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INSTRUCTION MANUAL

HANKiSON®

Contents

1.0 SAFETY

All compressed gases, including air, can be dangerous. Know and follow all safety rules when using compressed air and especially when breaking into and blowing down compressed air lines to install or modify equipment.

Compressed air treated by this equipment may not be suitable for breathing without further purification. See OSHA standard 29 CRF 1910.134 for breathing air requirements.

Specific safety procedures, including training of all personnel, should be developed and implemented.

HMM SERIES

MEMBRANE

COMPRESSED

AIR DRYER

SERVICE DEPARTMENT: (724) 746-1100

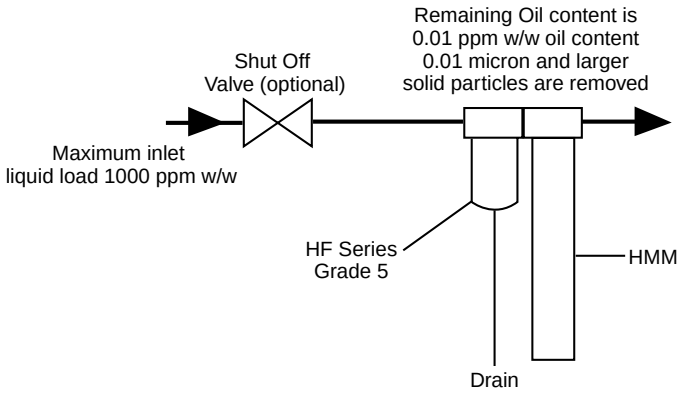
2.0 INSTALLATION, START-UP AND OPERATION

2.1 Filtration

Membrane dryers are specifically designed to remove water vapor. Dryer performance and life may be reduced if liquid water or liquid compressor oil enters the dryer. Filter(s) must be installed in front of the dryer to remove both liquid water and oil aerosols. Suitable filters are available from the factory.

The extended three year warranty on dryers requires use of factory supplied or approved coalescing filters. A written record of filter element changes every six months, and drain mechanism replacement yearly must be maintained.

Prefilter Package - One Prefilter



Prefilter Package - Two Prefilters

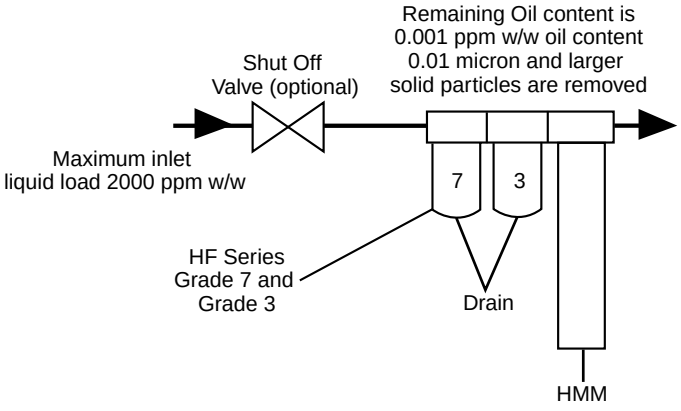


Figure 2.1

2.2 Pre-Installation

1. Membrane dryers can be used with oil lubricated, water lubricated or non-lubricated compressors.

2. Membrane dryers can be installed indoors or outdoors.

3. Always install a drainable drip leg prior to the inlet filtration to the dryer. This helps prevent the accumulation of water at low points that could overwhelm the water handling capability of the filter.

4. The inlet to the dryers should be as close as possible to the outlet of the filters. Long runs of piping and mounting the dryer inlet below the filter outlet may allow condensate to flow into the dryer and damage it.
5. Before installing the dryer verify that:

   a) The maximum pressure that could be encountered is less than the dryer and filter rated pressure.

   b) The compressed air supply temperature and ambient temperature at the dryer will not exceed 150°F (66°C) or the filter temperature rating if this is lower.

   c) The dryer sweep air will not be obstructed.

   d) The line sizes are adequate for the air flow and allowable pressure drop. Normal dryer pressure drop will be less than 5 psi (0.35 kgf/cm^2) at highest rated flows and less than 3 psi (0.21 kgf/cm^2) for most applications.

6. Membrane dryers and any related Prefiltration equipment are designed to be mounted in a vertical position. In most cases, we do not recommend supporting the module with the process piping. We recommend piping supports be located on either side of, directly in front of, or behind the dryer and filters. Integral dryer support brackets are available from the manufacturer to simplify your installation.

