

## Filter Drier Installation

17, 19, and 23 Series

C99  
9/28/99  
19SB82-6  
?

### **Purpose:**

To transmit instructions for use when installing filter drier systems on rotary machines.

### **Information:**

This bulletin provides information to the field for installing filter driers to remove moisture, acids and rust in low and high pressure machines. Two kits are available from RCD.

### **Section 1 - Filter Drier Installation Instructions for Low Pressure Machines (R-11, R-113) and Rust Removal for High Pressure Machines (R-12, R-22, R-500, R-114, R-134a):**

When installing a filter drier to remove moisture, acids, or rust particles from a low pressure machine, or for rust removal only on a high pressure machine, use the instructions and kit that follow.

Note: Because of manufacturing tolerances, machine dimensions may vary from those in this instruction.

#### **Drier Location:**

For 19GD's which have shipping rails, locate the drier assembly as shown in Figure 1. For machines without shipping rails, the drier can be placed on the floor in a wooden cradle which is made at the job site.

#### **Cooler Connections:**

The liquid pick-up and liquid and gas discharge can be located anywhere along the length of the shell, but they must be located vertically in relation to the top row of tubes. See Figure 1 and the tube location tables.

Weld a 3/4" Thread-o-let to the shell. Drill an 11/16" hole through the Thread-o-let. Be careful not to damage the threads or hit the cooler tubes. See Table 2.

Condenser Connection: 19C Condensers have an extra 3/8" NPT purge connection which can be used as the pick-up point for the eductor gas. Add a 3/8" connection if one is needed.

Piping Arrangement: See Figure 1.

Install the dry eyes, items 6 and 7, close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

Downstream from the ejector, restrictions in the line must be minimized. Be sure to use a long radius elbow, item 13, or if soft copper is used make a wide bend.

File:

**Table 1: Location of Top Row of Cooler Tubes for 19D Series Machines**

Shell Size	Centerline of Unishell * to Centerline of Top Cooler Tubes (Inches)					Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet Which Rests on Shipping Rails (Inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11	7.625	7.625	7.625	10.375	-	10.375	10.375	9.625	9.625	
12	-		7.625		10.375	-	-	9.625	-	13.025
13	7.625	7.625	7.625	10.375	-	10.375	10.375	-	9.625	-
14	-				10.375	-	-	-	-	13.025
15	6.875	6.875	6.875	10.375	-	11.125	11.125	10.375	9.625	-
16	-	-	-	-	10.375	-	-	-	-	13.025
17	6.125	6.125	6.125	-	-	11.875	11.875	11.125	-	-
20	-	-	10.375	10.375	10.375	-	-	6.750	9.625	13.025
21	9.625	9.625	9.625	9.625	9.625	14.375	14.375	7.500	10.375	13.775
23	8.875	8.875	9.625	8.875	8.875	15.125	15.125	7.500	11.125	14.525
25	8.875	8.875	8.875	8.125	8.125	15.125	15.125	8.250	11.875	15.275
27	8.125	8.125	8.125	8.125	8.125	15.875	15.875	9.000	11.875	15.275
31	17.250	18.000	13.500	13.500	13.500	10.750	10.000	5.000	8.380	12.760
33	17.250	17.250	13.500	13.500	13.500	10.750	10.750	5.000	8.380	12.760
35	16.500	17.250	12.750	12.750	12.750	11.500	10.750	5.750	9.130	13.510
36	-	-	16.500	-	-	-	-	7.375	-	-
37	14.750	16.500	16.500	-	-	12.250	11.500	7.375	-	-
39	15.750	15.750	15.750	-	-	12.250	12.250	8.125	-	-
41	-	-	-	16.500	16.500	-	-	-	10.260	14.620
42	-	-	-	16.500	16.500	-	-	-	10.260	14.620
43	-	-	-	15.750	15.750	-	-	-	11.000	15.370
46	-	-	-	15.000	15.000	-	-	-	11.760	16.120
47	-	-	-	14.250	14.250	-	-	-	12.510	16.870
48	-	-	-	13.500	13.500	-	-	-	13.260	17.620

\* Usually, there are two punch marks at the centerline of the unishell right next to the tubesheet

