LECTRODRYER

ADSORPTION TECHNOLOGY EXPERTS

TYPE-R

HEATLESS LECTRODRYERS

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The Type-R LECTRODRYER is a dual absorber unit capable of drying compressed air and gases to dewpoints of -100 F and below without using electric heaters or any other source of heat for reactivation.

The heatless principle takes advantage of two basic physical phenomena (1) absorbents and desiccants seek to establish a vapor pressure equilibrium with their environment and (2) expansion of compressed gas from a high pressure to a low pressure reduces the partial pressure of all constituents in a proportion equal to the ratio of absolute pressure change. Thus, an absorbent in the highly active state will have a very low water vapor pressure, and will absorb water vapor from a higher vapor pressure environment. Conversely, a water saturated desiccant will give up its water vapor to a lower vapor pressure environment.

Operation of these heatless LECTRODRYER consists of passing the wet air through one tower where the water vapor is removed. A portion of this dry air is expanded to essentially atmospheric pressure and flows through the other tower stripping off the water vapor that had been previously adsorbed and in accordance with the aforementioned principles.

There are sixteen (16) standard sizes of Type-R LECTRODRYERS available, each normally operating on a relatively short time cycle. Smaller units are wall mounted and larger are floor mounted. Each has essentially the same quality components for trouble-free installation and service.

All sizes incorporate the same basic concepts of good design which include depressurizing, purging, and repressurizing in a downward direction to avoid pressure shocks to the desiccant bed. Drying is in an upward direction and bed velocities are limited below a particle flotation point to minimize bed disturbance and potential dusting.

Since each standard size Type-R LECTRODRYER can be rated for a wide range of capacities, a single size valve and piping manifold for each could either add to the costs for a low rating, or could have a high pressure drop for the high rating. Therefore, two sizes of piping manifolds are available on some sizes to provide wider flexibility and economy.

Purge loss is a function of the actual operating pressure and ranges down to about 10% at 150 PSIG. A steam jet ejector or a vacuum pump can be furnished to reactivate under partial vacuum and reduce purge losses to about 2% at 150 PSIG.

Cycling of Type-R LECTRODRYERS is performed on short time intervals. In the event of a power failure, causing the timer to stop, there is no shut off of air supply since the system is “fail-safe.” Generally, enough drying capacity is in each tower to allow up to eight hours continued operation of dry air until the fault can be corrected. For those remote locations where no power is available, an all pneumatic control system is available as an optional feature.

Very few air systems are free of oil, pipe scale, dirt, contaminants. All these can decrease the drying capacity and efficiency of a LECTRODRYER. Similarly, dusting of the desiccant from filling, attrition during shipment and mis-operation can occur. Suitable prefilters and afterfilters are available. Consult the local LECTRODRYER representative for recommendations.

MODEL	LENGTH	WIDTH	HEIGHT	WEIGHT	MOUNTING
R-20	19"	12"	32"	200 LBS	WALL
R-35	19"	12"	44"	300 LBS	WALL
R-80	35"	22"	81"	500LBS	FLOOR
R-140	56"	23"	89"	790 LBS	FLOOR
R-225	56"	23"	91"	1075 LBS	FLOOR
R-320	56"	24"	93"	1350 LBS	FLOOR
R-500	56"	28"	95"	1500 LBS	FLOOR
R-800	56"	28"	98"	2100 LBS	FLOOR

MODEL	LENGTH	WIDTH	HEIGHT	WEIGHT	MOUNTING
R-1200	62"	40"	106"	3000 LBS	FLOOR
R-1850	80"	48"	115"	4500 LBS	FLOOR
R-2600	84"	58"	115"	6670 LBS	FLOOR
R-3550	96"	69"	120"	9065 LBS	FLOOR
R-4600	108"	80"	135"	11850 LBS	FLOOR
R-6000	120"	90"	140"	14890 LBS	FLOOR
R-10000	132"	100"	150"	25500 LBS	FLOOR
R-16500	160"	125"	172"	41600 LBS	FLOOR