Note: It is IMPORTANT for maximum membrane life, that the appropriate filtration system be included with the membrane dryer. Proper prefiltration will ensure the effective removal of particulates, water, compressor lubricant oil, and other types of contaminants. This is best accomplished by the use of our optional integrated pre-filtration. Damage to the membrane dryer or dew point degradation may result if the Prefiltration is removed or relocated at a distance away from the module.

7. Consult your supplier or refer to your Filtration Manual for specific details.

2.3 Installation (Continuous Operation)

1. A typical membrane dryer installation is shown schematically in Figure 2.1.

2. Prior to installing the dryer and filters, slowly open the compressed air line shut off valve and allow any accumulated water, oil, or particulates to blow out. Use extreme caution to prevent accidents and injuries during this operation.

3. If after blowing out the line, the compressed air is visibly contaminated with water, oil, or particulates, proper prefiltration, sized for the supply air flow and pressure, must be installed before the dryer to protect and prolong the dryer life. Prefilters are available from the factory. As referenced in Section 2.1.

4. Connect the compressed air supply to the filter and then to the dryer. The coalescing filter should be as close to the dryer as practical (less than one foot separation)(use connecter kit) to prevent cooling of the air and condensation of water and oil between the coalescing filter and the dryer. A shut-off valve (ball or gate valve) the same size as the suppy line should be installed before the filter and dryer so that the dryer and application can be isolated.

5. Connect the dry air outlet to the application.

6. The filter drains may discharge oil and water. Route the filter drain line to a suitable location in compliance with local regulations.

7. Multiple Dryers for Higher Capacities - Multiple dryers in parallel (see Figure 2.2) can be used to increase capacity beyond that available with a single dryer. All the dryers should be the same model. It is not necessary to provide any mechanism to balance flows between the dryers. Installing prefilters upstream is preferred (for pressure-drop balance and cost). Size prefilters for the combined flow. Figure 2.2 does not show valves that could be used to isolate one dryer; valves are not recommended, but if used, identical valves and configuration must be used for all dryers.

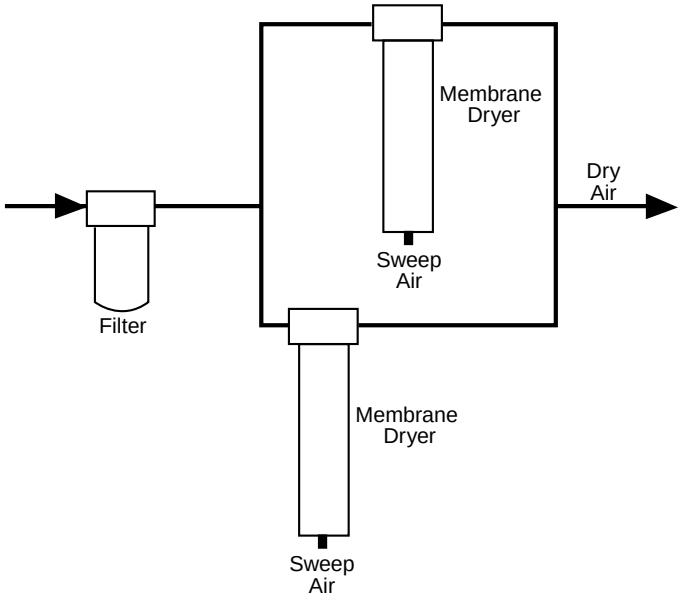


Figure 2.2

2.4 Start-up and Operation

1. Open the air supply to the dryer and check for any possible leaks. Maximum pressurization rate of 15 psi/sec.

   NOTE: Prefilters: The automatic drain may leak air until the pressure builds up to about 10 psig (0.7 kgf/cm^2) and will then seal except when discharging accumulated water and oil.

2. The filter differential pressure indicator(s) and drain(s) should be inspected on a regular schedule, preferably at least weekly. If the filter differential pressure indicator enters the red area on either the prefilter or coalescing filter, both of the filter element(s) must be changed. It is recommended that replacement filter elements be kept on hand as spares for fast change-outs to eliminate down time.

   NOTE: If coalescing filter life is consistently less than six months, a prefilter should be installed. If filter life remains less than six months with a prefilter installed, compressor maintenance or excessive line corrosion and/or contamination is indicated.

   NOTE: If any decrease is observed in the drain rate, the filter should be depressurized and the bowl removed. If the liquid level in the bowl is above the automatic drain float, the automatic drain is not operating correctly and should be replaced.

3. Filter element(s) should be replaced on a regular schedule (preferably every six months). When replacing the filter element, the filter bowl and automatic drain should be washed with warm soapy water to remove any accumulated oil.

4. To shutdown the dryer turn off the air supply and allow the pressure to decrease to atmospheric. Maximum de-pressurization of 15 psi/sec.

