

PSB

PURIFICATION



DRYING



SYSTEMS

Air • Gas • Liquid



PSB INDUSTRIES INC.
General Air Division

Founded in 1951 within the shipyards of Lake Erie as Perry Ship Building, PSB Industries' assistance in the construction of bulk-carrier lake freighters—plus its expertise in the repair and alteration of boilers—earned the company a reputation for excellence that continues today. PSB Industries offers a legacy of craftsmanship and innovation to its industrial packaging and manufacturing customers throughout the world. From its highly skilled workforce to its unique manufacturing capabilities, PSB is well equipped to handle any size job—from concept to completion, and beyond.

ISO 9001 CERTIFIED

General Air Division (formerly a division of Zurn Industries) specializes in compressed air, gas, and liquid dehydration/purification technologies and offers a diverse line of product applications. Our packaged systems—from the smallest to the largest applications—remove moisture and contaminants from process streams. General Air's custom-designed Hydryers® are specially constructed to our customers' specifications for gas and liquid processes, unlimited in size and capacity, and are designed for maximum efficiency. Meeting this manufacturing challenge, General Air's own facilities, as well as our key worldwide alliances, are well-equipped to handle our customers' wide range of requirements.

PSB ENGINEERING AND FABRICATION

Customers worldwide have benefited from PSB's proven expertise in the assembly and fabrication of industrial products, from adsorption, compressor and pump skids to pipe racks, burners and more. Working from your drawings or helping to customize a specific solution, our experienced team can take the appropriate components and sub-assemblies and "package" completed industrial equipment for delivery anywhere in the world.

Housing everything needed to complete our customers' requirements from start to finish, PSB's 350,000 square-foot facility includes: three covered and two outside loading docks, 20 functional production bays with overhead-crane lifting capabilities in each, six multimedia blasting booths, ventilated and heated paint booths, control panel shop and 60,000 square feet of warehouse space.

PSB's formal Quality Assurance program is designed to maintain the high standards required by the many customers served by General Air, including the following industries:

- *air separation*
- *refining*
- *electronics*
- *chemical*
- *gas treatment*
- *pharmaceutical*
- *petrochemical*

QUALITY-POLICY STATEMENT

It is the policy of PSB Industries Inc. to consistently meet customer requirements through the education, implementation, and maintenance of our documented system in compliance with all applicable codes and standards and the ISO 9001 Standard.

Custom Hydryers®

meeting customer specifications with special designs

DEHYDRATION *ppb levels*

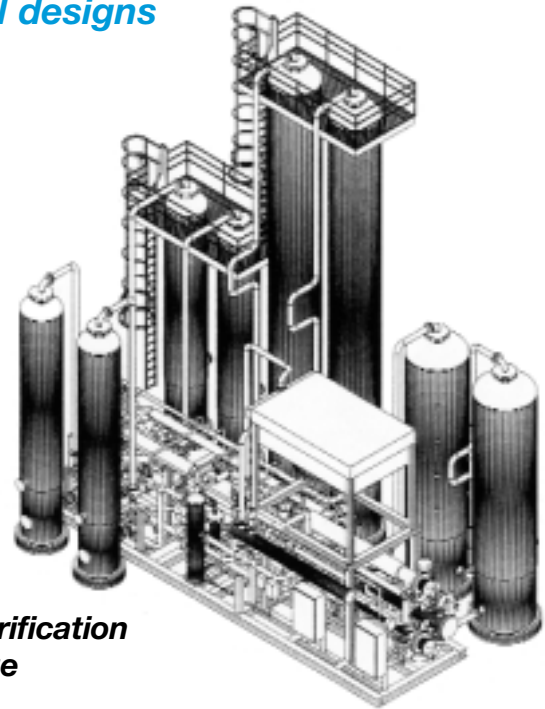
PURIFICATION *ppb levels*

CATALYTIC PURIFICATION

TRACE-SULFUR REMOVAL

SOLID-ADSORBENT TECHNOLOGY

- Molecular sieve
- Selective adsorbents
- Activated alumina
- Activated carbon
- Catalyst



