

# INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

PN 32-0276  
REV A  
OCTOBER 2003

## PIPE LINE DEHYDRATOR FOR NATURAL GAS *PLD 8-7.2 thru PLD 36-7.2*

### WARNING

**DONOTREMOVE,REPAIRORREPLACEANYITEMONTHISVESSELWHILEITISUNDERPRESSURE.**

**DONOTOPERATEIFTHEREISALEAKINVESSEL.IMMEDIATELYTAKEVESSELOUTOFERVICEANDCALLYOURCERTIFYINGAUTHORITY.IF THEREISALEAK,DEPRESSURIZEVESSEL,INSPECT,REPAIRANDORREPLACEASNECESSARY.**

**DONOTOPERATEABOVEMAXIMUMWORKINGPRESSURE(MWP)ANDORABOVEMAXIMUMOPERATINGTEMPERATURE(DEGREES°F).**

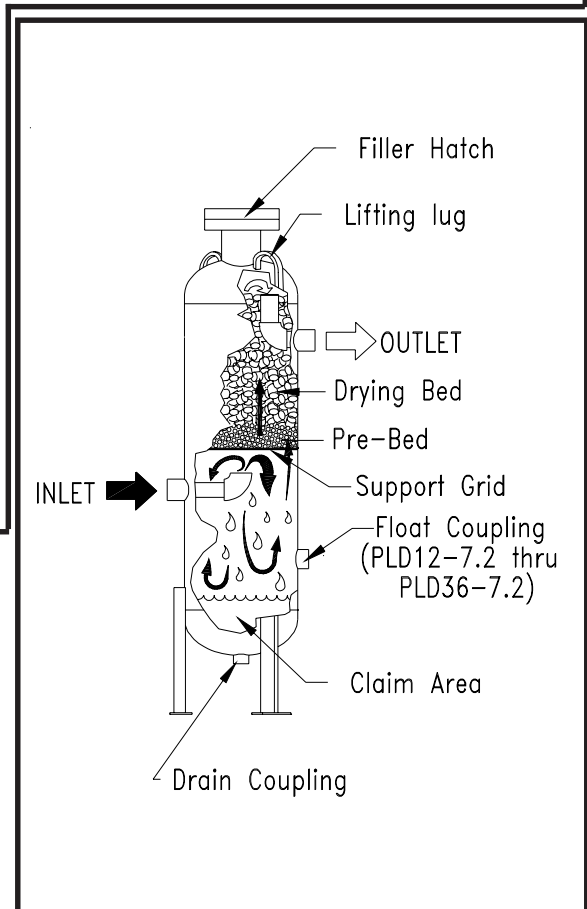
**DONOTWELDORGRINDVESSEL.ITWILLNOTBESAFETOOPERATE**

**DONOTOPERATEIFTHEVESSELHASBEENDAMAGEDBYFIRE.TAKEOUTOFSERVICEIMMEDIATELYANDNOTIFYYOURCERTIFYINGAUTHORITY.**

**ANYDAMAGETOVESSELCANMAKEITUNSAFE.INSPECTOUTSIDEANDINSIDEOFVESSELREGULARLYFORCORROSIONORANYDAMAGE(I.E.,DENTS,GOUGESORBULGES).IFDAMAGED,TAKEOUTOFSERVICEIMMEDIATELY.CALLYOURCERTIFYINGAUTHORITY.**

### 1.0 OPERATION

A Pipeline Dehydrator removes the water vapor (humidity) present in the gas line. The process cleans and dries the gas as it flows through a vessel which is filled with a special drying agent (desiccant). The dehydrator operates automatically. There are no moving parts and no external source of power is required.



"Wet" natural gas enters the lower portion of the dryer where liquid water and solid particles are separated by gravity and fall to the bottom of the vessel. The gas moves upward through the desiccant bed consisting of a prebed and a drying bed of Van Air desiccant tablets. These tablets attract and absorb moisture from the gas before it flows through the dryer outlet. The tablets dissolve gradually as they absorb the moisture. The prebed creates an extended surface area because of the liquid run off from the drying bed. The prebed then creates an area capable of removing additional moisture from the gas entering the drying bed. This conserves the absorbent desiccant tablets. The solution of dissolved desiccant and water falls into the claim area at the bottom of the vessel and must be drained regularly. An automatic drain can be installed on the dehydrator to drain the vessel automatically.