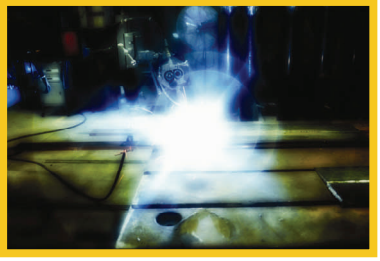
Design Features:

WALL MOUNTED TYPE-R LECTRODRYERS:
Standard features include adsorber vessels built for working pressures up to 150 PSIG, ball activated alumina desiccant, stainless steel desiccant supports, desiccant fill and drain connections, electrically operated valving arrangement, check valves, purge flow adjusting valve, purge exhaust muffler, repressurization feature, timer, control switch, indicating light, and 110 volt AC operation with NEMA 4 electrical enclosure as standard. (Also meets NEMA 1 and 12.)

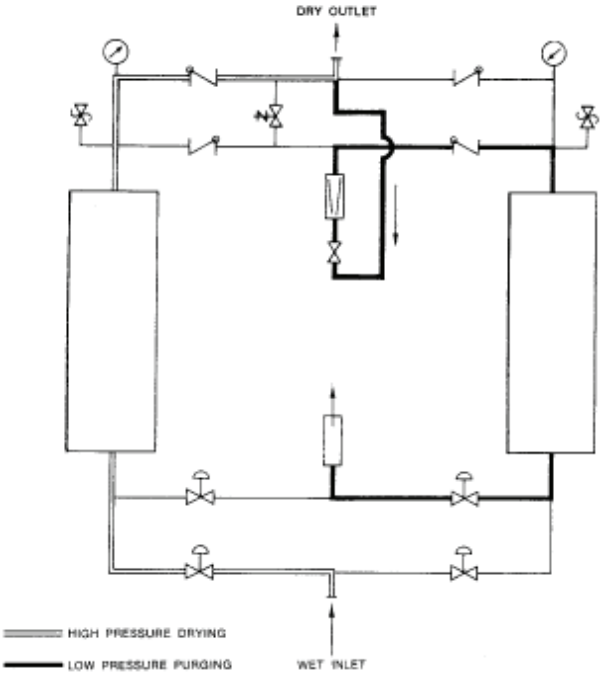
Optional features include pressure gages, over-pressure relief valves, switch failure detection with alarm contacts and NEMA 7 electrical enclosures.

FLOOR MOUNTED TYPE-R LECTRODRYERS:
The floor mounted Type-R LECTRODRYERS include ASME Code stamped pressure vessels with a design pressure of 150 PSIG, ball activated alumina desiccant, stainless steel desiccant supports, desiccant fill and drain connections, interconnecting piping arrangement with pneumatically operated 2-way valves, except R-80 which has solenoid valves, check valve manifold, over-pressure relief valve and pressure gage for each adsorber, repressurization feature, purge flowmeter and purge flow adjusting valve, purge exhaust
muffler, timer, control switch, indicating light and 100 volt AC operation with NEMA 1 electrical enclosure.

Optional features include outlet humidity indicator, switch failure detection with alarm contacts, high humidity detection with alarm contacts, NEMA 4, 7, and 12 electrical enclosures, and all pneumatic controls where no electrical power is available.



