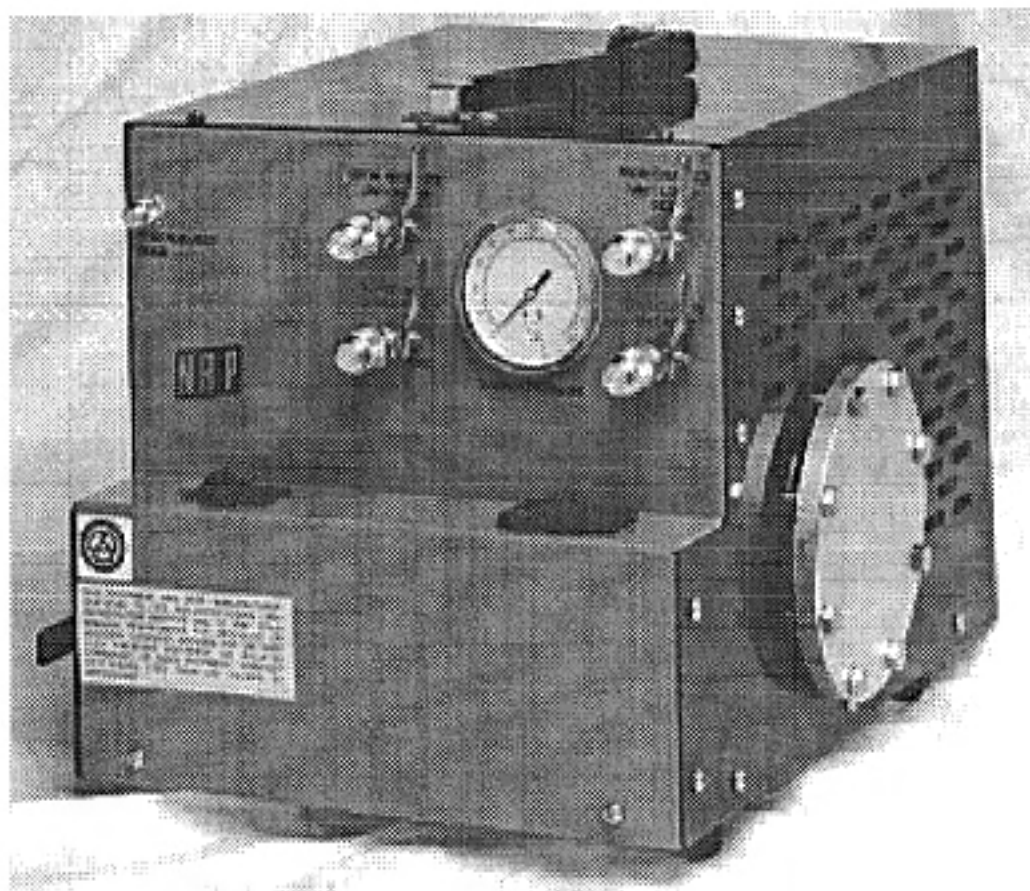


# *OPERATING INSTRUCTIONS*



## **MODEL RAD700** ADD-ON RECYCLER

**NATIONAL REFRIGERATION PRODUCTS**  
985 WHEELER WAY • LANGHORNE, PA 19047  
(215) 638-8909 • FAX (215) 638-9270

# MODEL RAD700

The RAD700, when used in conjunction with your NRP recovery unit\*, can recover/recycle both liquid and vapor refrigerant. It has only one inlet for refrigerant from the disabled system. The RAD700 automatically adjusts itself for the proper mode when liquid or vapor enters the unit. It also catches any oil pumped by the recovery unit compressor by passing through the RAD700 a second time. The RAD700 has an hourmeter to indicate when to change filter-drier cores. The filter-drier must be changed every 1 1/2 hours in order to maintain IRG2 quality refrigerant!

- ALWAYS USE CYLINDERS APPROVED FOR RECOVERY (NRP model NC50U or equivalent).
- DO NOT MIX DIFFERENT REFRIGERANTS IN A CYLINDER. Mixtures cannot be separated.
- ALWAYS WEAR RUBBER GLOVES AND GOGGLES WHEN TRANSFERRING REFRIGERANT.
- BEFORE FILLING AN EMPTY CYLINDER ALWAYS EVACUATE THE CYLINDER FOR 15 MINUTES OR TO AT LEAST 1000 MICRONS TO REMOVE AIR AND NONCONDENSABLES. NONCONDENSABLES WILL INCREASE DISCHARGE PRESSURE DRAMATICALLY.
- ALWAYS USE A PREFILTER (ALCO #ALF-033, PARKER #PF053-MF, OR SPORLAN #C-053) AT THE INLET OF THE UNIT. FAILURE TO USE A PREFILTER MAY RESULT IN MALFUNCTIONING OF THE PRESSURE REGULATOR.

