



# Technical Specifications

## Freedom Dryers

### 2 through 16,000 SCFM

#### Main Features

Van Air Freedom compressed air dryers remove costly compressed air line moisture effectively and economically. Specially formulated Van Air absorbent desiccants enable the Freedom dryer to provide a self-adjusting pressure dew point that is automatically regulated by the inlet temperature to the dryer.

All Van Air Freedom dryers feature...

#### Energy-Free, Environmentally Friendly Operation

- No electricity is required for dryer operation.

- No refrigerants are needed. Dry-O-Lite® desiccant is non-toxic, non-polluting and adds no harmful acidity to the drain solution. Material Safety Data Sheets and independently conducted bioassay test results are available on request.

#### Low Initial and Operating Costs

- No electrical costs, low pressure drop (less than 1% of operating pressure), automatic desiccant usage regulation based on air flow and a low purchase price compared to other dryer types save money.

#### Application and Installation Versatility

- Ideal for a wide range of uses, the Freedom dryer protects against freeze-ups in the winter and liquid in the summer. It may be installed indoors or out and can be incorporated into stationary or portable compressed air systems. It is also suitable for dusty and hazardous locations.

#### Call Us for Larger or Engineered-to-Order Models for Your Application

#### Operation

Wet compressed air enters the bottom of the dryer and flows upward through a bed of desiccant which absorbs moisture as it slowly dissolves. Condensate drops to the bottom to

be drained. Dry air exits the top.

The Freedom dryer automatically provides a pressure dew point that is 20°F/11°C lower than the inlet temperature to the dryer. If the

inlet air temperature to the dryer is 80°F/27°C, the dryer will provide a 60°F/15.5°C pressure dew point. If the inlet air temperature to the dryer is 30°F/-1.1°C, the dryer will provide a 10°F/-12.2°C pressure dew point.

#### Standard Equipment

##### Model D-2 (7 scfm)

- Manual drain valve (1/4" NPT)
- Sight window (to check desiccant level)
- Epoxy interior coating
- PVC plastic bed support grid
- Epoxy exterior finish
- 10-year warranty

##### Models D-4 and D-8 (10 & 50 scfm)

- Manual drain valve (1/2" NPT)
- Sight window (to check desiccant level)
- Vessel fabricated to ASME Code, Section VIII, UM stamped & certified
- Epoxy interior coating
- Epoxy coated carbon steel bed support grid

- Primer & enamel exterior finish
- 10-year warranty

##### Models D-12 through D-36 (75-850 scfm)

- Manual drain valve (1" NPT)
- Sight windows (2 - to check desiccant level)
- Elliptical direct entry hatch cover
- Pressure relief coupling
- Vessel fabricated to ASME Code, Section VIII (models D-12 and D-16 UM stamped & certified, models D-20 through D-36 U stamped & certified)
- Epoxy interior coating
- Epoxy coated carbon steel bed support grid
- Primer & enamel exterior finish
- 10-year warranty

##### Models D-42 through D-156 (1250-16,000 scfm)

- Manual drain valve (1" NPT on D-42 through D-54, 2" NPT on D-60 through D-156)
- Sight windows (2 - to check desiccant level)
- Elliptical direct entry hatch cover
- Inspection coupling
- Pressure relief connection
- Vessel fabricated to ASME Code, Section VIII and U stamped & certified
- Epoxy and polyurethane interior coating
- ABS plastic bed support grid
- Primer & enamel exterior finish
- 10-year warranty