## 2.0 INSTALLATION

### 2.1 SELECTING LOCATION

*The ability of a dehydrator to dry natural gas is dependent on the correct location of the unit. Temperature and pressure are the keys to selecting the proper location.*

#### IMPORTANT

**ALWAYS PROCESS THE GAS THROUGH THE DEHYDRATOR AT THE LOWEST POSSIBLE TEMPERATURE AND THE HIGHEST PRACTICAL PRESSURE.**

**INLET GAS TEMPERATURE:** Lower inlet gas temperatures will result in a lower moisture content at the outlet of the dehydrator. Locate the dehydrator at the lowest possible temperatures.

#### CAUTION

**Never locate the dryer in a hot area. The inlet gas temperature should never exceed 100°F.**

#### MAXIMUM CAPACITIES - MSCFD

1,000 STANDARD CUBIC FEET PER DAY

MODEL NO.	PART NO.	MAXIMUM WORKING PRESSURE	100 PSIG	200 PSIG	300 PSIG	400 PSIG	500 PSIG	600 PSIG	720 PSIG
PLD 8-7.2	80-1326	720 PSIG	70	131	192	253	314	375	448
PLD 12-7.2	80-1328	720 PSIG	132	247	362	476	590	707	846
PLD 16-7.2	80-1330	720 PSIG	214	400	587	773	959	1147	1371
PLD 20-7.2	80-1332	720 PSIG	331	620	909	1199	1489	1774	2120
PLD 24-7.2	80-1334	720 PSIG	481	900	1319	1738	2158	2578	3081
PLD 36-7.2	80-1308	720 PSIG	1191	2230	3270	4308	5346	6383	7629

**AFTERCOOLING:** If the gas being processed has been compressed mechanically, an aftercooler, finned tubing or extended run of piping will usually be necessary to reduce the inlet gas temperature to the dehydrator.

**OPERATING PRESSURE:** More gas can be processed through the dehydrator at higher pressures. Locate the dehydrator at the highest practical pressure, but do not exceed the maximum rated working pressure of the dehydrator. Refer to the capacity chart located below.

**CAPACITY:** The chart below indicates the maximum flow rate through the dehydrator for a 24 HOUR period. To calculate the capacity for a rate per minute just multiply the **MSCFD RATE (from chart )** by **0.6944** example:

A PLD 12-7.2 operating at 100 PSIG has a maximum MSCFD rate of 132. To figure the SCFM multiply 132 MSCFD x 0.6944 which equals 92 SCFM

**NOTE: This is the MAX instantaneous flow that can be processed through the dehydrator without deterioration of the drying performance.**

### 2.2 PIPING AND ANCILLARY EQUIPMENT

#### IMPORTANT

**COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS CONCERNING INSTALLATION OF NATURAL GAS SYSTEMS. COMPLIANCE TO AND KNOWLEDGE OF ALL REGULATIONS IS THE RESPONSIBILITY OF THE INSTALLER.**

Make sure that the temperature of gas is not too high. If gas temperature is too high, cool it prior to the dehydrator.

Mount the dehydrator on a level surface capable of supporting the weight of the vessel. Such as a cement pad or a skid.

Install a pressure relief valve on the provided coupling (relief valve not furnished). A relief valve must be installed to conform with the ASME Boiler and Pressure Vessel Codes, Section VII, Division 1 UG-125, Paragraph (1) and OSHA standards also any local and/or federal applicable codes.

## 2.3 INLET AND OUTLET PIPING

**(OPTIONAL)** Two shut-off valves should be installed (not furnished with dryer)--one at dryer inlet and another at dryer outlet. See Figure 2-A Recommended Installation.

Pipe the natural gas in through the lower connection (inlet) and out through the upper connection (outlet).