**Table 2: 19D Series Shell Thickness**

Unishell Size	Cooler (Inches)					Condenser (Inches)				
	19D	19DA	19DG	19DH	19DK	19D	19DA	19DG	19DH	19DK
11-16	-	-	-	.2500	.2500	-	-	-	.3750	.3750
11-17	.3125	.3125	.3125	-	-	.3125	.3125	.3125	-	-
20-27	.3750	.3750	.3750	.2500	.2500	.3750	.3750	.3750	.3750	.3750
31-35	.5000	.3125	.4375	.3125	.3125	.5000	.5000	.4375	.4375	.4375
36	-	-	.3125	-	-	-	-	.5000	-	-
37	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
39	.5000	.3125	.3125	-	-	.5000	.5000	.5000	-	-
41-43	-	-	-	.3125	.3125	-	-	-	.5000	.5000
46-48	-	-	-	.3125	.3125	-	-	-	.5000	.5000

**Table 3 - Location of Top Row of 19C Cooler Tubes and Heat Exchanger Shell Thickness**

Heat Exchanger Size	Location of Top Row of Cooler Tubes		Heat Exchanger Shell Thickness	
	Centerline of Cooler to Centerline of Top Row of Tubes (Inches)	Centerline of Top Row of Tubes to Bottom Edge of Tube Sheet (Inches)	Cooler (Inches)	Condenser (Inches)
1	5 - 5/16" Down	23 - 3/16"	3/16"	3/16"
2	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
3	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
4	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
5	4 - 9/16" Down	23 - 3/16"	3/16"	3/16"
6	3 - 13/16" Down	23 - 3/16"	3/16"	3/16"
7	3 - 13/16" Down	23 - 3/16"	3/16"	3/16"
8	3 - 1/16" Down	23 - 3/16"	3/16"	3/16"
9	3 - 1/4" Down	23 - 3/16"	1/4"	3/16"
10	-	-	-	3/16"
11	3 5/8" Down	30 - 9/16"	1/4"	1/4"
12	7" Down	32 - 3/16"	5/16"	1/4"
13	7" Down	32 - 3/16"	5/16"	1/4"
14	4" Down	29 - 7/8"	5/16"	1/4"
15	3 - 1/4" Down	29 - 7/8"	5/16"	1/4"
16	4" Down	28 - 3/16"	5/16"	5/16"
17	5/16"	28 - 3/16"	5/16"	5/16"
18	4 - 3/8" Down	38 - 3/8"	5/16"	5/16"
19	2 - 5/16" Down	35"	1/2"	5/16"
20	1 - 5/8" Up	30"	1/2"	5/16"
21	1 - 7/8" Up	31 - 1/2"	1/2"	5/16"
22	3 - 5/8" Up	31 - 1/2"	5/8"	5/16"
23	3 - 3/8" UP	31 - 1/2"	5/8"	5/16"
24	-	-	-	5/16"

**19CB660-006 Filter Drier Kit**

Item #	Qty.	Description	Item #	Qty.	Description
1	2	Street Elbow 5/8" ODS	14	1	Ball Valve 7/8" ODS
2	10	90° Elbow 5/8" ODS x 5/8" ODS	16	4	12-6 x 3/4" out Thread-o-let
3	25Ft	5/8" OD Copper Tube (Field Supplied)	17	1	Adaptor 3/4" MPT x 7/8" ODS
4	8FT	7/8" OD Copper Tube (Field Supplied)	18	1	Filter Drier Shell 7/8" inlet x 5/8" outlet
5	1	Relief Valve 1/2" MPT x 5/8" Flare	19	4	Filter Drier Cores
6	1	Dry Eye 7/8" ODS	20	1	Adaptor 5/8" ODS x 3/8" FPT
7	1	Dry Eye 5/8" ODS	21	3	90° Elbow 7/8" ODS x 7/8" ODS
8	2	Adaptor 1/2" FPT x 5/8" ODS	22	1	Tee 7/8" ODS x 5/8" ODS x 5/8" ODS
9	3	Ball Valve 5/8" ODS	23	18Ft	Armaflex 1/2" ID x 1/2" wall
10	3	Adaptor 3/4" MPT x 5/8" ODS			(Field Supplied)
11	1	Ejector	24	1	Armaflex Sheet 36" x 48" x 1/2" thick
12	2	Tee 5/8" ODS			(Field Supplied)
13	6	Elbow 5/8" Wide Angle	25	1	5/8" Flare Nut (Field Supplied)
			26	1	Adaptor 5/8" ODF x 1/2" FPT

## **Section 2 - Filter Drier Installation Instructions for high pressure Machines (R-12, R-22, R-500, R-114, R-134a):**

These are instructions for installing a filter-drier to remove moisture and acids from high pressure machines.