2.5 Intermittent or Cyclic Operation

See your membrane dryer distributor for details regarding installation.

3.0 MAINTENANCE AND TROUBLESHOOTING

The only routine maintenance required is replacement of the filter element(s) every six months and rebuilding or replacing the drain mechanism annually. There are no repairable components within the membrane dryer. Replacement of the membrane bundle can be performed if damaged or oil soaked.

To ensure performance of the membrane dryer and to obtain maximum compressor life, all compressor maintenance schedules recommended by the compressor manufacturer should be followed.

3.1 Filter Elements

If the filter differential pressure indicator shows red, filter element(s) must be changed. Continuing to operate for an extended period after the filter differential pressure indicator(s) have changed completely to red could result in low air pressure, high dew points; and eventually in failure of the filter element leading to contamination and damage of the dryer.

Filter element(s) should be changed at least every six months. See Section 2.1.

If the coalescing filter element life is consistently less than six months, a prefilter should be installed. If filter element life remains less than six months with a prefilter installed, compressor maintenance or excessive line corrosion or contamination is indicated.

Detailed instructions for element replacement are supplied with the filter(s) and replacement element(s).

3.2 Filter Automatic Drains

If a high water level is observed in a filter liquid level indicator, the automatic drain is not functioning correctly. The dryer should be shut down and the drain mechanism should be repaired or replaced before proceeding. Extended operation with malfunctioning automatic drain(s) could result in liquid water and oil entering the dryer, resulting in elevated dew points and damage to the dryer. See instructions supplied with the filter to replace the automatic drain.

3.3 High Dew Point

Before attempting to troubleshoot the membrane dryer verify that the dry air usage is at or below the design level. High air flow will result in high dew points.

The most likely cause of high dew point is low air supply pressure, due to either low pressure to the filters or high pressure drop across the filters. The latter will be indicated by the filter differential pressure indicator.

Another possible cause of high dew point is failure of the automatic drains as discussed in section 3.2.

3.4 Recovery From Water Flooding

Liquid water entering the membrane dryer will soak and saturate the membrane fibers and eliminate the moisture vapor differential that drives the drying process. High outlet dew points will result. To reinitiate drying, the membrane fibers must be dried out completely. This can only be accomplished by operating the dryer with predried compressed air. The recovery process is made faster by using hotter, drier, and higher pressure air. Contact the factory if you cannot perform this operation yourself. Water flooding can be avoided by proper dryer installation and by proper filter and drain maintenance.

4.0 SIZING TABLES

Table 1 Inlet Inlet and Outlet Flow Capacities (scfm) at 100 psig

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			50°F (10°C)	40°F (4.4°C)	20°F (-6.7°C)	0°F (-17.8°C)	-20°F (-29°C)	-40°F (-40°C)
HMM1	40°F (4.4°C)	Inlet	-	-	3.14	1.24	0.86	0.63
		Outlet	-	-	2.92	1.02	0.64	0.41
	60°F (16°C)	Inlet	4.98	3.70	1.39	0.95	0.70	0.53
		Outlet	4.77	3.49	1.17	0.73	0.49	0.31
	80°F (27°C)	Inlet	2.89	1.52	1.06	0.78	0.59	0.45
		Outlet	2.67	1.31	0.84	0.57	0.38	0.23
	100°F (38°C)	Inlet	1.35	1.15	0.87	0.67	0.51	0.38
		Outlet	1.13	0.94	0.65	0.45	0.30	0.16
	120°F (49°C)	Inlet	1.07	0.94	0.74	0.58	0.45	0.34
		Outlet	0.85	0.73	0.53	0.37	0.24	0.12
	150°F (66°C)	Inlet	0.84	0.76	0.62	0.49	0.39	-
		Outlet	0.63	0.55	0.41	0.29	0.18	-
HMM2	40°F (4.4°C)	Inlet	-	-	8.25	3.78	2.77	2.16
		Outlet	-	-	7.68	3.21	2.20	1.59
	60 °F (16°C)	Inlet	13.09	9.73	4.16	2.45	2.36	1.89
		Outlet	12.5	29.16	3.59	3.03	1.79	1.31
	8° F (27°C)	Inlet	7.59	4.52	3.30	2.57	2.07	1.68
		Outlet	7.02	3.95	2.73	2.00	1.50	1.11
	100 °F (38 C)	Inlet	4.07	3.56	2.80	2.26	1.85	1.51
		Outlet	3.50	2.99	2.23	1.69	1.28	0.94
	120°F (49°C)	Inlet	3.32	2.99	2.45	2.03	1.68	1.38
		Outlet	2.76	2.43	1.89	1.46	1.12	0.82
	150 F (66°C)	Inlet	2.69	2.48	2.10	1.77	1.49	-
		Outlet	2.14	1.93	1.55	1.22	0.94	-
HMM3	40°F (4.4°C)	Inlet	-	-	20.3	8.34	6.05	4.67
		Outlet	-	-	18.9	6.94	4.64	3.27
	60°F (16°C)	Inlet	32.3	24.0	9.24	6.62	5.12	4.07
		Outlet	30.8	22.6	7.83	5.21	3.71	2.67
	80°F (27°C)	Inlet	18.7	10.1	7.25	5.60	4.47	3.62
		Outlet	17.3	8.70	5.84	4.19	3.07	2.22
	100°F (38°C)	Inlet	7.61	7.84	6.11	4.90	3.99	3.27
		Outlet	9.02	6.43	4.71	3.49	2.59	1.86
	120°F (49°C)	Inlet	7.29	6.54	5.32	4.38	3.63	3.00
		Outlet	5.91	5.16	3.94	2.99	2.24	1.62
	150°F (66°C)	Inlet	5.85	5.38	4.53	3.82	3.22	-
		Outlet	4.50	4.03	3.19	2.47	1.87	-