### NOTE

Inlet and outlet shut-off valves will make start-up and addition of desiccant easier.

## 2.4 OPTIONAL AFTERFILTER

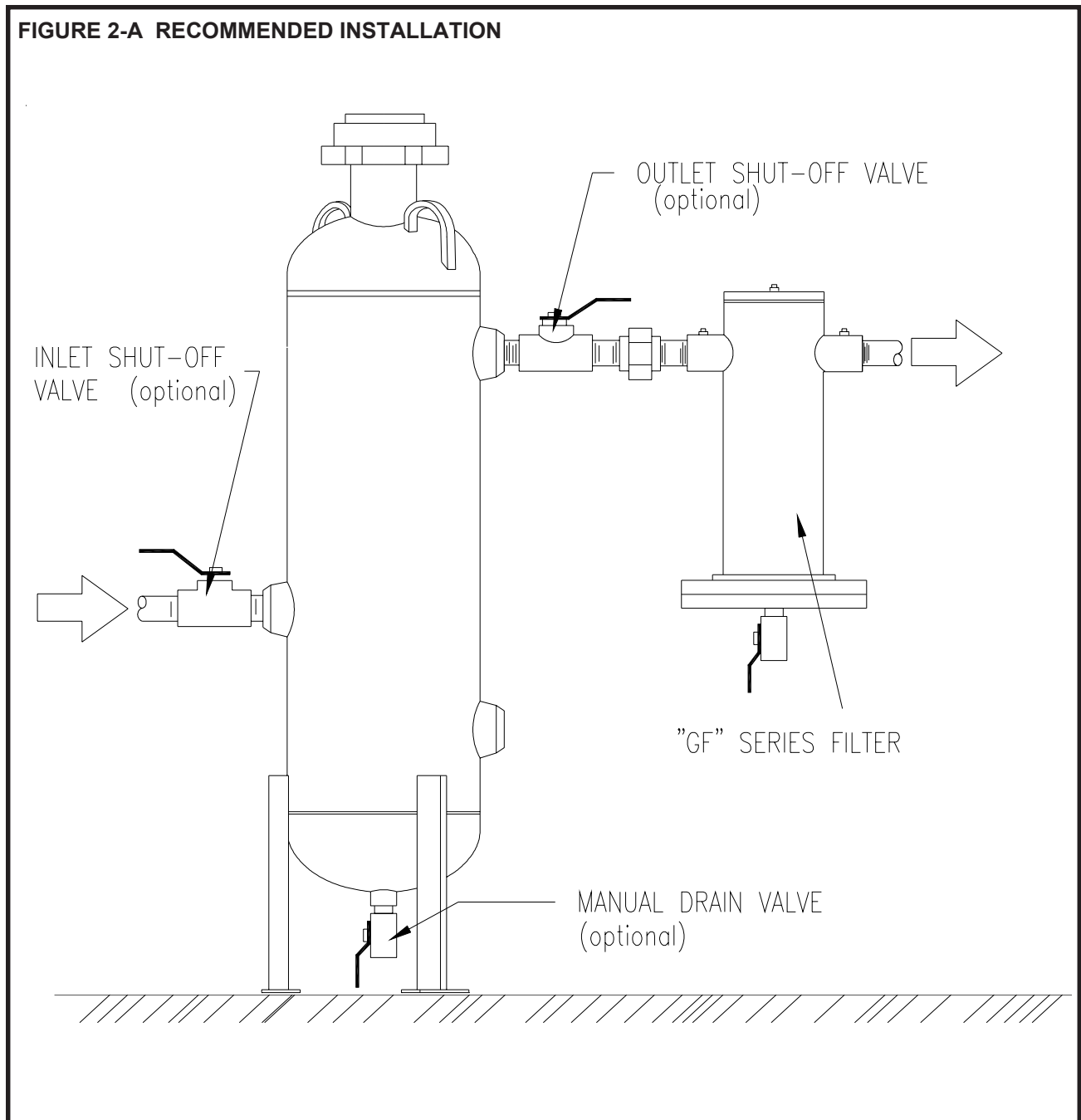
"GF" Series Filters can be ordered from the factory. The filters are designed to remove particles from the process gas. To order, contact the Van Air Factory for price and delivery.