## NOTE:

1. All valves on the RAD700 must be in the closed position, except when the unit is in use. The RAD700 is like a refrigeration unit. It must not be left open to the atmosphere.
2. Connect the RAD700 to a properly grounded 115 Volt, single phase, 60 Hz outlet.
3. Refrigeration hoses should not exceed eight feet in length..
4. USE A PREFILTER (ALCO #ALF-033, PARKER #PF053-MF, OR SPORLAN #C-053) TO PREVENT PARTICLES FROM INTERFERING WITH THE PROPER OPERATION OF THE PRESSURE REGULATOR. THE FILTER MUST BE CHANGED AFTER RECOVERY FROM A BURNOUT SYSTEM, BEFORE PROCESSING ANOTHER REFRIGERANT, AND AFTER PROCESSING 40 POUNDS OF REFRIGERANT.
5. The RAD700 unit is suitable for use with R12, R22, 134a, R502
6. Always remove Schrader cores from access fittings when processing refrigerant from a disabled unit. Schrader cores reduce flow rates drastically.

## Note:

Damage to the pressure regulator due to particles introduced in to the RAD700 unit because a prefilter was not used or changed will not be covered by the warranty.

## WARRANTY

NRP Recovery/Recycling Equipment is warranted to be free if manufacturing defects. NRP will repair or give credit for repair at NRP's choice if any NRP Recovery/Recycling unit or accessories have manufacturing defects. Any warranty claim must be submitted in writing within one year of purchase with a copy of the original invoice. Under no circumstances shall NRP be liable for the cost of special or consequential damages for defective goods, late delivery or non-delivery. There are no warranties which extend beyond the description of the face hereof, and NRP makes no warranty of merchantability or fitness for a specific purpose. This warranty does not cover damage by improper operation or abuse.

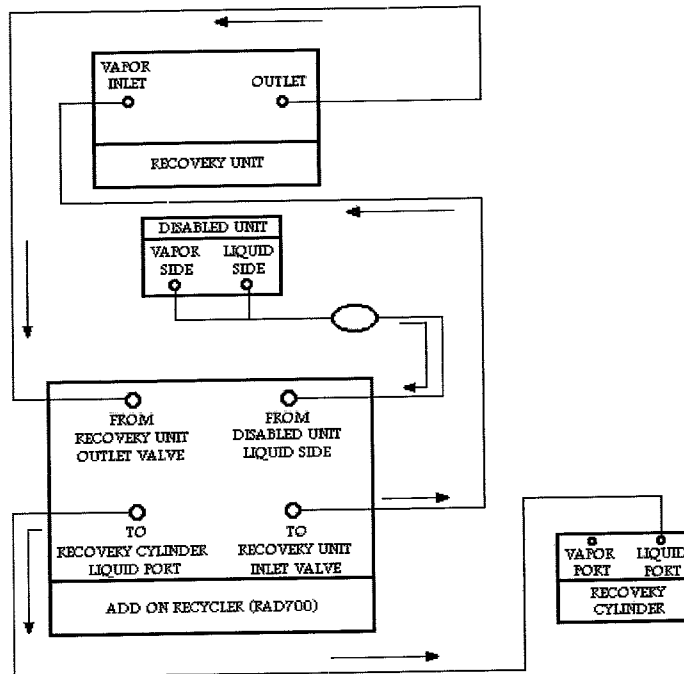
\* This excludes models FF1 & FF1UL.

## RECOVERY/RECYCLING PROCEDURE

The RAD700, when used in conjunction with your NRP recovery unit\*, can recover/recycle liquid and vapor refrigerant. It has only one inlet for refrigerant from the disabled system to be cleaned. When liquid or vapor enters the unit it automatically switches itself to the proper mode of operation.

**IMPORTANT:** Pump-out must be in the “ON” position during recovery/recycling. This prevents liquid from condensing in the recovery unit before the oil is separated in the RAD700.