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			50°F (10°C)	40°F (4.4°C)	20°F (-6.7°C)	0°F (-17.8°C)	-20°F (-29°C)	-40°F (-40°C)
HMM4	(40°C) (4.4°C)	Inlet	-	-	26.7	11.2	8.30	6.50
		Outlet	-	-	24.9	9.30	6.50	4.70
	60°F (16°C)	Inlet	42.4	31.5	12.3	9.00	7.10	5.70
		Outlet	40.6	29.7	10.4	7.20	5.30	3.90
	80°F (27°C)	Inlet	24.6	13.3	9.80	7.70	6.30	5.10
		Outlet	22.7	11.4	8.00	5.90	4.40	3.30
	100°F (38°C)	Inlet	12.0	10.5	8.40	6.80	5.60	4.70
		Outlet	10.1	8.70	6.50	5.00	3.80	2.80
	120°F (49°C)	Inlet	9.80	8.90	7.40	6.10	5.10	4.30
		Outlet	8.00	7.10	7.40	4.30	3.30	2.50
	150°F (66°C)	Inlet	8.00	7.40	6.30	5.40	4.60	-
		Outlet	6.20	5.60	4.60	3.60	2.80	-
HMM5	40°F (4.4°C)	Inlet	-	-	47.6	20.6	15.1	11.8
		Outlet	-	-	44.3	17.3	11.8	8.50
	60°F (16°C)	Inlet	75.5	56.1	22.7	16.5	12.9	10.3
		Outlet	72.2	52.8	19.4	13.2	9.60	7.00
	80°F (27°C)	Inlet	43.7	24.7	18.0	14.0	11.3	9.20
		Outlet	40.5	21.4	14.7	10.7	8.00	5.90
	100°F (38°C)	Inlet	22.2	19.4	15.3	12.3	10.1	8.30
		Outlet	18.9	16.1	12.0	9.00	6.80	5.00
	120°F (49°C)	Inlet	18.1	16.3	13.3	11.0	9.20	7.60
		Outlet	14.8	13.1	10.1	7.80	6.00	4.40
	150°F (66°C)	Inlet	14.6	13.5	11.4	9.70	8.20	-
		Outlet	11.5	10.3	8.30	6.50	5.00	-
HMM6	40°F (4.4°C)	Inlet	-	-	77.6	32.3	23.9	18.8
		Outlet	-	-	72.2	26.9	18.6	13.4
	60°F (16°C)	Inlet	123	91.5	35.5	26.0	20.5	16.5
		Outlet	118	86.1	30.1	20.6	15.1	11.2
	80°F (27°C)	Inlet	71.3	38.4	28.3	22.3	18.1	14.8
		Outlet	66.0	33.1	23.0	16.9	12.7	9.40
	100°F (38°C)	Inlet	34.7	30.4	24.2	19.7	16.2	13.4
		Outlet	29.3	25.1	18.8	14.3	10.9	8.00
	120°F (49°C)	Inlet	28.4	25.7	21.2	17.7	14.8	12.3
		Outlet	23.1	20.4	15.9	12.4	9.50	7.00
	150°F (66°C)	Inlet	23.1	21.3	18.2	15.5	13.2	-
		Outlet	17.9	16.2	13.1	10.3	8.00	-