**NOTES:** 1) For removal of rust from high pressure machines, refer to Section 1.

2) Because of engineering tolerances, machine dimensions may vary from those in this bulletin.

### **Materials Required**

Drier installation package    19EA660-020

### **Drier Location**

Locate the drier in a wooden cradle on the floor near the utility vessel (19EA, 19EB) or the cooler (17/19FA).

### **Connections**

**19EA, 19EB** Many machines have a liquid drain valve on the bottom of the utility vessel which can be used for a liquid pick-up. On machines which were shipped before the liquid drain valve was added, a tee can be installed in the bypass line between the float ball chamber and the economizer. Machines shipped after August, 1975 have neither the bypass line nor the liquid valve in the economizer. Therefore, take the liquid from the 1/2" coupling at the bottom of the low-side float chamber nearest to the cover. Do not pipe from the new liquid valve near the bottom isolation valve, since the liquid valve is downstream of the low side valve.

**17/19FA** Take the liquid supply from the 1/2" coupling at the bottom of the low side float chamber near the cover. Return the liquid to the cooler through any convenient location. There are one inch couplings on the bottom of the cooler at each end. Some vessels have extra coupling near the relief valves. If a new connection is made, enter the shell at the same elevation as the motor cooling refrigerant return to the cooler.

### **Piping Arrangement**

Use Figure 2 as a guide to arrange the components of the 19EA, 19EB, and 17/19FA machines. The connections apply only to the 19EA and 19EB machines.

Install the dry eyes (5) close to each other so they can be seen from the same angle. Leave the covers on when not viewing the dry eye.

The relief valve (8) is installed to prevent the dangerously high pressures that can occur if the drier shut-off valves are closed, and the liquid in the drier is not vented.