#### Optional Equipment

##### Model D-2 (7 scfm)

- Pressure gauge kit

##### Models D-4 and D-8 (10 & 50 scfm)

- Pressure gauge kit
- Canadian Registration Number

##### Models D-12 through D-36 (75-850 scfm)

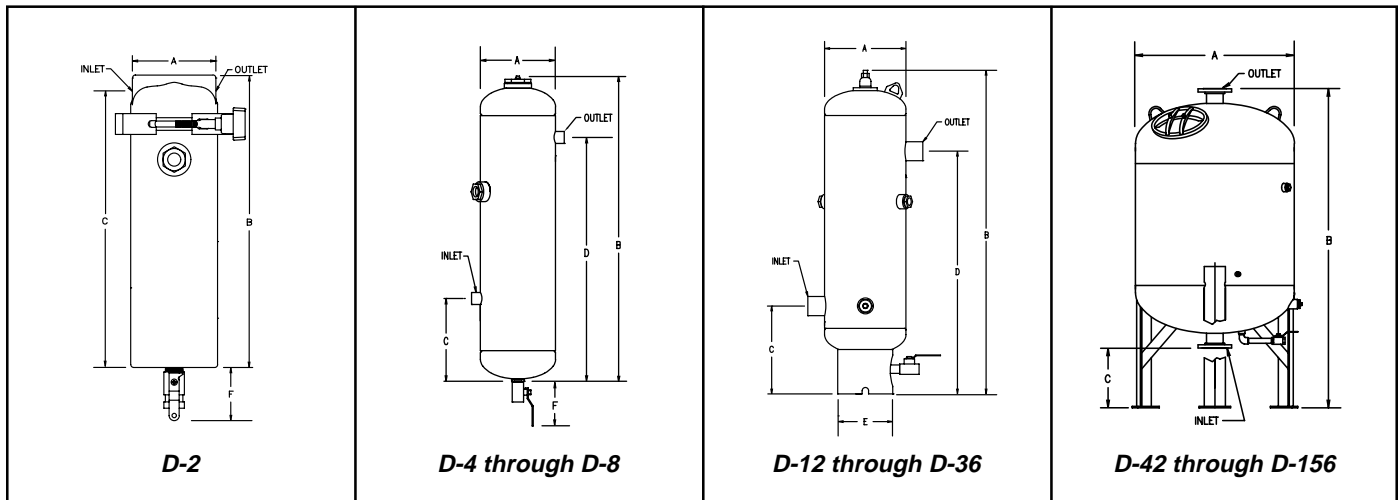
- Pressure gauge

- Temperature gauge
- Temperature/pressure gauge
- High condensate level alarm (gauge coupling may be used for installation on models D-12 through D-20)
- Electric automatic ball valve drain
- Canadian Registration Number

##### Models D-42 through D-156 (1250-16,000 scfm)

- Pressure gauge
- Temperature gauge
- Temperature/pressure gauge
- High condensate level alarm
- Electric automatic ball valve drain
- Canadian Registration Number