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			50°F (10°C)	40°F (4.4°C)	20°F (-6.7°C)	0°F (-17.8°C)	-20°F (-29°C)	-40°F (-40°C)
HMM7	40°F (4.4°C)	Inlet	-	-	147	60.8	44.7	34.9
		Outlet	-	-	137	50.6	34.5	24.7
	60°F (16°C)	Inlet	233	173	67.0	48.7	38.1	30.5
		Outlet	223	163	56.8	38.5	27.9	20.4
	80°F (27°C)	Inlet	135	72.8	53.1	41.5	33.4	27.3
		Outlet	125	62.6	43.0	31.3	23.3	17.1
	100°F (38°C)	Inlet	65.5	57.2	45.1	36.5	30.0	24.6
		Outlet	55.3	47.1	35.0	26.3	19.8	14.5
	120°F (49°C)	Inlet	53.3	48.1	39.5	32.7	27.3	22.7
		Outlet	43.3	38.1	29.5	22.7	17.3	12.7
	150°F (66°C)	Inlet	43.1	39.8	33.8	28.6	24.2	24.2
		Outlet	33.4	30.1	24.0	18.9	14.5	-
HMM8	(40°F) (4.4°C)	Inlet	-	-	205	90.7	68.9	55.1
		Outlet	-	-	191	76.5	54.7	40.9
	60°F (16°C)	Inlet	325	242	98.9	74.4	59.6	48.8
		Outlet	311	228	84.8	60.2	45.5	34.6
	80°F (27°C)	Inlet	189	107	80.4	64.4	53.0	43.9
		Outlet	174	92.4	66.2	50.2	38.9	29.7
	100°F (38°C)	Inlet	96.9	85.9	69.5	57.4	48.0	40.0
		Outlet	82.7	71.8	55.3	43.2	33.8	25.8
	120°F (49°C)	Inlet	80.4	73.4	61.5	51.9	43.9	36.9
		Outlet	66.5	59.4	47.6	37.9	30.0	23.0
	150°F (66°C)	Inlet	66.3	61.7	53.3	45.8	39.3	-
		Outlet	52.7	48.1	39.7	32.2	25.7	-
HMM9	40°F (4.4°C)	Inlet	-	-	287	118	89.6	71.7
		Outlet	-	-	267	97.9	69.7	51.8
	60°F (16°C)	Inlet	456	339	129	96.7	77.6	63.5
		Outlet	436	319	109	76.8	57.7	43.6
	80 F (27 C)	Inlet	264	138	105	83.8	69.0	57.2
		Outlet	244	119	84.6	63.9	49.1	37.3
	100°F (38°C)	Inlet	126	112	90.4	74.7	62.4	52.0
		Outlet	106	91.8	70.5	54.8	42.5	32.2
	120°F (49°C)	Inlet	104	95.3	80.0	67.5	57.1	48.0
		Outlet	84.9	75.8	60.4	47.9	37.6	28.5
	150°F (66°C)	Inlet	86.1	80.2	69.2	59.5	51.1	-
		Outlet	67.1	61.1	50.2	40.5	32.0	-

(1) Use inlet air temperature if the air entering the dryer has not been dried upstream (air is saturated). If air has been dried. (e.g. in a refrigerated dryer) use the dew point temperature of the inlet air.

(2) Flow capacities at 100 psig (7 kgf/cm^2). For capacities at other pressures consult factory. Capacities are established in accordance with CAGI (Compressed Air and Gas Institute) Standard ADF 700: Membrane Compressed Air Dryers - Methods for Testing and Rating.

Table 2 Inlet and Outlet Flow Capacities (m³/min) @ 7 kgf/cm² (2)