**Diagram (1): Recovery/Recycling Arrangement**



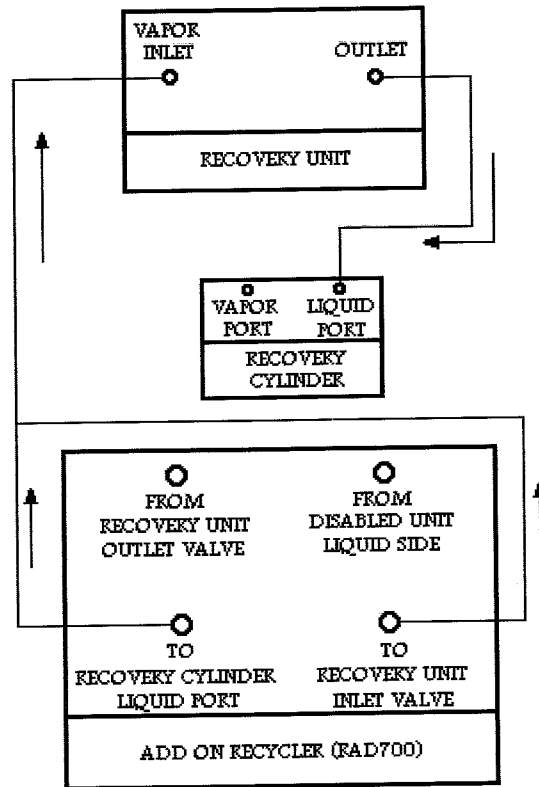
1. Connect a 3/8” hose from the valve labeled “From Disabled Unit Liquid Side” of the RAD700 unit to the liquid side of the source of contaminated refrigerant. (The Liquid and Vapor side of the disabled system may be optionally manifolded and you may need to use 1/4” reducer fitting to adapt).
2. Connect a 3/8” hose from the valve labeled “To Recovery Cylinder Liquid Port” of the RAD700 unit to the liquid port of the recovery cylinder.
3. Connect a hose from the valve labeled “From Recovery Unit Outlet Valve” on the RAD700 unit to the Outlet valve on the recovery unit.
4. Connect a hose from the valve labeled “To Recovery Unit Inlet Valve” on the RAD700 unit to the inlet valve on the recovery unit.
5. Open all ball valves on the Recovery unit and RAD700. Open the liquid valve on the refrigerant cylinder, and liquid valve on contaminated refrigerant source (if it has one).
6. Turn on the RAD700 unit and recovery unit. The RAD700 unit will recover/recycle refrigerant. Switching from liquid to vapor recovery/recycling is automatic.
7. Recovery/Recycling is complete when you have reached the desired level of vacuum. The level of vacuum depends on the type of refrigerant and the amount of charge recycled.
8. When recovery/recycling is complete, close all the valves and drain the accumulator.

\* This excludes the FF1 & FF1UL.

## CLEARING TRAPPED REFRIGERANT

The RAD700 is designed to be used with different refrigerants. The clearing procedure which removes residual refrigerant out of the unit must be followed before recycling a different refrigerant.

### DIAGRAM (2): Clearing Trapped Refrigerant



To clear refrigerant out of the unit:

1. Make sure the "PUMP OUT" switch is in the off position on your NRP recovery unit\* .
2. Connect a hose from the "Inlet" of your NRP recovery unit to a tee or manifold. Connect off the tee to the valves on the RAD700 labeled "To Recovery Cylinder Liquid Port" and "To Recovery Unit Inlet Valve".
3. Connect a hose from your NRP recovery unit\* "Outlet" valve to the liquid port on your recovery cylinder.
4. Open the "VAPOR INLET" and "OUTLET" valves of your NRP recovery unit\* and the liquid valve of your cylinder.
5. Turn the NRP recovery unit\* "ON".
6. Open the valves labeled "To Recovery Cylinder Liquid Port" and " To Recovery Unit Inlet Valve" on the RAD700.
7. When the inlet gauge on the NRP recovery unit\* indicates vacuum, turn the pump out switch "ON".
8. The inlet pressure will rise at first. When the inlet gauge is down to 10" of vacuum, pump out is complete.
9. Turn "OFF" the power switch. Turn off the pump out switch.
10. Close all valves.
11. A total evacuation of the unit can be obtained by using a vacuum pump. Evacuate the RAD700 to 1000 microns or for 15 minutes.