Gas Purification Package

Standard Dryers

latest technology, standard construction, standard options

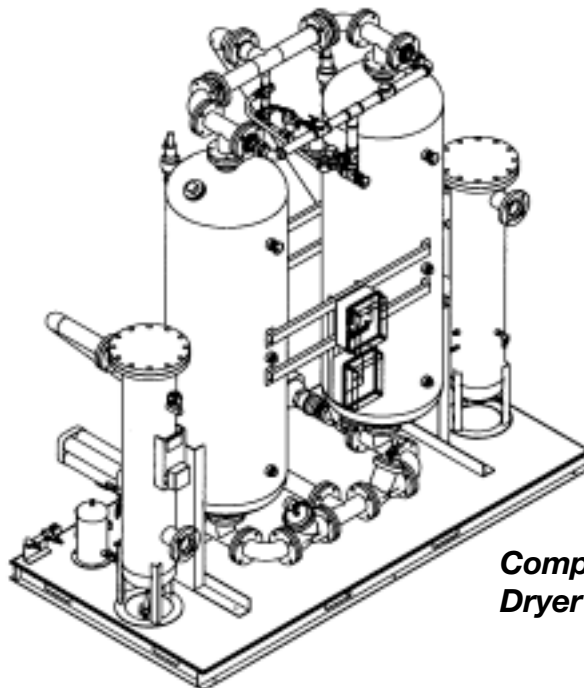
REFRIGERATED

DUAL-TOWER DESICCANT

- Heatless
- Blower Purge
- External Heater
- Internal Heater
- Closed Loop

SINGLE VESSEL

- Deliquescent
- Oilsorber
- Tank Vent
- Mini Adsorber



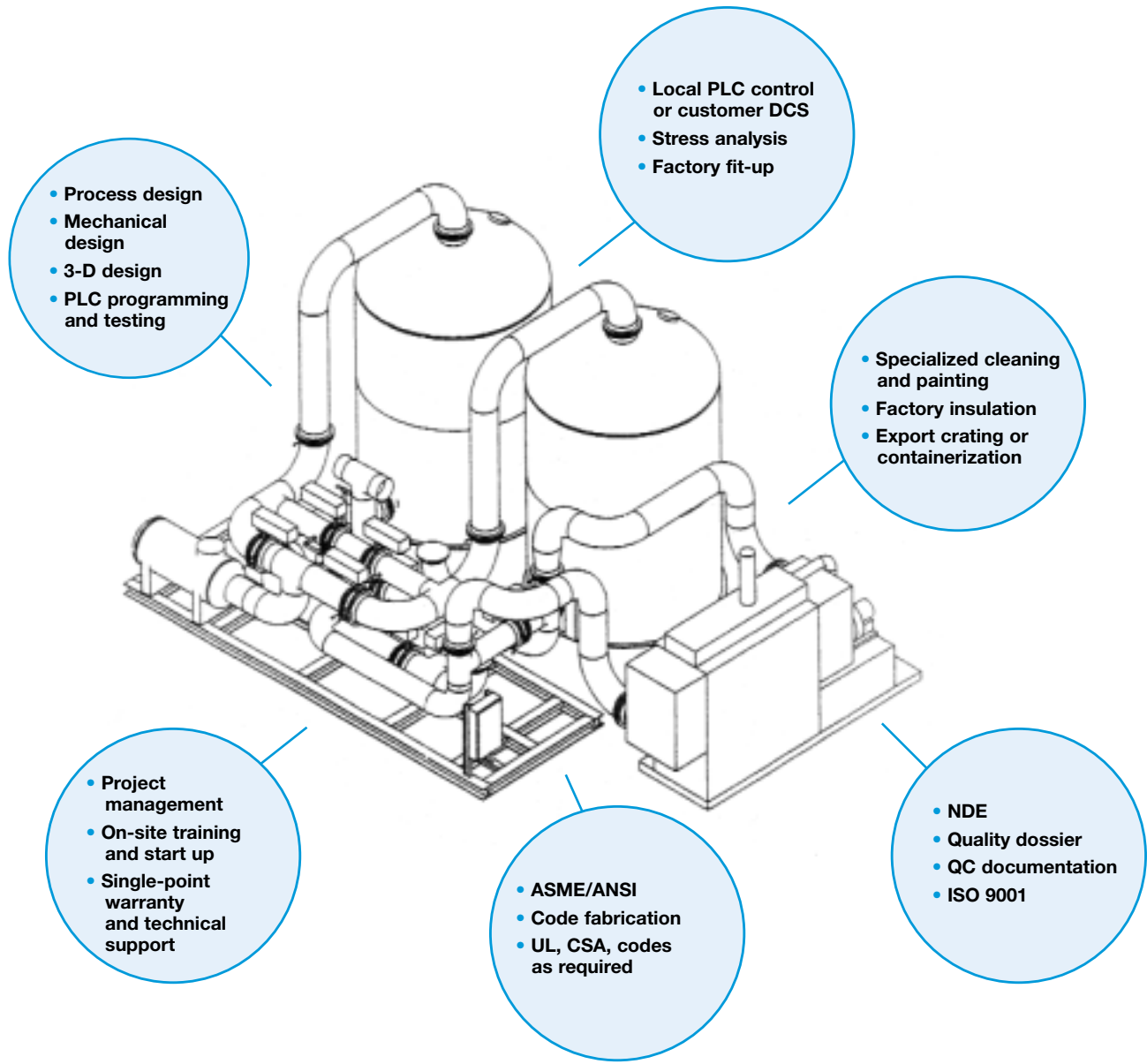
Compressed Air Dryer Package

Parts/Custom Service/Technical Support

- Spare parts for Pritchard, Brown Fintube, Zurn and PSB Hydryers®
- Specialty dryers and accessories
- Filter replacement elements
- All types of desiccant
- Domestic and international technical support

PSB Packaged Hydryers®

From originating **PROCESS DESIGN** to meeting **OUTLET SPECIFICATION**, PSB ensures your process and mechanical requirements are satisfied.



Contact us or visit our website at www.psbindustries.com to fill out our Application Questionnaire.

Applications Using Solid Adsorbents

REMOVING WATER AND OTHER CONTAMINANTS FROM:

Gases

- Inorganic Gas
 - Air
 - Ammonia
 - Argon
 - Chlorine
 - Helium
 - Hydrogen
 - Hydrogen Sulfide
 - Mixed Gases
 - Nitrogen
 - Oxygen
 - Sulphur Dioxide
- Organic Gas
 - Butane
 - Carbon Dioxide
 - Carbon Monoxide
 - Ethane
 - Ethers
 - Ethylene
 - FCC Offgas
 - Landfill/Digester
 - Methane
 - Methylene Chloride
 - Mixed Hydrocarbon Gases
 - Natural Gas
 - Propane
 - Propylene
 - Synthesis Gas