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			10°C (50°F)	3°C (37°F)	-10°C (14°F)	-20°C (-4°F)	-30°C (-22°F)	-40°F (-40°C)
HMM1	5°C (41°F)	Inlet	-	-	0.047	0.030	0.022	0.016
		Outlet	-	-	0.040	0.025	0.017	0.010
	20°C (68°F)	Inlet	0.077	0.049	0.030	0.022	0.017	0.013
		Outlet	0.072	0.043	0.023	0.017	0.012	0.007
	30°C (86°F)	Inlet	0.047	0.355	0.025	0.019	0.015	0.011
		Outlet	0.040	0.030	0.018	0.013	0.008	0.005
	40°C (104°F)	Inlet	0.034	0.029	0.021	0.017	0.013	0.010
		Outlet	0.028	0.023	0.015	0.012	0.007	0.003
	50°C (122°F)	Inlet	0.028	0.024	0.018	0.015	0.012	0.009
		Outlet	0.023	0.018	0.013	0.008	0.007	0.003
	66°C (150 F)	Inlet	0.023	0.020	0.015	0.013	0.010	-
		Outlet	0.017	0.015	0.010	0.007	0.005	-
HMM2	5°C (41°F)	Inlet	-	-	0.142	0.097	0.073	0.057
		Outlet	-	-	0.125	0.080	0.057	0.042
	20°C (68°F)	Inlet	0.217	0.146	0.093	0.073	0.058	0.048
		Outlet	0.202	0.130	0.078	0.057	0.043	0.033
	30°C (86°F)	Inlet	0.135	0.108	0.078	0.063	0.053	0.043
		Outlet	0.120	0.093	0.063	0.048	0.037	0.028
	40°C (104°F)	Inlet	0.105	0.089	0.068	0.056	0.048	0.040
		Outlet	0.090	0.073	0.053	0.042	0.033	0.025
	50°C (122°F)	Inlet	0.088	0.078	0.062	0.052	0.044	0.037
		Outlet	0.073	0.063	0.047	0.037	0.030	0.022
	66°C (150°F)	Inlet	0.073	0.066	0.053	0.046	0.039	-
		Outlet	0.058	0.052	0.038	0.032	0.025	-
HMM3	5°C (41°F)	Inlet	-	-	0.317	0.208	0.158	0.125
		Outlet	-	-	0.277	0.168	0.118	0.085
	20°C (68°F)	Inlet	0.492	0.625	0.202	0.158	0.128	0.103
		Outlet	0.453	0.287	0.163	0.120	0.090	0.065
	30°C (86°F)	Inlet	0.303	0.242	0.170	0.138	0.114	0.093
		Outlet	0.265	0.203	0.132	0.100	0.077	0.055
	40°C (104°F)	Inlet	0.232	0.197	0.150	0.123	0.103	0.086
		Outlet	0.195	0.160	0.113	0.087	0.065	0.048
	50°C (122°F)	Inlet	0.192	0.168	0.133	0.111	0.094	0.079
		Outlet	0.155	0.131	0.097	0.075	0.057	0.042
	66°C (150°F)	Inlet	0.158	0.142	0.117	0.099	0.085	-
		Outlet	0.122	0.105	0.080	0.063	0.048	-

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			10°C (50°F)	3°C (37°F)	-10°C (14°F)	-20°C (-4°F)	-30°C (-22°F)	-40°F (-40°C)
HMM7	5°C (41°F)	Inlet	-	-	2.233	1.550	1.192	0.925
		Outlet	-	-	1.947	1.263	0.905	0.638
	20°C (68°F)	Inlet	3.416	2.333	1.500	1.167	0.950	0.783
		Outlet	3.138	2.055	1.222	0.888	0.672	0.505
	30°C (86°F)	Inlet	2.133	1.750	1.267	1.033	0.850	0.705
		Outlet	1.858	1.475	0.992	0.758	0.575	0.430
	40°C (104°F)	Inlet	1.675	1.442	1.100	0.917	0.767	0.650
		Outlet	1.405	1.172	0.830	0.647	0.497	0.380
	50°C (122°F)	Inlet	1.417	1.250	0.988	0.833	0.717	0.605
		Outlet	1.152	0.985	0.723	0.568	0.452	0.340
	66°C (150°F)	Inlet	1.167	1.050	0.867	0.742	0.642	-
		Outlet	0.907	0.790	0.607	0.482	0.382	-
HMM8	5°C (41°F)	Inlet	-	-	3.195	2.333	1.833	1.500
		Outlet	-	-	2.795	1.933	1.433	1.100
	20°C (68°F)	Inlet	4.833	3.342	2.283	1.833	1.500	1.250
		Outlet	4.443	2.952	1.893	1.443	1.110	0.860
	30°C (86°F)	Inlet	3.167	2.583	1.950	1.617	1.350	1.133
		Outlet	2.783	2.200	1.567	1.233	0.967	0.750
	40°C (104°F)	Inlet	2.500	2.167	1.725	1.450	1.250	1.050
		Outlet	2.123	1.790	1.348	1.073	0.873	0.673
	50°C (122°F)	Inlet	2.133	1.900	1.550	1.333	1.150	0.975
		Outlet	1.763	1.530	1.180	0.963	0.780	0.605
	66°C (150°F)	Inlet	1.783	1.642	1.367	1.200	1.033	-
		Outlet	1.422	1.280	1.005	0.838	0.672	-
HMM9	5°C (41°F)	Inlet	-	-	4.397	2.940	2.367	1.933
		Outlet	-	-	3.837	2.380	1.807	1.373
	20 C (68 F)	Inlet	6.667	4.500	2.933	2.367	1.967	1633
		Outlet	6.122	3.955	2.388	1.822	1.422	1.088
	30 C (86 F)	Inlet	4.167	3.155	2.533	2.083	1.750	1.483
		Outlet	3.632	2.620	1.998	1.548	1.215	0.948
	40 C (104 F)	Inlet	3.182	2.842	2.233	1.883	1.617	1.453
		Outlet	2.655	2.315	1.707	1.357	1.090	0.927
	50 C (122 F)	Inlet	2.750	2.475	2.017	1.733	1.483	1.283
		Outlet	2.232	1.957	1.498	1.215	0.965	0.765
	66 C (150 F)	Inlet	2.333	2.117	1.783	1.550	1.350	-
		Outlet	1.827	1.610	1.277	1.043	0.843	-