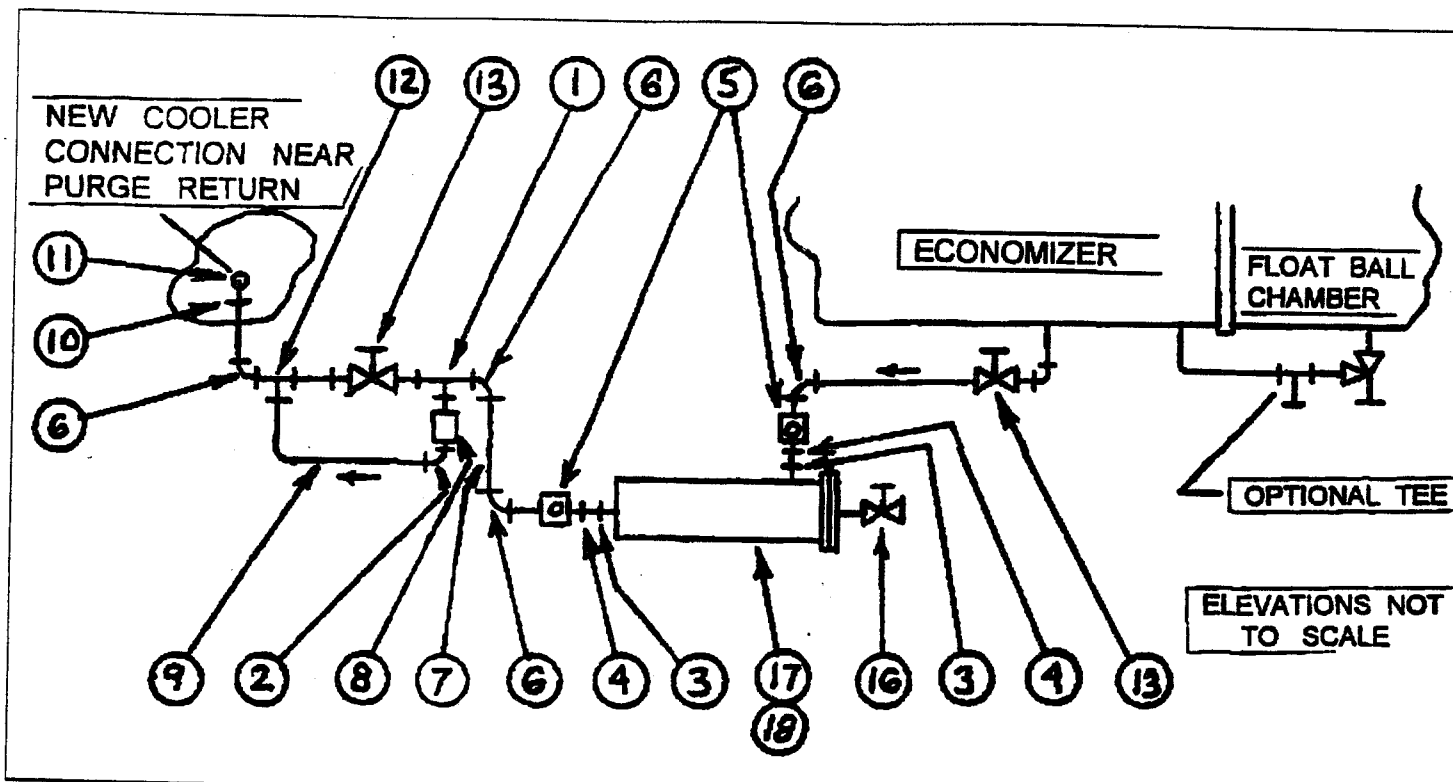


FIGURE 2 - 19EA, 19EB, and 17/19FA, 17/19EX Moisture and Acid Removal

Table 4 Location of Top Row of 19EA and 19EB Cooler tubes			
Unishell Size	Centerline of *Unishell to Centerline of Top Cooler Tubes	Centerline of Top Cooler Tubes to Bottom Edge of Tube Sheet which rests on the shipping rail	
		19EA	19EB
41, 71	10.5"	11"	18.26"
42, 72	10.5"	11"	18.26"
43, 73	11"	12.75"	20.198"
45, 75	11"	12.75"	20.198"
46, 76	12.125"	11.625"	18.995"
47, 77	11.375"	12.375"	19.745"
51, 81	14"	11.5"	18.983"
52, 82	13.25"	12.25"	19.688"
53, 83	13.25"	12.25"	19.688"
55, 85	14.75"	13"	20.373"
57, 87	14"	13.75"	21.123"
59, 89	14.375"	14.375"	21.865"

\* Usually, there are two prick punch marks at the centerline of the unishell, right next to the tube sheet.