# Dimensions and Specifications



MODEL NO.	Rated Flow @ 100 psig (6.9 bar)		A		B		C		D		E		F		In/Out Conn. in	Filler Hatch Opening in	Vessel Weight		Initial Fill* Dry-O-Lite	
	SCFM	Nm <sup>3</sup> /hr	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm			lbs	kg	lbs	kg
D-2	7	11.3	3.5	9	12.5	32	11.8	30	—	—	1.2	3	—	—	½ NPT	Removable	4	1.8	2	0.9
D-4	10	16.1	4.5	11.5	28	71	7	18	22.5	57	—	—	5.1	13	¾ NPT	2 NPT	30	14	6	2.7
D-8	50	80	8.5	21.5	35	89	9.5	24	28	71	—	—	5.1	13	¾ NPT	2 NPT	60	27	30	14
D-12	100	161	13	33	51	130	14	36	38	97	8.5	22	—	—	2 NPT	4 x 3	130	59	130	59
D-16	155	249	16	41	55	140	15.5	39	42	107	13	33	—	—	2 NPT	4 x 3	145	65	220	100
D-20	250	402	20	51	56	142	16	41	43	109	16	41	—	—	2 NPT	4 x 6	210	95	360	163
D-24	375	603	24	61	59	150	17	43	44	112	16	41	—	—	2 NPT	4 x 6	285	128	500	227
D-30	625	1005	30	76	64	163	22	56	45	114	24	61	—	—	3 NPT	4 x 6	640	290	710	322
D-36	850	1367	37	94	70	178	25	64	49	124	24	61	—	—	3 FLG	4 x 6	780	353	1130	513
D-42	1250	2010	43	109	86	218	16	41	—	—	—	—	—	—	4 FLG	12 x 16	1275	580	1700	770
D-48	1500	2412	49	124	91	231	18.5	47	—	—	—	—	—	—	4 FLG	12 x 16	2150	975	2300	1045
D-54	2000	3215	55	140	94	239	18.5	47	—	—	—	—	—	—	4 FLG	12 x 16	2640	1195	2900	1315
D-60	2500	4019	61	155	97	246	18.5	47	—	—	—	—	—	—	4 FLG	12 x 16	2700	1225	3600	1635
D-66	3000	4823	67	170	100	254	18.5	47	—	—	—	—	—	—	6 FLG	12 x 16	3200	1450	4400	1995
D-72	3500	5627	73	185	110	279	18.5	47	—	—	—	—	—	—	6 FLG	12 x 16	4075	1850	6300	2860
D-78	4000	6431	79	201	115	292	21	53	—	—	—	—	—	—	6 FLG	12 x 16	4775	2165	7400	3355
D-84	4500	7235	85	216	124	315	21	53	—	—	—	—	—	—	6 FLG	12 x 16	5700	2585	10000	4535
D-90	5500	8842	91	231	127	323	21	53	—	—	—	—	—	—	6 FLG	12 x 16	7200	3265	11000	4990
D-96	6000	9646	97	246	130	330	21	53	—	—	—	—	—	—	6 FLG	12 x 16	7800	3540	13000	5895
D-102	7000	11254	103	262	137	348	25	64	—	—	—	—	—	—	8 FLG	12 x 16	9000	4080	14000	6350
D-108	7500	12058	109	277	139	353	24	61	—	—	—	—	—	—	8 FLG	12 x 16	10300	4670	16000	7255
D-114	8500	13665	115	292	142	361	24	61	—	—	—	—	—	—	8 FLG	12 x 16	12440	5645	18000	8165
D-120	9500	15273	121	307	145	368	24	61	—	—	—	—	—	—	8 FLG	12 x 16	12900	5850	20000	9070
D-126	10500	16881	127	323	148	376	24	61	—	—	—	—	—	—	8 FLG	12 x 16	15800	7165	22000	9980
D-132	11500	18489	133	338	157	399	24	61	—	—	—	—	—	—	8 FLG	12 x 16	16700	7575	24000	10885
D-138	12500	20096	140	356	155	394	24	61	—	—	—	—	—	—	10 FLG	12 x 16	17800	8075	27000	12245
D-144	13500	21704	146	371	158	401	24	61	—	—	—	—	—	—	10 FLG	12 x 16	18900	8570	29000	13155
D-156	16000	25723	158	401	168	427	28	71	—	—	—	—	—	—	10 FLG	12 x 16	21000	9525	34000	15420

\*Price of dryer includes initial fill of Dry-O-Lite® desiccant. Additional Dry-O-Lite is sold in 50 lb. bags, 50 lb. pails, 506 lb. metal drums and 2000 lb. bulk bags.

Due to our policy of continuous improvement, dimensions and specifications may change without notice. Request certified drawing for pre-piping. Contact factory for larger or special models.