Liquids

- Solvents/Other
 - Acetone
 - Benzene
 - Comonomers
 - Ethanol
 - Freons
 - Heat Transfer Fluids
 - IPA
 - Methanol
 - Monomers
 - NGL
 - Trichloroethylene
 - Toluene
 - Xylene
- Refinery Products
 - Butadiene
 - Butane
 - Butene
 - Ethane
 - Isobutane
 - Isopentane
 - Kerosene
 - Naphtha
 - Pentane
 - Propane
 - Propylene
 - Raffinates

GAS AND LIQUID PURIFICATION

- **Removal of carbon dioxide** from ethylene for production of polyethylene plastic.
- **Removal of MAPD and arsine/phosphine** from propylene.
- **Removal of carbon dioxide** from organic and inorganic gases prior to liquefaction.
- **Removal of sulfur compounds, such as mercaptans and hydrogen sulfide**, from natural gas prior to liquefaction.
- **Removal of water, nitriles, oxygenates, and sulfur compounds** from propylene.
- **Removal of water and carbon dioxide** from mixed gases prior to cryogenic separation.
- **Removal of sulfur compounds** from gasoline blendstocks.

CATALYTIC PURIFICATION

- **Removal of oxygen** from nitrogen, argon, etc.
- **Removal of hydrogen** from helium or other gases.
- **Removal of H₂/CO** from air for high-purity process.
- **Catalytic oxidation** of hydrocarbons.

REGENERATION OPTIONS

“X” – External/Separate Source

When customer has dry, clean regeneration gas available.

“A” – Split Stream

A portion of process is split off, used to regenerate bed, then returned to process.