## 2.5 RE-PAINTING INSTRUCTIONS

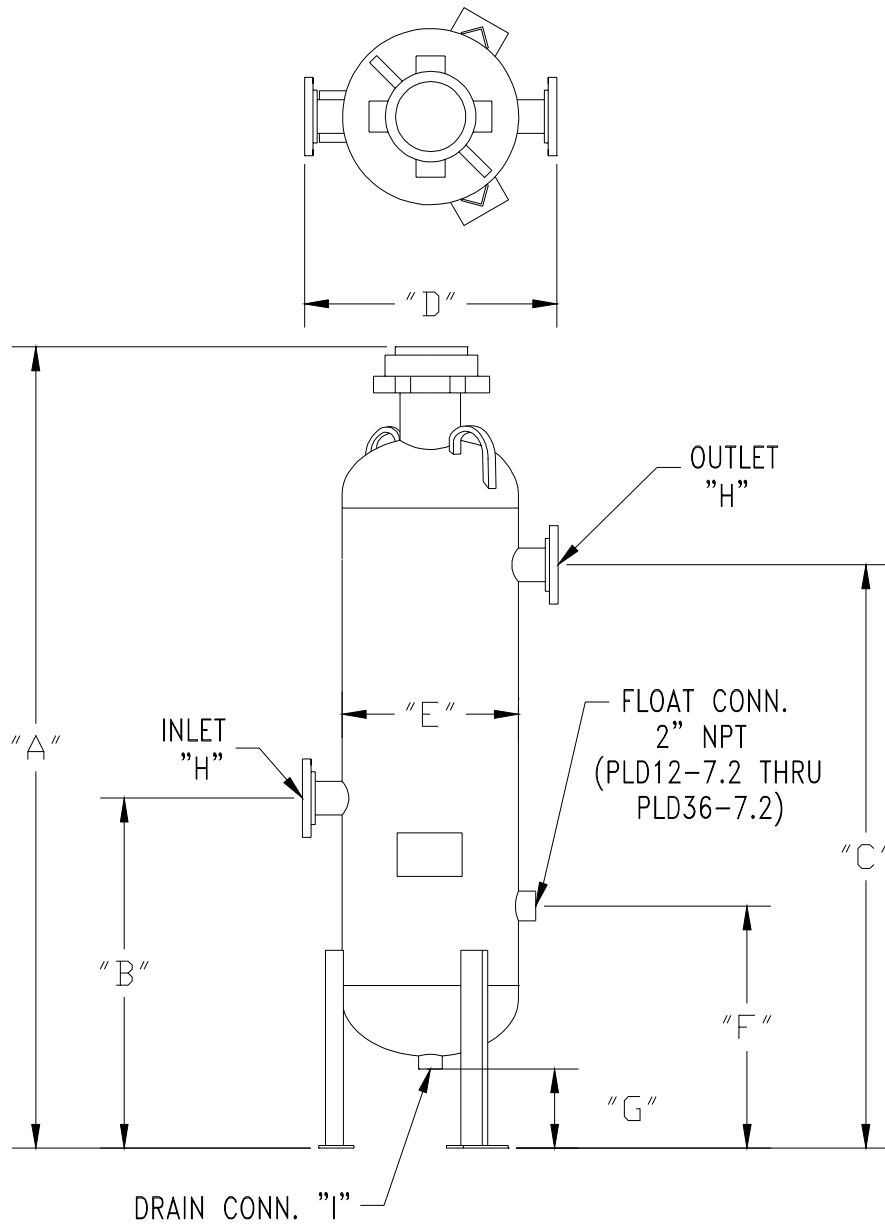
If the application requires that the vessel be repainted to fit the color code of the installation the following points must be considered:

- 1) Never paint the safety relief valve.
- 2) Do NOT grind the exterior surface. Hand sand exterior only.
- 3) Do NOT paint gasket sealing surfaces.
- 4) Do NOT paint gauges or valves.

