

# AIR SEPARATION AND DISTRIBUTION FACILITIES

## TRICENTRIC® TRIPLE OFFSET



### APPLICATION DETAILS

Air Separation Units (ASU) generate high purity gaseous and liquid oxygen, nitrogen, and argon from a filtered air input. Some units produce rare gases. ASU's all have processes for filtration, compression, air cooling, adsorption purification, and distillation. These units can output gases with purity up to 99.8%.

ASU's provide industrial gases for oxygen furnaces, blast furnaces and electric arc furnaces, smelters, methanol, natural gas to liquids projects, petrochemical synthesis, coal

gasification, and oxy-coal combustion systems. Industrial gases are found in a wide range of industries, which include oil and gas, petrochemicals, chemicals, mining, steelmaking, pharmaceuticals, biotechnology, water, and aerospace.

TRICENTRIC® triple offset valves are used for isolation and control in both ambient and cryogenic temperatures occurring within the air separation process.

### APPLICATION CONSIDERATIONS

<b>AIR INTAKE - AMBIENT TEMPERATURES</b>	Valves installed in the intake process will need to withstand ambient temperatures from -40°F (-40°C) to +122°F (+50°C).
<b>AIR SEPARATION AND PRODUCT DISTRIBUTION/LOADING - CRYOGENIC TEMPERATURES</b>	Valves installed in the cold box will need to withstand temperatures as low as -300°F (-184°C) for liquid oxygen, -320°F (-196°C) for liquid nitrogen, and -423°F (-253°C) for liquid hydrogen. All construction materials are selected to maintain their ductility at cryogenic temperatures, including qualified welding at -300°F (-184°C) as per ASME B31.3 requirements.
<b>TEMPERATURE FLUCTUATIONS</b>	Valves may need to operate through high temperature fluctuations from ambient to cryogenic temperatures during process adjustments and start up/shutdown.
<b>RELIABLE OPERATION</b>	Valves need to operate reliably from ambient to cryogenic temperatures and provide long term cycling and tight closure performance for process efficiency. Cryogenic valves require bonnet extensions of adequate length to provide an insulating gas column to maintain the stuffing box seal. Bonnet extensions must be robust and designed to ASME B16.34 and B31.3 for stresses associated with the valve torque, weight of the near vertical actuator, line pressure, system vibration, and shock. The cryo extension should extend four (4) to six (6) inches beyond the cold box or insulation.
<b>PROCESS PURITY/ CLEANLINESS</b>	To ensure process product purity, the valve material selection requires non-particle shedding components and the valve must be cleaned and degreased. To ensure oxygen production purity and safety, the valves for oxygen service must be processed using FDA audited procedures under an ISO 9001 registered quality system; design and materials must be compatible with oxygen to avoid ignition hazards and selected to conform to CGA-G4, 4.4; ASTM 663,88,94; NFPA 53 or other customer-specific standards.
<b>TIGHT SHUTOFF</b>	Tight shutoff of at least ANSI FCI 70.2 Class V and VI is required to maintain efficient SRU performance. For critical cryogenic processes, including equipment isolation and loading arms, valves are required to have proven cryogenic closure performance with testing to BS 6364.
<b>LIMITED MAINTENANCE</b>	Typically valves in this service are required to perform flawlessly for a minimum of 5 years between maintenance cycles.

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The TRICENTRIC® triple offset butterfly valve's non-rubbing, metal to metal, torque seated design, and material selection combine to provide a custom, economical and compact solution to meet the extreme requirements of air separation and distribution facility applications while delivering high efficiency, reduced downtime, and capital expenditure.

### TRICENTRIC® TRIPLE OFFSET CRYOGENIC AIR SEPARATION CONFIGURATION

The TRICENTRIC® triple offset butterfly valve can be customized to suit any cryogenic air separation application. The below description is an example of a typical configuration.

#### FEATURES

- › Standard materials of construction include A351 CF8M body, A351 CF8M disc, 17-4 PH DH1150 shaft, A351 CF3M cryogenic extension
- › All materials for cryogenic applications are selected to maintain their ductility at cryogenic temperatures
- › Monel® materials for oxygen service are readily available from inventory
- › 316SS (or Duplex 2205 SS) and graphite laminated seal ring for tight shutoff—several other seal configurations available to suit any application
- › All TRICENTRIC® valves are supplied with one-piece shafts for customer safety
- › Live loaded packing configuration available in inventory
- › Standard packing includes graphite or PTFE, BAM qualified materials and ISO 15848-1 configuration available on request.
- › Minimal cavities within which contaminating fluids could be trapped
- › Stellite® 21 seat overlay for high cycle applications
- › Multiple extension sizes available from inventory—customer-specific sizes can be manufactured quickly
- › In-house cryogenic testing available to BS 6364 or other customer-specific request
- › Cryogenic seat leakage has been independently tested by third parties



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