**Table 5 19EA and 19EB Shell Thicknesses**

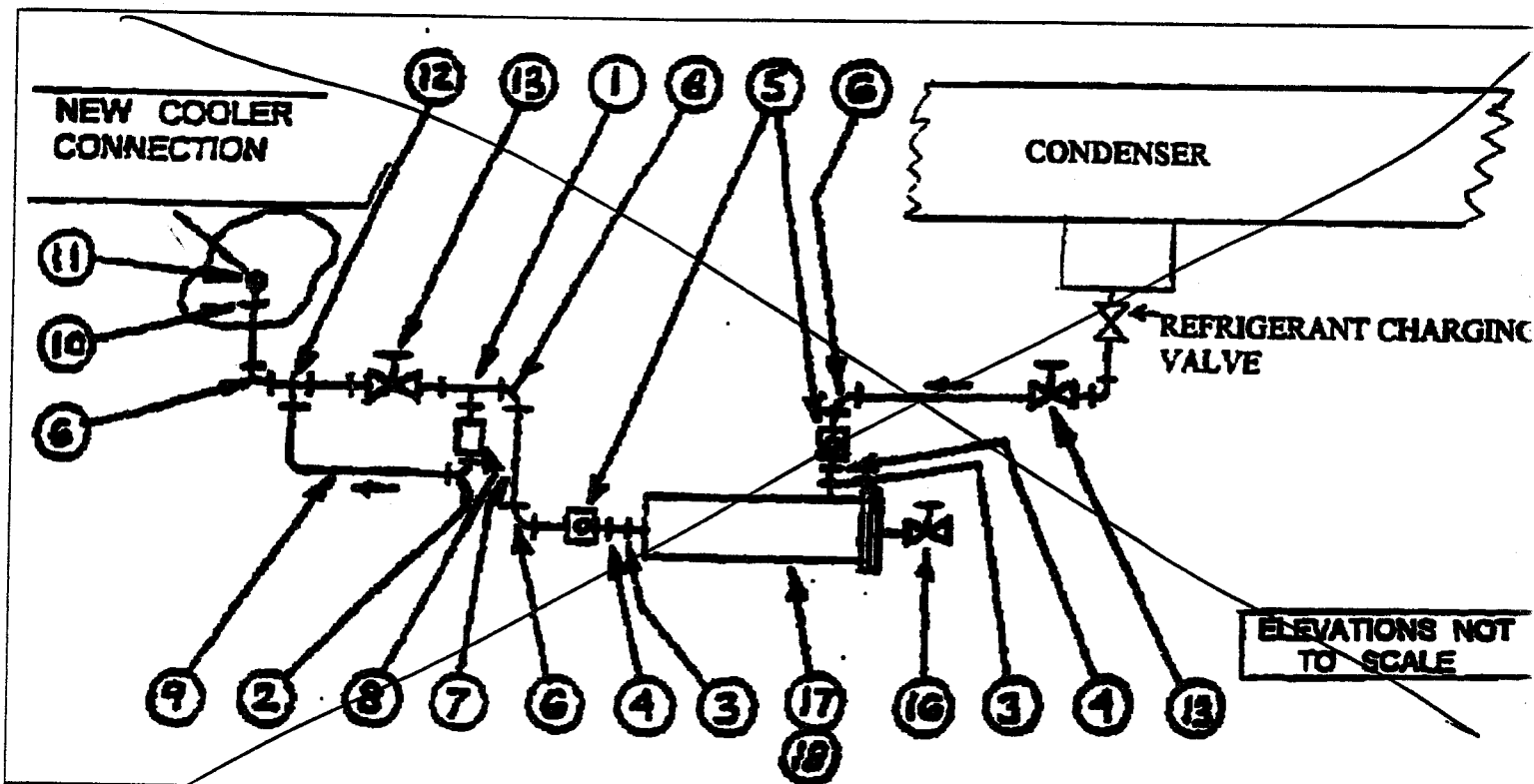
Unisell Size	Cooler	Condenser
41-47 and 71-77	.5"	.5"
51-57 and 81-87	.626"	.625"
59 and 89	.75"	.75"

**Table 6 – 17/19FA Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
22	6.5 (165.1)Down	0.5 (12.7)	-
24	5.0 (127.0)Down	0.5 (12.7)	0.38 (9.7)
25	4.25 (108.0)Down	0.5 (12.7)	0.38 (9.7)
26	3.5 (88.9)Down	0.5 (12.7)	0.38 (9.7)
27	8.06 (204.7)Down	0.5 (12.7)	0.438 (11.1)
28	7.32 (185.9)Down	0.5 (12.7)	0.438 (11.1)
29	6.56 (166.6)Down	0.5 (12.7)	0.438 (11.1)
30	-	-	0.5 (12.7)
31	-	-	0.5 (12.7)
32	-	-	0.5 (12.7)
52	6.5 (165.1)Down	0.5 (12.7)	-
54	5.0 (127.0)Down	0.5 (12.7)	-
55	4.25 (108.0)Down	0.5 (12.7)	0.38 (9.7)
56	3.5 (88.9)Down	0.5 (12.7)	0.38 (9.7)
57	8.06 (204.7)Down	0.5 (12.7)	0.38 (9.7)
58	7.32 (185.9)Down	0.5 (12.7)	0.438 (11.1)
59	6.56 (166.6)Down	0.5 (12.7)	0.438 (11.1)
60	5.06 (128.6)Down	0.5 (12.7)	0.5 (12.7)
61	-	-	0.5 (12.7)
62	-	-	0.5 (12.7)

**Table 7 - 17/19EX Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
31	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
32	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
33	1.00 (25.4)Down	0.375 (9.5)	0.375 (9.5)
41	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
42	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
43	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
45	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
46	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
47	2.38 (60.4)Down	0.5 (12.7)	0.375 (9.5)
48	3.75 (95.2)Up	0.5 (12.7)	-
51	-	-	0.375 (9.5)
52	-	-	0.375 (9.5)
53	-	-	0.375 (9.5)
55	-	-	0.375 (9.5)
56	-	-	0.375 (9.5)
57	-	-	0.375 (9.5)