# Maximum Capacities - scfm (Nm<sup>3</sup>/hr)

MODEL NO.	5 psig 0.3 bar	10 psig 0.7 bar	15 psig 1.0 bar	25 psig 1.7 bar	50 psig 3.4 bar	75 psig 5.2 bar	100 psig 6.9 bar	125 psig 8.6 bar	150 psig 10.3 bar	175 psig 12.1 bar	200 psig 13.8 bar	250 psig 17.2 bar
D-2	1.2 1.9	1.5 2.4	1.8 2.9	2.4 3.9	3.9 6.3	5.5 8.8	7 11.3	8.5 13.7	10.1 16.2	11.6 18.6	13.1 21	16.2 26
D-4	1.7 2.8	2.2 3.5	2.6 4.2	3.5 5.6	5.6 9.1	7.8 12.6	10 16.1	12.2 19.6	14.4 23.1	16.5 27	19 30	23 37
D-8	8.6 14	11 17	13 21	17 28	28 45	39 63	50 80	61 98	72 115	83 133	94 150	115 186
D-12	17 28	22 35	26 42	35 56	56 91	78 126	100 161	122 196	144 231	165 266	187 301	231 371
D-16	27 43	33 54	40 65	54 86	87 141	121 195	155 249	189 304	223 358	256 412	290 466	358 575
D-20	43 69	54 87	65 104	87 139	141 227	196 314	250 402	304 490	359 577	413 665	468 752	—
D-24	64 104	81 130	97 156	130 209	212 340	293 471	375 603	457 734	538 866	620 997	702 1129	—
D-30	107 173	135 216	162 260	216 348	353 567	489 786	625 1005	761 1224	897 1443	1034 1662	1170 1881	—
D-36	146 235	183 294	220 354	294 473	479 771	665 1069	850 1367	1035 1664	1221 1962	1406 2260	—	—
D-42	215 345	269 433	324 520	433 696	705 1134	978 1572	1250 2010	1522 2448	1795 2886	—	—	—
D-48	258 414	323 519	388 624	519 835	846 1360	1173 1886	1500 2412	1827 2937	2154 3463	—	—	—
D-54	344 552	431 692	518 833	692 1113	1128 1814	1564 2515	2000 3215	2436 3916	2872 4617	—	—	—
D-60	429 690	538 866	647 1041	865 1391	1410 2267	1955 3143	2500 4019	3045 4895	—	—	—	—
D-66	515 828	646 1039	777 1249	1038 1669	1692 2721	2346 3772	3000 4823	3654 5874	—	—	—	—
D-72	601 966	754 1212	906 1457	1211 1948	1974 3174	2737 4401	3500 5627	4263 6853	—	—	—	—
D-78	687 1105	861 1385	1036 1665	1384 2226	2256 3627	3128 5029	4000 6431	4872 7832	—	—	—	—
D-84	773 1243	969 1558	1165 1873	1558 2504	2538 4081	3519 5658	4500 7235	5481 8812	—	—	—	—
D-90	945 1519	1184 1904	1424 2290	1904 3061	3102 4988	4301 6915	5500 8842	6699 10770	—	—	—	—
D-96	1031 1657	1292 2077	1554 2498	2077 3339	3384 5441	4692 7544	6000 9646	7308 11749	—	—	—	—
D-102	1202 1933	1507 2423	1813 2914	2423 3895	3949 6348	5474 8801	7000 11254	8526 13707	—	—	—	—
D-108	1288 2071	1615 2597	1942 3122	2596 4173	4231 6802	5865 9430	7500 12058	9135 14686	—	—	—	—
D-114	1460 2347	1830 2943	2201 3538	2942 4730	4795 7708	6647 10687	8500 13665	10353 16644	—	—	—	—
D-120	1632 2623	2046 3289	2460 3955	3288 5286	5359 8615	7429 11944	9500 15273	11571 18602	—	—	—	—
D-126	1803 2899	2261 3635	2719 4371	3634 5843	5923 9522	8211 13202	10500 16881	12789 20560	—	—	—	—
D-132	1975 3175	2476 3981	2978 4787	3980 6399	6487 10429	8993 14459	11500 18489	14007 22518	—	—	—	—
D-138	2147 3452	2692 4328	3237 5204	4327 6956	7051 11336	9776 15716	12500 20096	15224 24476	—	—	—	—
D-144	2319 3728	2907 4674	3496 5620	4673 7512	7615 12243	10558 16973	13500 21704	16442 26435	—	—	—	—
D-156	2748 4418	3446 5539	4143 6661	5538 8903	9025 14510	12513 20117	16000 25723	19487 31330	—	—	—	—

MWP: D-2 = 300 psig, D-4 through D-16 = 250 psig, D-20 through D-30 = 200 psig, D-36 = 175 psig, D-42 through D-54 = 150 psig, D-60 and larger = 125 psig. Higher pressures available on request.

## Sizing Instructions

- Determine the highest anticipated flow (peak load volume of the compressor). If this must be estimated, use a ratio of 4 to 5 scfm per compressor horsepower.
- Determine the minimum operating pressure.
- On the chart above, locate the column for the minimum operating pressure and read down to the capacity that meets or exceeds the scfm requirement; then find the corresponding dryer model in the left column.  
Example: For an installation that will operate at 125 psig and handle a flow of 3000 scfm, select model D-60.