Typical Flow Diagram #1

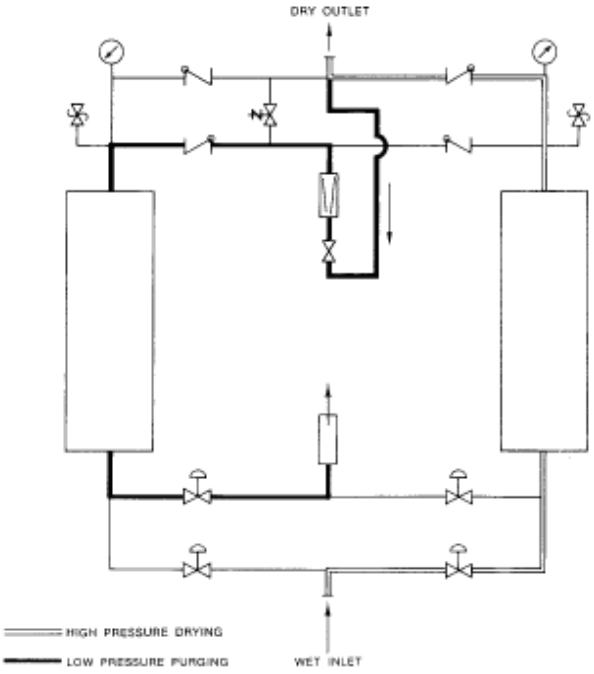


The Type-R LECTRODRYER Drying Cycle

A normal operation would be as shown in Diagram 1. The wet air enters at the bottom as shown and exits at the top, dried to the equilibrium condition of the desiccant. At the same time, a portion of the dry air is diverted as shown by the solid line, expanded to about atmospheric pressure, and purges through the other adsorber, establishing a new desiccant equilibrium. After repressurization at the end of the purging period, switchover occurs and flows are as shown in Diagram 2.

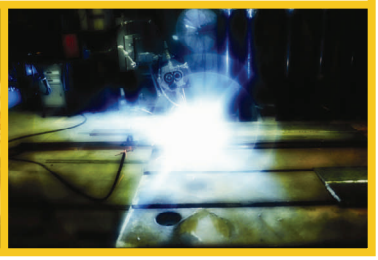
Illustrating a beginning operation, with the desiccant saturated with respect to an 80 F dewpoint (water vapor partial pressure equals 1.0 In. Hg) assume an operating pressure of 10 atmospheres. The first adsorber dries to an equilibrium of 1.0 In. Hg which when expanded from 10 atmospheres brings the other adsorber to an equilibrium of .01 In. Hg. The second absorber subsequently goes on drying service to provide dry air at 0.1 In. Hg and purging air at 0.01 In. Hg to the first adsorber. This process continues until each tower is in a high state of activation, producing very low moisture content effluents.