“C” – Atmospheric Air

Typically known as blower purge and uses ambient air for regeneration.

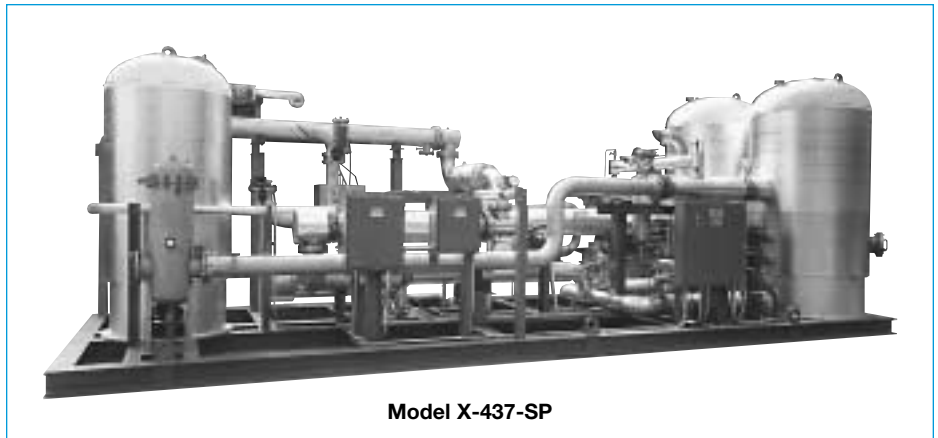
“E” – Closed Loop

A captive volume of gas is recirculated to heat and cool the regenerating tower.

Typical Custom Applications

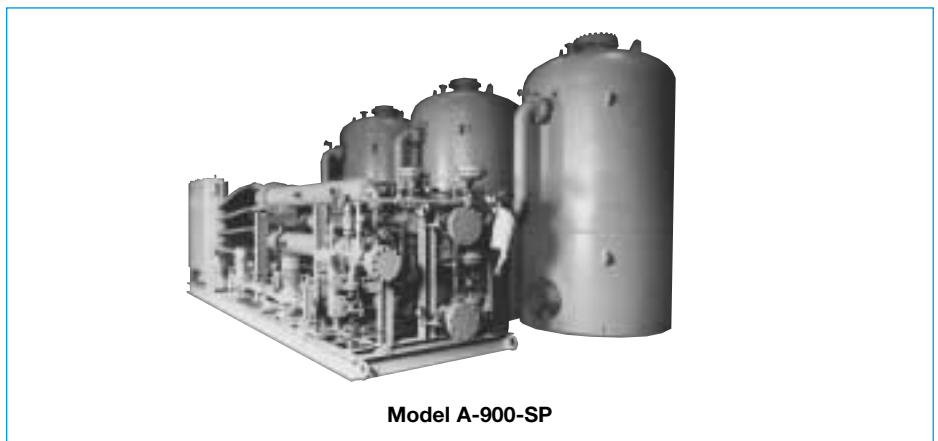
HIGH-PURITY AIR HYDRYER®

- Electronics plant
- 4,592 scfm at 135 psia
- Outlet specification:
 - 0.1 ppmv H₂O
 - 0.1 ppmv CO₂
 - 5.0 ppbv CO
- Catalytic purifier
- Two-stage cooling
- Local PLC control
- Dual-tower adsorbent beds
- Electric heater with SCR