**FIGURE 3 - 23XL, 19XL, 19XR, 19XT, 19XRT Moisture and Acid Removal**

**Table 8 – 23XL Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
10	1.63 (41.3) Up	0.38 (9.65)	0.38 (9.65)
11	2.50 (63.5) Up	0.38 (9.65)	0.38 (9.65)
20	1.94 (49.2) Up	0.38 (9.65)	0.38 (9.65)
21	2.81 (71.4) Up	0.38 (9.65)	0.38 (9.65)
40	3.00 (76.2) Down	0.38 (9.65)	0.38 (9.65)
41	2.12 (54.0) Down	0.38 (9.65)	0.38 (9.65)
42	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
43	0.38 (9.5) Down	0.38 (9.65)	0.38 (9.65)

**Table 9 – 19XR Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
10	1.62 (41.2) Down	0.25 (6.35)	0.25 (6.35)
11	0.75 (19.0) Down	0.25 (6.35)	0.25 (6.35)
12	0.12 (3.1) Up	0.25 (6.35)	0.25 (6.35)
15	1.62 (41.2) Down	0.25 (6.35)	0.25 (6.35)
16	0.75 (19.0) Down	0.25 (6.35)	0.25 (6.35)
17	0.12 (3.1) Up	0.25 (6.35)	0.25 (6.35)
20	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
21	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
22	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
30	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
31	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
32	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
35	1.93 (49.1) Down	0.25 (6.35)	0.25 (6.35)
36	1.06 (27.0) Down	0.25 (6.35)	0.25 (6.35)
37	0.69 (17.6) Up	0.25 (6.35)	0.25 (6.35)
40	1.06 (27.0) Down	0.38 (9.65)	0.38 (9.65)
41	0.26 (6.5) Up	0.38 (9.65)	0.38 (9.65)
42	1.13 (28.6) Up	0.38 (9.65)	0.38 (9.65)
45	1.06 (27.0) Down	0.38 (9.65)	0.38 (9.65)
46	0.26 (6.5) Up	0.38 (9.65)	0.38 (9.65)
47	1.13 (28.6) Up	0.38 (9.65)	0.38 (9.65)
50	0.44 (11.2) Up	0.38 (9.65)	0.38 (9.65)
51	1.75 (44.4) Up	0.38 (9.65)	0.38 (9.65)
52	2.63 (66.7) Up	0.38 (9.65)	0.38 (9.65)
55	0.44 (11.2) Up	0.38 (9.65)	0.38 (9.65)
56	1.75 (44.4) Up	0.38 (9.65)	0.38 (9.65)
57	2.63 (66.7) Up	0.38 (9.65)	0.38 (9.65)
60	2.0 (50.7) Up	0.38 (9.65)	0.38 (9.65)
61	2.87 (73.0) Up	0.38 (9.65)	0.38 (9.65)

**Table 9 Continued – 19XR Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
62	3.76 (95.4) Up	0.38 (9.65)	0.38 (9.65)
65	2.0 (50.7) Up	0.38 (9.65)	0.38 (9.65)
66	2.87 (73.0) Up	0.38 (9.65)	0.38 (9.65)
67	3.76 (95.4) Up	0.38 (9.65)	0.38 (9.65)
70	0.59 (14.9) Down	0.38 (9.65)	0.38 (9.65)
71	0.73 (18.5) Up	0.38 (9.65)	0.38 (9.65)
72	2.04 (51.8) Up	0.38 (9.65)	0.38 (9.65)
75	0.59 (14.9) Down	0.38 (9.65)	0.38 (9.65)
76	0.73 (18.5) Up	0.38 (9.65)	0.38 (9.65)
77	2.04 (51.8) Up	0.38 (9.65)	0.38 (9.65)
80	1.87 (47.6) Down	0.38 (9.65)	0.38 (9.65)
81	0.56 (14.2) Down	0.38 (9.65)	0.38 (9.65)
82	0.75 (19.0) Up	0.38 (9.65)	0.38 (9.65)
85	1.87 (47.6) Down	0.38 (9.65)	0.38 (9.65)
86	0.56 (14.2) Down	0.38 (9.65)	0.38 (9.65)
87	0.75 (19.0) Up	0.38 (9.65)	0.38 (9.65)