FIGURE 2-A RECOMMENDED INSTALLATION



**FIGURE 2-B DIMENSIONAL AND COMPONENT LAYOUT**



MODEL	DRYER DIMENSIONS-INCHES								
	A Overall Height	B Inlet Height	C Outlet Height	D In to Out Width	E Outside Dia.	F Float Height	G Drain Height	H Inlet /Outlet NPT (f)	I Drain NPT (f)
PLD 8-7.2	70"	13-7/8"	54-7/8"	13-1/8"	8-5/8"	N/A	1-3/4"	2" NPT	1" NPT
PLD 12-7.2	94-3/8"	30"	76"	15-3/4"	12-3/4"	25"	13-5/8"	2" NPT	2" NPT
PLD 16-7.2	95-1/4"	30"	76"	19-1/4"	16"	25"	12-7/8"	2" NPT	2" NPT
PLD 20-7.2	94-3/4"	30"	76"	23-1/4"	20"	25"	11-7/8"	2" NPT	2" NPT
PLD 24-7.2	93-1/8"	26-1/8"	71-5/8"	36"	24"	21-1/8"	6-1/4"	3" RF FLG	2" NPT
PLD 36-7.2	100-7/8"	30-3/4"	76-1/4"	49-3/4"	37-3/4"	25-3/4"	7-1/8"	3" RF FLG	2" NPT

## 2.6 INSTALLING DESICCANT

Open filler hatch and add the proper amount of pre-bed material and desiccant to fill the dehydrator to the **MAXIMUM LEVEL**; then level off the top off the bed. (Reference SECTION 4.2 for desiccant installation instructions) **USE VAN AIR ABSORBENT DESICCANT ONLY!**

Close filler hatch. Make sure that the inlet and outlet shut-off valves, and manual drain valve are closed.

## 3.0 OPERATION

### 3.1 START-UP

Close dehydrator drain valve. See Figure 2-A Recommended Installation.

**SLOWLY** pressurize by opening the inlet shutoff valve.

Open the outlet shutoff valve (if installed) slowly to place dehydrator on stream.

#### CAUTION

**Make sure that the dehydrator is not subjected to sudden flow surges. Always open valves slowly to permit a gradual equalization of pressure between the dehydrator and the gas supply lines.**

Check all pipe and fitting connections made during installation for leaks. If any leaks are present, immediately depressurize the system and remedy the problem before continuing operation. A solution of soapy water applied to all connections can be used to check for leaks.

### 3.2 SHUTDOWN

Before shutdown, drain the dryer to remove any moisture accumulated in the sump area, using the manual valve.

Close dryer inlet and outlet shutoff valves. Open manual drain valve to depressurize the vessel.

## 4.0 MAINTENANCE & REPAIR

### 4.1 MAINTENANCE

#### WARNING

**IF DRYER IS NOT DRAINED REGULARLY, FLOODING WILL OCCUR. IF FLOODING OCCURS, ACCUMULATED LIQUID MAY ENTER SYSTEM AND DAMAGE DOWNSTREAM EQUIPMENT.**

**INSPECT BED LEVEL:** During the drying process, the desiccant tablets dissolve slowly. More tablets must be added to the supply when the top of the bed drops to the **MINIMUM LEVEL**. The consumption rate is dependent upon several factors, such as inlet temperature and flow. In Section 4.4, **DESICCANT CONSUMPTION**, are several charts showing an example of desiccant usage rate. Use the charts and formula along with the Desiccant Usage Report available from Van Air to determine an approximate usage rate for your application. However, until the actual usage rate is determined, check the bed level monthly.

#### NOTE

Use VAN AIR desiccants only. Filling dryer with any other material will void the warranty.

### 4.2 ADDITION OF DESICCANT

Close dryer inlet and outlet shut-off valves. Open drain valve and allow dryer to depressurize completely.