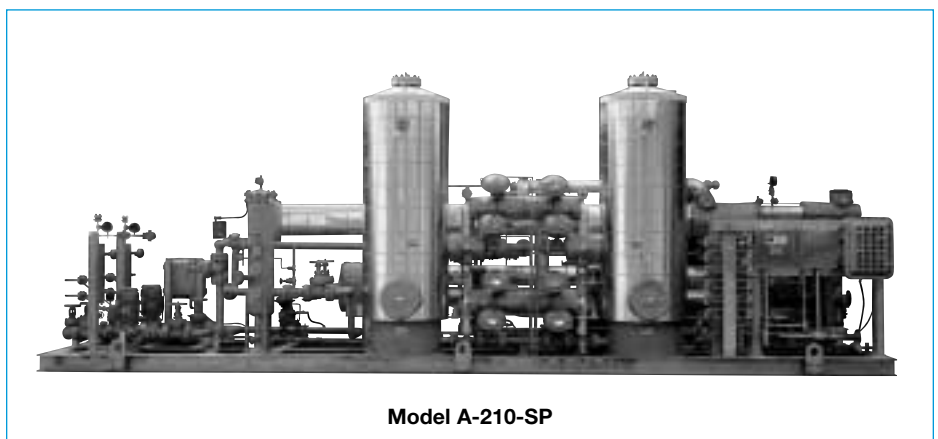
PROPANE HYDRYER®

- Underground storage site
- 4,800 gpm at 240 psig, saturated with water
- <20 ppmw water outlet
- Activated alumina
- Air-cooled condenser
- Parallel on-stream vessels
- Multiple electric heaters
- Local high- and low-voltage electrical enclosures



BUTANE HYDRYER®

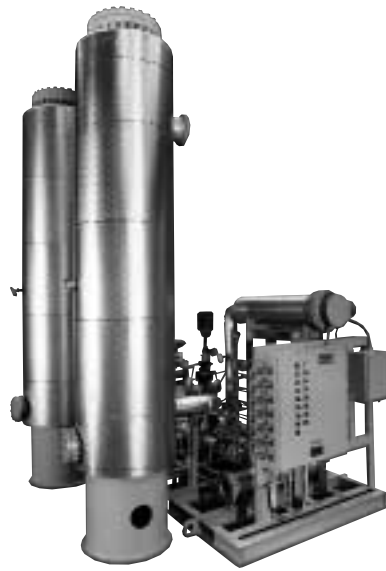
- Refinery
- 4,600 BPSD
- <10 ppmw water outlet
- Steam heater
- Dual API pumps
- Remote, redundant PLC
- Factory insulated
- Galvanized base and piping supports



Typical Custom Applications

CO₂ HYDRYER®

- Beverage industry
- 44,501 lb/hr
- 292 psig
- -80°F dew point
- Sulfur removal
- Factory insulated
- Metal seated valves
- Selective adsorbent



Model X-270-SP

N₂ HYDRYER®

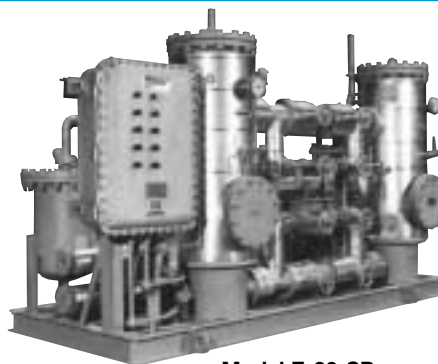
- PET processing
- 2.0 psig
- 500 SCFM
- -40°F dew point
- Organic removal
- Blower purge
- PLC control
- Molecular sieve adsorbent



Model C-300-SP

VENT-GAS HYDRYER®

- Chemical plant
- 1,200 lb/hr
- 36 psig
- 300 ppmv H₂O in
- 0.1 ppmv H₂O out
- Closed-loop regeneration
- Explosion-proof electrical enclosure
- Manual switching



Model E-30-SP

Typical Custom Applications

LANDFILL GAS

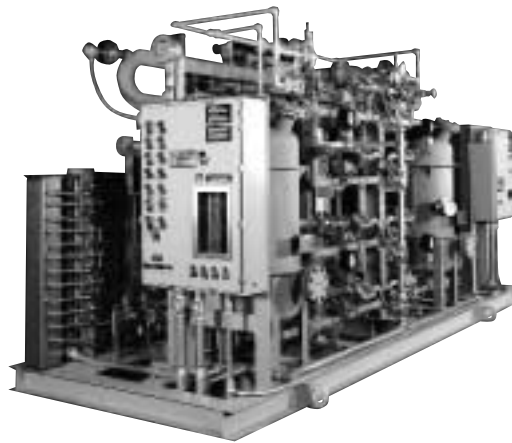
- Waste to energy plant
- 1,070 SCFM Biogas
- 70% CH₄, 20% CO₂, 1% H₂S, balance water and trace elements
- 30-35 psig, 105°F inlet
- Outlet dew point of 38°F
- Stainless steel materials in contact with process
- Class 1, Division 2, Group C & D electricals
- NEMA 4X "Z" purged electrical enclosure