Typical Flow Diagram #2

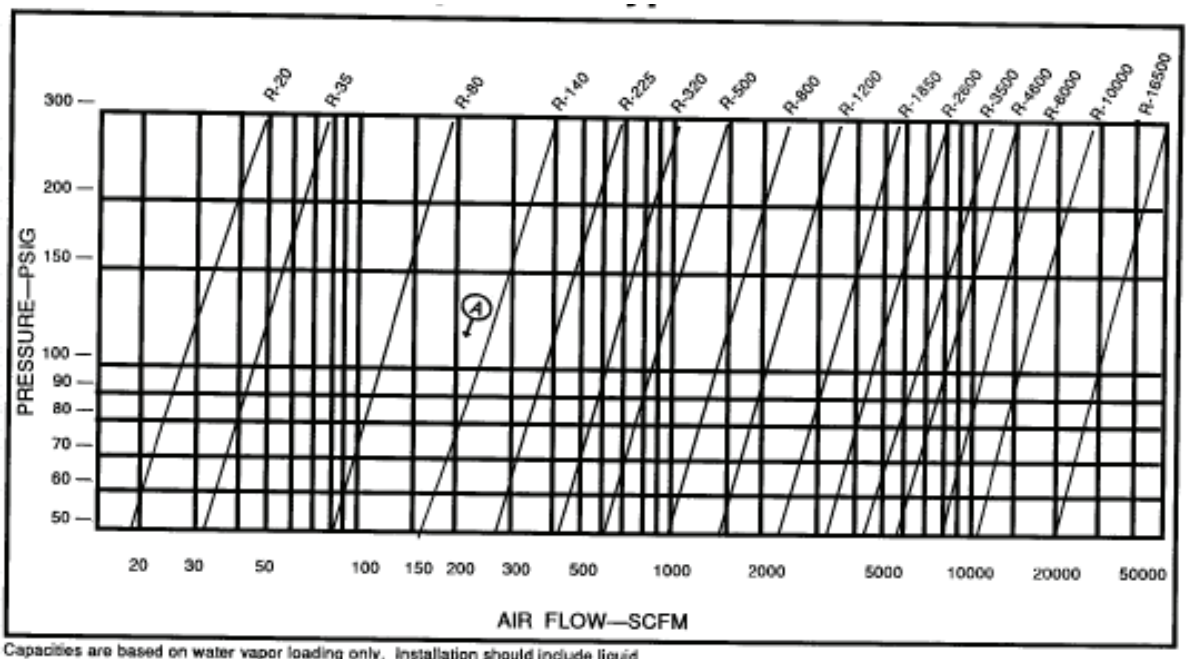


Advantages of the Type-R LECTRODRYER:

- Capable of producing dewpoints below -100 F.
- Eliminates the need for heaters and any attendant problems.
- Performance not greatly affected by variations in the inlet saturation temperatures up to 120 F. This allows economic selection since a heated type dryer rated at 120 F is about double the size of one rated at 95 F.
- Reduces the need for high power loads, since the electrical control demand averages less than a light bulb.
- Dependable trouble-free automatic operation with simple control systems.
- No need for personnel heat guards, thus, simplifying installation safety requirements.
- Lower initial cost, simplified installation, and low maintenance and operating costs.
- Incase of power loss unit will fail safe with reactivation valves closed and adsorption valves open.



How to Select the Proper Size Type-R LECTRODRYER



Capacities are based on water vapor loading only. Installation should include liquid and solid entrainment removal equipment ahead of LECTRODRYER. Consult us for recommendations.

How to select the proper size Type-R LECTRODRYER…
PROBLEM:
Flow of 200 SCFM of air needs to be dried at 100 PSIG.
SOLUTION:
Find the intersection of 200 SCFM and 100 PSIG-Point A on chart.
Choose R-140 LECTRODRYER.

Let LECTRODRYER help you with any type of moisture problem.
LECTRODRYER, founded in 1932 and originally known as Pittsburg Lectrodryer, manufactured the world's first standard line of adsorption dryers. LECTRODRYER offers a complete line of drying equipment and related products applicable to almost every major industry. Although LECTRODRYER models vary greatly in size and application, the basic purpose of LECTRODRYER equipment is to remove water and other similar trace constituents from a fluid.

In a true sense a LECTRODRYER is a piece of equipment for removing a constituent from a fluid by means of absorption and then having the ability of returning that adsorbent to its original condition so that the process can be repeated as many times as necessary.

LECTRODRYER maintains an efficient and productive manufacturing plant in Richmond, KY. Strict quality control features together with modern manufacturing techniques enable LECTRODRYER to produce equipment with utmost drying efficiency and long-term economy.

But perhaps the most important aspect of our facilities is the expertise that goes into the design and manufacture of LECTRODRYER equipment.

Drying equipment is used in almost every major industry in one way or another. (For example, 90% of the 100 largest industrial firms in the United States are now using LECTRODRYER equipment for dehumidification.) But the applications and requirements are many and varied.

As a result, LECTRODRYER offers a complete selection of standard units in a wide range of sizes and capacities. Plus the knowledge and ability to design and build custom equipment for unusual drying problems.

Thousands of LECTRODRYERS work around the clock to keep moisture out of the instrument and other compressed air lines, and out of gas storage and piping systems. LECTRODRYERS are also used to dehumidify laboratories, pilot plants, and entire production areas in manufacturing and pharmaceutical plants. This tremendous acceptance is your assurance of dependability and sound engineering know-how to serve construction/engineering firms, consultants, process and plant engineers.

Get more information at www.lectrodryer.com.

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