**Table 10 – 19XL Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, In. (mm)	Shell Thickness, in. (mm)
40	3.0 (76.2) Down	0.38 (9.65)	0.38 (9.65)
41	2.12 (54.0) Down	0.38 (9.65)	0.38 (9.65)
42	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
43	0.375 (9.5) Down	0.38 (9.65)	0.38 (9.65)
50	3.44 (87.3) Down	0.38 (9.65)	0.38 (9.65)
51	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
52	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
53	0.376 (9.54) Down	0.38 (9.65)	0.38 (9.65)
55	3.44 (87.3) Down	0.38 (9.65)	0.38 (9.65)
56	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
57	1.25 (31.8) Down	0.38 (9.65)	0.38 (9.65)
58	0.376 (9.54) Down	0.38 (9.65)	0.38 (9.65)

**Table 11 - 19XRT, 19XT Vessel Information**

Heat Exchanger Size	Cooler		Condenser
	Centerline of Cooler to Centerline of Top Row of Tubes, in. (mm)	Shell Thickness, in. (mm)	Shell Thickness, in. (mm)
60	2.56 (65.1) Down	0.38 (9.65)	0.38 (9.65)
61	0.82 (20.6) Down	0.38 (9.65)	0.38 (9.65)
62	0.5 (12.7) Up	0.38 (9.65)	0.38 (9.65)
63	2.25 (57.2) Up	0.38 (9.65)	0.38 (9.65)

**19EA660-020 Filter Drier Kit (High Pressure)**

ITEM	QTY	DESCRIPTION
1	1	Tee 1/2" ODS x 1/4" FPT Tee
2	1	90° 1/4" MPT x 1/4" ODS
3	2	Bushing - Male to Female 2-1/8" x 7/8"
4	2	Bushing - Male to Female 7/8" x 1/2"
5	2	Dry Eye 1/2" ODS
6	4	90° 1/2" ODS x 1/2" ODS
7	25'	Copper Tubing - 1/2" O.D.
8	1	Relief Valve 1/4" MPT in x 1/4" FPT out
9	3'	Copper Tubing 1/4" O.D.
10	1	90° El 3/8" RPT x 1/2" ODS
11	1	Black Pipe Nipple 3/8" MPT x 3" lg
12	1	Tee 1/2" ODS x 1/4" ODS
13	3	Hand Valve 1/2" ODS
14	1	37/64" Tap Drill
15	1	3/8" -18 NPT Tap
16	1	Angle Valve 1/4" MPT
17	1	Drier Housing - KH49EA-110
18	4	Drier Cartridges - P506-8H100

## SERVICE BULLETIN DISTRIBUTION

**BULLETIN NAME:** Filter Drier Installation

**BULLETIN NUMBER:** C99

**AUTHOR:** Jason Gough

**COLLS:**

**MODEL CODE:** 17, 17, 19, and 23 Series

**KEY WORDS:**

		Mail Key	COIN	cc:Mail
X	DOMESTIC SERVICE PERSONNEL BSS Regional Operations Managers BSS Area Managers BSS Account Executives BSS Technical Consultants BSS Service Offices BSS Regional General Managers BSS Service Managers and Mechanics	2.40A 2.40B 2.40D 2.40M - 2.40 2.46A	#BSS-ROM - - #CBSTSE #BSSVC #BSS-RGM -	
X	INTERNATIONAL SERVICE PERSONNEL International Service Managers Miscellaneous Service Personnel	5.25G 2.33A	#SBMISC #SBMISC	
	DOMESTIC SALES PERSONNEL Canadian Field Sales BSS/ESS Sales/Managers  (Service Bulletins which relate to application)	2.44 2.40L	#CSD-CND #BSSESS	
	INTERNATIONAL SALES PERSONNEL International Marketing Managers  (Service Bulletins which relate to application)	5.25C	#CIC-ASC	
X	SPECIAL DISTRIBUTION CAES Products, Service & SO Engineers Miscellaneous Eng, Mktg, RCD Personnel	2.33B 2.33D	#SBMISC	