	Inlet Temperature (1)		Outlet Pressure Dew Point					
			10°C (50°F)	3°C (37°F)	-10°C (14°F)	-20°C (-4°F)	-30°C (-22°F)	-40°F (-40°C)
HMM4	(5°C) (41°F)	Inlet	-	-	0.425	0.287	0.222	0.175
		Outlet	-	-	0.373	0.235	0.170	0.123
	20°C (68°F)	Inlet	0.633	0.433	0.280	0.217	0.180	0.147
		Outlet	0.583	0.383	0.230	0.167	0.130	0.097
	30°C (86°F)	Inlet	0.400	0.317	0.233	0.192	0.160	0.133
		Outlet	0.350	0.267	0.183	0.142	0.110	0.083
	40°C (104°F)	Inlet	0.308	0.267	0.205	0.173	0.145	0.123
		Outlet	0.260	0.218	0.157	0.125	0.097	0.075
	50°C (122°F)	Inlet	0.258	0.230	0.183	0.157	0.133	0.113
		Outlet	0.210	0.182	0.135	0.108	0.085	0.065
	66°C (150°F)	Inlet	0.217	0.197	0.163	0.140	0.122	-
		Outlet	0.170	0.150	0.117	0.093	0.075	-
HMM5	5°C (41°F)	Inlet	-	-	0.776	0.517	0.398	0.312
		Outlet	-	-	0.673	0.423	0.305	0.218
	20°C (68°F)	Inlet	1.200	0.800	0.508	0.400	0.323	0.253
		Outlet	1.110	0.710	0.418	0.310	0.233	0.173
	30°C (86°F)	Inlet	0.750	0.583	0.425	0.347	0.287	0.237
		Outlet	0.662	0.495	0.337	0.258	0.198	0.148
	40°C (104°F)	Inlet	0.563	0.483	0.375	0.308	0.262	0.217
		Outlet	0.477	0.397	0.288	0.222	0.175	0.130
	50°C (122°F)	Inlet	0.478	0.417	0.333	0.283	0.242	0.203
		Outlet	0.392	0.330	0.247	0.197	0.155	0.117
	66°C (150°F)	Inlet	0.395	0.355	0.292	0.250	0.217	-
		Outlet	0.312	0.272	0.208	0.167	0.133	-
HMM6	5°C (41°F)	Inlet	-	-	1.183	0.817	0.633	0.508
		Outlet	-	-	1.032	0.665	0.482	0.357
	20°C (68°F)	Inlet	1.833	1.217	0.800	0.633	0.500	0.425
		Outlet	1.687	1.070	0.653	0.487	0.362	0.278
	30°C (86°F)	Inlet	1.133	0.933	0.672	0.550	0.462	0.383
		Outlet	0.988	0.788	0.527	0.405	0.317	0.238
	40°C (104°F)	Inlet	0.888	0.767	0.592	0.492	0.417	0.350
		Outlet	0.747	0.625	0.450	0.350	0.275	0.208
	50°C (122°F)	Inlet	0.750	0.658	0.533	0.450	0.383	0.328
		Outlet	0.610	0.518	0.393	0.310	0.243	0.188
	66°C (150°F)	Inlet	0.625	0.567	0.467	0.405	0.350	-
		Outlet	0.488	0.430	0.330	0.268	0.213	-

(1) Use inlet air temperature if the air entering the dryer has not been dried upstream (air is saturated). If air has been dried. (e.g. in a refrigerated dryer) use the dew point temperature of the inlet air.