## Dry-O-Lite® Desiccant

Non-toxic and non-polluting Dry-O-Lite® desiccant dissolves slowly, making it a long-lasting desiccant that keeps operating costs low. With most single-shift operations, desiccant only needs to be added to the dryer a couple of times per year.

Formed of hygroscopic materials compacted into tablets under high pressure, Dry-O-Lite creates a structured bed within the dryer that, unlike some competitive desiccants, will not crush under its own weight.

Each tablet maintains a definite shape. Minimal contact points expose almost all surface areas and air flows freely around the tablets for greatest efficiency and low pressure drop.

Tablets continue to absorb moisture until they are completely consumed and Dry-O-Lite adds no harmful acidity to the solution, unlike some competitive formulations.

Packaged in 50 lb. (23 kg) multiple-layered heat sealed bags or plastic resealable pails, Dry-O-Lite has an unlimited shelf life. It is also available in 506 lb. metal drums and 2000 lb. bulk bags with pour spouts for easy filling of larger dryers.

Material Safety Data Sheets and independently conducted bioassay test results are available on request.

Other desiccants with enhanced dew point performance are also available.

### Desiccant Usage

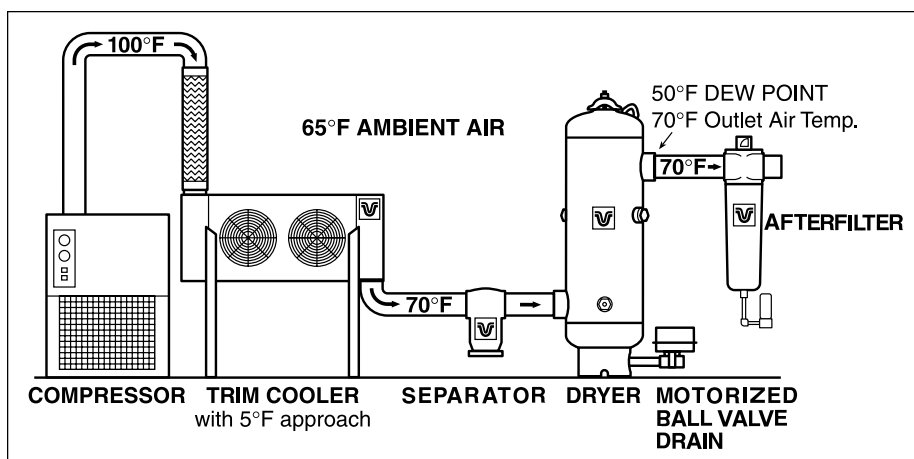
- Automatically adjusts to system demand
- Proportional to moisture loading
- Each 20°F change in inlet temperature to the dryer changes moisture loading by a factor of nearly 2:1. (Inlet temperature to the dryer is affected by the trim cooler - see Typical System Installation below.)

### Usage Example:

Based on 2000 hrs. (1 shift for 1 year) @100 psig and a 75°F average inlet temperature to the dryer:

Flow (scfm)	Desiccant Usage (lbs./yr.)
10	13
50	65
100	130
500	650
1000	1300

## Typical System Installation



For greatest operating efficiency, locate the dryer at the **highest practical pressure** (which does not exceed the maximum working pressure of the dryer) and the **lowest possible temperature**. More air can be

processed through the dryer at higher pressures and less desiccant will be consumed at lower temperatures. Choose the indoor or outdoor location which provides the coolest ambient temperature. Inlet

temperatures above 100°F are not recommended. A Van Air **trim cooler** may be needed to provide additional cooling.

Installation requires air inlet and outlet connections, bypass piping with three valves and provision for drain solution disposal. A **motorized ball valve-type drain** is recommended and is available from Van Air.

If large quantities of compressor lubricant are present in the system, a **coalescing prefilter** is recommended to protect the desiccant bed. A **filter downstream** of the dryer will prevent desiccant dust from reaching equipment. For your convenience, both are also offered by Van Air.

A **high level alarm** is also available to sense high condensate levels within the dryer.

Refer to the Installation, Operation and Maintenance manual for specific instructions on your dryer model.