Model R320A-SP

BENZENE HYDRYER®

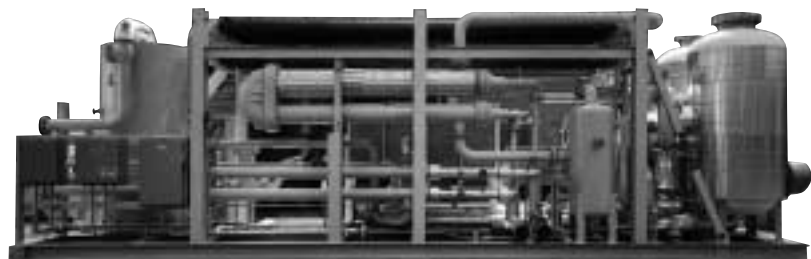
- LAB plant
- 525 lb/hr with 1,600 ppmw water
- <16 ppmw water outlet
- Split stream regeneration, no loss of product
- CSA electricals, inspected at factory
- Fully assembled, ready for piping and electrical connection
- CRN vessels



Model A-20-SP

ARGON HYDRYER®

- Air separation plant
- 41,700 SCFH crude argon
- 62 psia
- 4% oxygen inlet
- 2 ppmv oxygen outlet
- -100°F outlet dew point
- Catalytic deoxo bed
- Recirculation blower to dilute oxygen
- Finned pipe coolers



Model X-230-SP

Typical Custom Applications

PROPYLENE HYDRYER®

- Gulf coast refinery
- 14,300 BPD at 400 psig
- 0.5 ppmw outlet water
- Dual steam heaters
- Split stream regeneration – no loss of product
- Valve status lights on local PLC enclosure
- Galvanized base with deck plate



Model A-1410-SP

HYDROGEN HYDRYER®

- Chlor-Alkalai facility
- 28 MMSCFD @ 410 psig
- Eight vessel system
- HCl removal, lead-lag
- Sulfur removal
- Deoxo/RCI catalytic conversion
- Heat recovery
- Final moisture removal



Model X-930-SP

AIR PRE-PURIFIER HYDRYER®

- Air-separation plant
- Combination chiller/dryer
- 1,441 SCFM, 125 psia
- 400 ppm CO₂
- O₂ cleaned
- O₂ rich regeneration
- Remote PLC panel
- Outlet specification:
 - <0.1 ppmv H₂O
 - <1.0 ppmv CO₂



Model R360W/X-158-SP

Standard Dryers

Dryer Selection Guide

Dryer Type	Type Drying	Primary Service	Standard Flow Rates To SCFM	Obtainable Dew Point Range	Type Reactivation	Heater Location	Reactivation Purge	Purge Loss
G4 and G5	Refrigerated	Air, Gas	25,000	38°F to 50°F	NA	NA	NA	No
SD	Deliquescent Absorption	Air, Gas	16,500	20°F to 30°F Suppression	NA	NA	NA	No
GH	Adsorption	Air, Gas	6,000	-40°F to -100°F	Heatless	NA	Dry Product	Yes
GX	Adsorption	Air, Gas	6,000	-40°F	Electric	External	Mixed Flow	Yes
GXB	Adsorption	Air, Gas	6,000	-40°F	Electric	External	Mixed Flow	Yes
P and PC	Adsorption	Air, Gas	3,200	-40°F to -100°F	Electric	Internal in Pipe	Dry Product	Yes



MODEL G4

- Refrigerated
- Hot gas
- Economical
- 10-3,000 scfm
- Air or water cooled
- 35°F to 40°F dew point



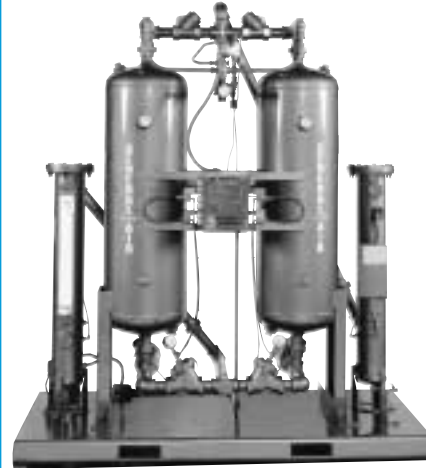
MODEL G5

- Refrigerated
- Digital dew-point readout
- Electronic demand control
- 40-25,000 scfm
- Air or water cooled
- 35°F to 40°F dew point