#### WARNING

**COMPLETELY DEPRESSURIZE DRYER BEFORE ATTEMPTING TO REMOVE FILLER COVER OR ANY PART OF DRYER.**

**WHEN HATCH COVER IS REMOVED TO ADD DESICCANT, ALWAYS CHECK GASKET FOR SIGNS OF WEAR.**

**CHECK COVER FOR RUST, CORROSION OR DAMAGE; REPLACE IF NECESSARY.**

**Addition of Desiccant (continued)**

Remove the filler cover.

Using the chart in Figure 4-A Determine the proper quantity of prebed.

Place the prebed into the dehydrator first. Level off the prebed.

Again using the chart in Figure 4-A determine the correct quantity of desired desiccant required to fill the dehydrator.

Slowly pour the desiccant into the dehydrator. Level off the

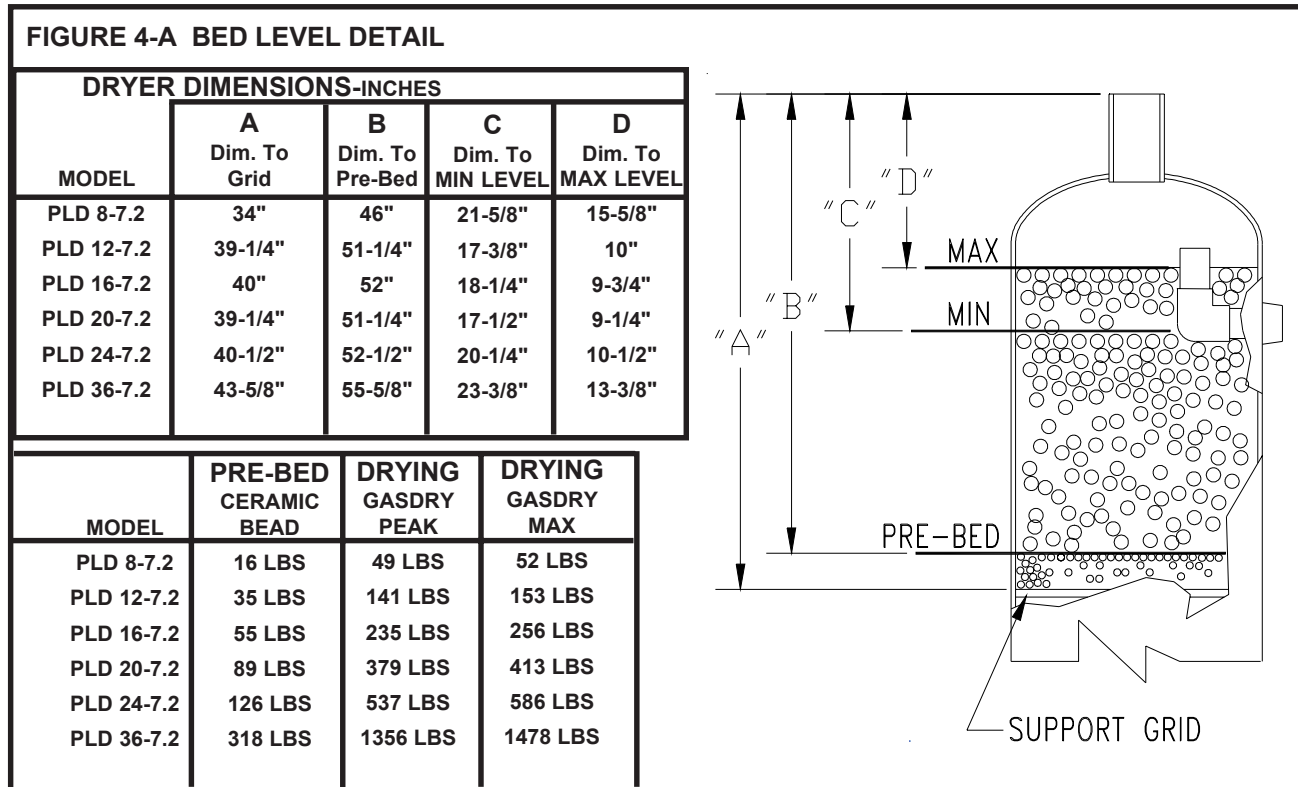
desiccant bed. The desiccant level should NOT be higher than the OUTLET screen.

