies to improve H2 output of Reformers and Electrolizers

• High Outlet Pressure
  – Find solutions to reduce need for 12ksi
    • More efficient Fuel Cells