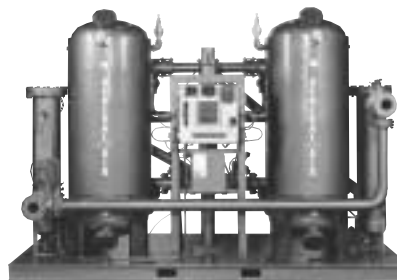
MODEL P/PC

- Internally heated
- Minimal purge loss
- Blower assist option
- Closed loop — no-loss option
- Standard and custom feature
- -40°F to -100°F dew point



MODEL GH

- Heatless
- -40°F to -100°F dew point
- 10-6,000 scfm
- Filter package options



MODEL GX

- Externally heated
- GXB – blower purge
- GXBC – closed loop
- 40-6,000 scfm
- Skid package
- -40°F dew point

For larger capacities, call, fax or e-mail our factory:

**Phone: (814) 453-3651 • Toll Free: (800) 829-1119
Fax: (814) 454-3492 • E-Mail: psb@genair.net**

For dryer selection, you may also visit our website:

www.psbindustries.com

Specialized Dryer Products

Deliquescent Desiccant Dryers can be installed indoors or outdoors, on systems equipped with aftercoolers. They are highly efficient at lower inlet temperatures. At inlet temperatures up to 100°F, a **20-30°F dew point temperature suppression** is attained.



Oilsorber®
The General Air Oilsorber® utilizes a bed of activated alumina and/or carbon to remove vapor phase oil through the adsorption process. The Oilsorber® will **remove vapor phase oil** entering an adsorbent bed dryer and prolong desiccant life.



Tank Vent Air Dryers
The General Air Storage Tank Vent Dryers are designed to reduce the water content of air entering a liquid storage tank, thus **decreasing internal corrosion and entrained water**. These dryers work on the same principles as General Air Desiccant Dryers with the exception that they are designed to efficiently dry air at atmospheric or near atmospheric conditions. **Carbon or stainless steel** construction is available.



Air and Gas Filters

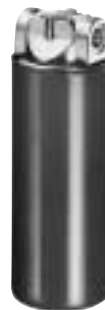
General Air's efficient **Filter** units, with replaceable cartridges, are available as **Particulate** filters, **Coalescing** filters, or as **Odorgard/Adsorbent** filters. The **Particulate** filter removes 100% of all solids 0.9 micron and larger. The **Coalescing** filter removes all particles and all aerosols down to 0.3 microns. The **Odorgard™** adsorbent filter removes oil and hydrocarbon vapors down to 0.001 ppm in addition to eliminating offensive odors affecting taste and smell.



Mini Adsorbers

The General Air Mini-Adsorber is the equivalent to a compact single-tower desiccant dryer. This type of system is designed to dry small volumes of compressed air for **point-of-use applications**. The General Air Mini-Adsorber design provides full bed adsorption. Inlet air flow is directed to the bottom of the canister, thus using the entire desiccant bed for upflow drying. Available adsorbers are:

- Activated alumina
- Molecular sieve
- Activated carbon



Parts

Spare Parts

- Filter elements
- All desiccant types

Parts, technical support, and optimization of dryers sold under PSB's brands:

- General Air
- Zurn
- Brown Fintube
- Pritchard

Drain Valves

ET-4 Electronically-Timed, Motor-Operated Ball-Drain Valves
NEMA 4X weatherproof enclosure for indoor and outdoor installation. Switches for adjusting the blow-down cycle and the valve-open time. A manual-override switch is equipped for manually checking the ball valve. These drain valves are available in 1/2", 3/4" and 1" NPT connections, carbon

steel, and stainless steel ball valves are available. The drain valves operate at 115 VAC, single phase, 50-60 cycles. This valve is a non-clogging, highly dependable drain used for receiver tanks, sumps, coalescing filter drains and refrigerated dryers.



PSB



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