Once the proper type and amount of desiccant is installed, replace the filler cover.

Close the manual drain valve.

Slowly open the inlet shut-off valve. Allow the dehydrator to pressurize.

Open the outlet shut-off valve and place the dehydrator on stream.



**4.3 BED LEVEL GUIDE**

The level of the desiccant bed should be maintained as close to the MAXIMUM level as possible. The bed level should not be allowed to fall below the MINIMUM level. Dehydrator performance will be effected. Reference Figure 4-A for levels and quantities.

With the filler port cover removed, use a measuring stick to determine the distance from the top of the filler opening to the top of the desiccant bed. Reference Figure 4-A dimension 'D'. A full vessel should measure this distance from the filler port to the bed.

**CAUTION**  
**Never fill the vessel above the MAXIMUM LEVEL.**  
**Filling the vessel above the MAXIMUM level may effect the performance of the dehydrator.**

The desiccant bed level should be checked regularly. Section 4.4 DESICCANT CONSUMPTION will help you estimate the amount of desiccant that the dehydrator should use.

**4.4 DESICCANT CONSUMPTION**

Consumption rate based on average conditions. Actual conditions can vary.

**4.4-A GASDRY PEAK DRYING TABLETS**

This general purpose tablet is recommended for installations where inlet gas temperature is 70°F or lower. Depending on the pressure and temperature, GasDry Peak can provide a residual moisture content below 7 lbs/mmscf.

Chart 1 shows the level of dryness that GasDry Peak will provide at different conditions.

Chart 2 shows an approximate consumption rate for GasDry Peak at several conditions. Use the charts for guidelines to calculate the approximate consumption rate of the desiccant.

**CHART 1**  
**MOISTURE CONTENT OF GAS (LBS. H2O/MMSCF)**  
**AFTER DEHYDRATOR WITH GASDRY PEAK**

INLET TEMP	50 PSIG	100 PSIG	150 PSIG	175 PSIG	200 PSIG	225 PSIG	250 PSIG
70°F	95.6	55	39.1	34.3	30.6	27.7	25.3
65°F	80.7	46.5	33.1	29.0	25.9	23.4	21.4
60°F	68	39.2	27.9	23.6	21.9	19.8	18.1
55°F	56.6	32.7	23.3	18.3	18.3	16.5	15.1
50°F	47.3	27.3	19.5	15.3	15.3	13.8	12.7
45°F	39.2	22.7	16.2	14.2	12.7	11.5	10.5
40°F	32.4	18.8	13.4	11.8	10.5	9.6	8.8

**4.4-B GASDRY MAX DRYING TABLETS**

Where extremely dry gas is required or where operating pressure is low, GasDry Max tablets provide a lower residual moisture content.

Chart 3 shows the level of dryness that GasDry Max will provide at different conditions.

**CHART 3**  
**MOISTURE CONTENT OF GAS (LBS. H2O/MMSCF)**  
**AFTER DEHYDRATOR WITH GASDRY MAX**

INLET TEMP	50 PSIG	100 PSIG	150 PSIG	175 PSIG	200 PSIG	225 PSIG	250 PSIG
70°F	35.5	20.4	14.5	12.7	11.3	10.2	9.4
65°F	29.9	17.2	12.2	10.7	9.6	8.7	7.9
60°F	25.2	14.5	10.3	9.1	8.1	7.3	6.7
55°F	21.0	12.1	8.6	7.6	6.8	6.1	5.6
50°F	17.5	10.1	7.2	6.3	5.6	5.1	4.7
45°F	14.5	8.4	6.0	5.3	4.7	4.3	3.9
40°F	12	6.9	4.9	4.3	3.9	3.5	3.2