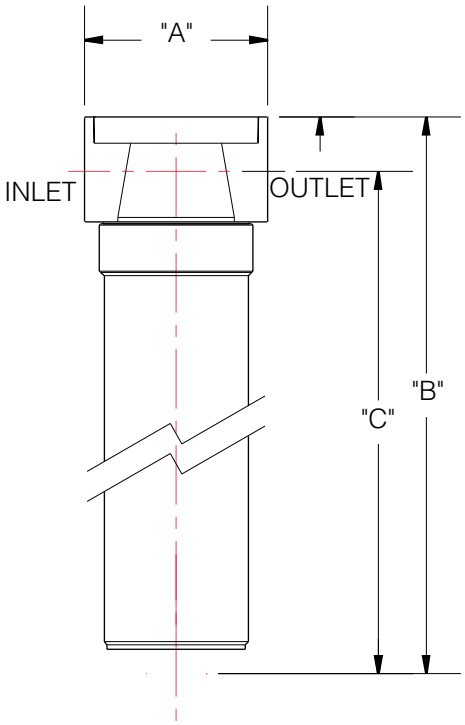
(2) Flow capacities at 100 psig (7 kgf/cm²). For capacities at other pressures consult factory. Capacities are established in accordance with CAGI (Compressed Air and Gas Institute) Standard ADF 700: Membrane Compressed Air Dryers - Methods for Testing and Rating.

5.0 DIMENSIONS AND WEIGHTS

Table 3 Physical Description

Model	Dimensions & Connections in					Weight lb	Maximum Working Pressure psig	Maximum Operating Temp. °F
	A	B	C*	D	E			
1	10	11	3/8" or 1/2"	4	4	5	200	150
2	14	15	3/8" or 1/2"	4	4	6	200	150
3	18	19	3/8" or 1/2"	4	4	7	200	150
4	26	27	3/8" or 1/2"	4	4	8	200	150
5	19	20	3/4" or 1"	5	5	11	200	150
6	26	27	3/4" or 1"	5	5	14	200	150
7	28	29	1"	6	6	17	200	150
8	32	35	1"	6	8	35	200	150
9	39	41	1"	6	8	40	200	150

* NPT or BSP thread
* Maximum Use Temperature: 150°F (65°C)
* Maximum Use Pressure: 200 psig (13.8 bar)
* Minimum Use Pressure: 60 psig (4 bar)



6.0 WARRANTY AND CONDITIONS OF SALE

The manufacturer warrants the product manufactured by it, when properly installed, operated, applied, and maintained in accordance with procedures and recommendations outlined in manufacturer's instruction manuals, to be free from defects in material or workmanship for a period of one (1) year from the date of shipment to the buyer by the manufacturer or manufacturer's authorized distributor, or eighteen months from the date of shipment from the factory, whichever occurs first, provided such defect is discovered and brought to the manufacturer's attention within the aforesaid warranty period. The manufacturer will repair or replace any product or part determined to be defective by the manufacturer within the warranty period, provided such defect occurred in normal service and not as a result of misuse, abuse, neglect or accident.

The warranty covers parts and labor for the warranty period. Repair or replacement shall be made at the factory or the installation site, at the sole option of the manufacturer. Any service performed on the product by anyone other than the manufacturer must first be authorized by the manufacturer. Normal maintenance items requiring routine replacement are not warranted. Unauthorized service voids the warranty and any resulting charge or subsequent claim will not be paid. Products repaired or replaced under warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The foregoing is the exclusive remedy of any buyer of the manufacturer's product. The maximum damages liability of the manufacturer is the original purchase price of the product or part.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR STATUTORY, AND IS EXPRESSED IN LIEU OF THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THE MANUFACTURER SHALL NOT BE LIABLE FOR LOSS OR DAMAGE BY REASON OF STRICT LIABILITY IN TORT OR ITS NEGLIGENCE IN WHATEVER MANNER INCLUDING DESIGN, MANUFACTURE OR INSPECTION OF THE EQUIPMENT OR ITS FAILURE TO DISCOVER, REPORT, REPAIR, OR MODIFY LATENT DEFECTS INHERENT THEREIN. THE MANUFACTURER, HIS REPRESENTATIVE OR DISTRIBUTOR SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE BUYER, WHETHER ARISING FROM BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

The manufacturer does not warrant any product, part, material, component, or accessory manufactured by others and sold or supplied in connection with the sale of manufacturer's products. 01/01/93

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

3 Year Warranty

The standard one year warranty is extended to three years when the dryer is installed with an optional prefilter package. To keep the warranty in effect, elements must be replaced on six month intervals and the drain mechanism yearly.

Fitness Guarantee

If during the first three months of operation, you are not satisfied with the suitability of the membrane dryer for your application, return the dryer for full credit. The credit can be applied to the purchase of any other Hankision drying equipment.

Maintenance Schedule

	Service Performed	Date	By
Installation			
6 Month Maintenance			
12 Month Maintenance			
18 Month Maintenance			
24 Month Maintenance			
30 Month Maintenance			
36 Month Maintenance			

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