**CHART 2**  
**GASDRY PEAK CONSUMPTION RATE (LBS./MMSCF)**

INLET TEMP	50 PSIG	100 PSIG	150 PSIG	175 PSIG	200 PSIG	225 PSIG	250 PSIG
70°F	40.4	23.3	16.5	14.5	12.9	11.7	10.7
65°F	34.1	19.6	14.0	12.3	10.9	9.9	9.1
60°F	28.7	16.6	11.8	10.5	9.2	8.4	7.7
55°F	23.9	13.8	9.8	9.1	7.7	7.0	6.4
50°F	20.0	11.5	8.2	7.7	6.5	5.9	5.4
45°F	16.6	9.6	6.9	6.0	5.4	4.9	4.5
40°F	13.7	7.9	5.7	5.0	4.5	4.0	3.7

**NOTE**  
**MMSCF is 1,000,000 STANDARD CUBIC FEET**

Chart 4 shows an approximate consumption rate for GasDry Max at several conditions. Use the charts for guidelines to calculate the approximate consumption rate of the desiccant.

**CHART 4**  
**GASDRY MAX CONSUMPTION RATE (LBS./MMSCF)**

INLET TEMP	50 PSIG	100 PSIG	150 PSIG	175 PSIG	200 PSIG	225 PSIG	250 PSIG
70°F	38.0	21.9	15.6	13.7	12.2	11.0	10.1
65°F	32.1	18.5	13.2	11.6	10.3	9.3	8.5
60°F	27.0	15.6	11.1	9.8	8.7	7.9	7.2
55°F	22.5	13.0	9.3	8.2	7.3	6.6	6.0
50°F	18.8	10.9	7.8	6.8	6.1	5.5	5.1
45°F	15.6	9.0	6.5	5.7	5.1	4.6	4.2
40°F	12.9	7.5	5.3	4.7	4.2	3.8	3.5

**4.0 TROUBLESHOOTING CHECK LIST**

If liquid water is detected downstream or if desiccant consumption seems excessively high, the most likely causes areas are as follows:

Possible Causes	Check list
Liquid downstream	The frequency of draining is not adequate.
High inlet temperature	Check inlet Temperature. Conditions may have changed. Determine the cause. If gas is compressed mechanically, check compressor aftercooler.
Low desiccant level	Check bed level to make sure that desiccant tablet level has not dropped below minimum level.
Incorrect flow and/or pressure	Check flow through dehydrator, refer to chart on page 2. Check inlet pressure.
Contaminated Desiccant bed	Inspect condition of desiccant. If discolored (deep yellow or brown), it may be contaminated. A heavily contaminated desiccant bed must be replaced to return dehydrator to optimum performance.

If correcting conditions in the troubleshooting check list does not remedy the problem, consult your local VAN AIR Distributor or call the VAN AIR factory in Lake City, Pennsylvania (888)-606-9303 or (814)-774-2636.

## 5.0 REPLACEMENT PARTS LIST

### PLD 8, PLD 12, AND PLD 16 DEHYDRATOR

DESCRIPTION	PART NO.
FILLER COVER (complete)	10-0450
FILLER COVER O-RING (only)	26-3639

### PLD 20, PLD 24, AND PLD 36 DEHYDRATOR

DESCRIPTION	PART NO.
FILLER COVER (complete)	10-0451
FILLER COVER O-RING (only)	26-3640

### DESICCANTS

#### CERAMIC BEAD (PREBED)

DESCRIPTION	PART NO.
90 LB. CARTON	33-0281

#### GASDRY PEAK (DRYING)

DESCRIPTION	PART NO.
45 LB. PAIL	33-0328
50 LB. BAG	33-0205
400 LB. DRUM	33-0283

#### GASDRY MAX (DRYING)

DESCRIPTION	PART NO.
7 LB. PAIL	33-0318
25 LB. PAIL	33-0232

GasDry Peak and GasDry Max are the registered trade names of chemical drying agents specifically formulated by and for VAN AIR Single Tower Dehydrators.

**VAN AIR INC**

WE MAKE COMPRESSED AIR AND GAS WORK BETTER.

2950 Mechanic Street  
 Lake City, Pennsylvania 16423-0354 USA  
 Phone: 888/606-9303 or 814/774-2636

PRINTED IN THE USA