\* This excludes the FF1 & FF1UL.

**VERY IMPORTANT:** During recovery/recycling pay attention to contaminant accumulator sight glass. Since all contaminants (oil, acid, particulate) are separated in the accumulator it is imperative to drain them out (see Contaminants draining procedure) when:

- A. Contaminants are level with the sight glass.
- B. Recovery/recycling is complete.
- C. Changing filter drier cores.

### CONTAMINANTS DRAINING PROCEDURE

1. Make sure the RAD700 is OFF and the pressure gauge on the RAD700 is at 0 PSIG.
2. Connect a hose to the “CONTAMINANTS DRAIN” valve. The hose must have a schrader depressor on the end to be connected to the “CONTAMINANTS DRAIN”. Place the other end of the hose into a container.
3. Connect another hose from the vapor valve of your recovery cylinder to the RAD700 ball valve labeled “From Disabled Unit”. Be sure to purge the hose.
4. Make sure the hose coming from the “CONTAMINANTS DRAIN” leads into your contaminants disposal container.
5. Slowly open the vapor valve of your recovery cylinder. The gauge on your RAD700 will begin to rise. **DO NOT ALLOW THE PRESSURE TO RISE ABOVE (5) PSIG.** Optimal pressure reading is between 3 PSIG and 5 PSIG.
6. The contaminants should be coming out of the “CONTAMINANTS DRAIN” into your disposal container. When there is only gas coming out of the “CONTAMINANTS DRAIN”, the contaminants draining procedure is complete.

**NOTE:**

- If properly done, this procedure drains all contaminants from the RAD700 and removes noncondensables out of the recycled refrigerant.

### FILTER DRIER CORE CHANGE

Filter drier cores must be changed when transferring a different refrigerant or after every 1 1/2 hours of recovery/recycling. The RAD700 has an hourmeter which is energized when the unit is on. Filter drier core change has to be made as fast as possible to avoid adsorption of moisture from the air.

**IMPORTANT:** After a filter drier change the RAD700 must be evacuated.

To change filter cores:

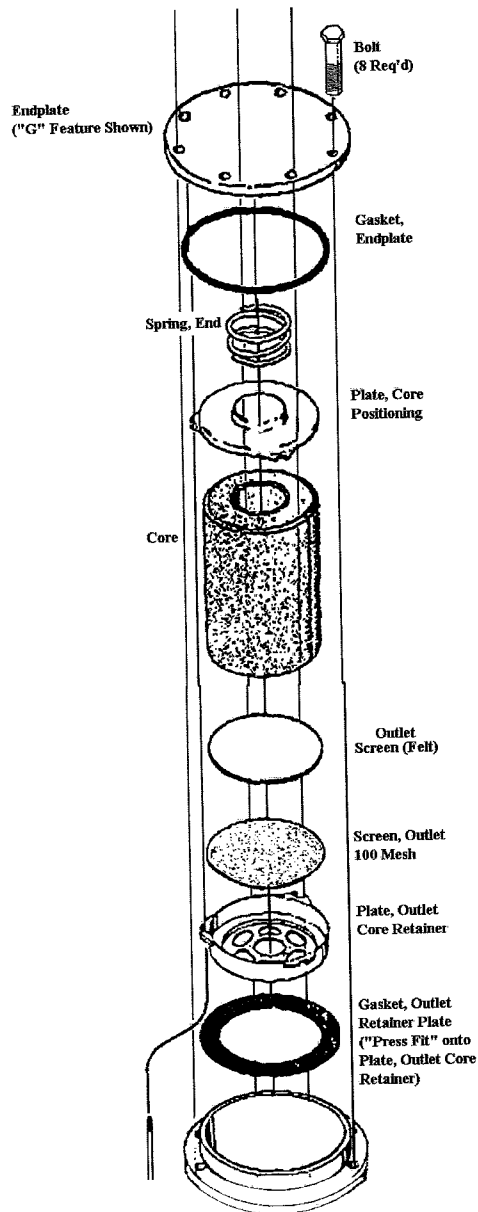
1. Clear the RAD700 of refrigerant. This relieves pressure from the RAD700 unit before opening it to atmosphere.
2. Unscrew the bolts on filter drier shell and remove all parts of the filter drier from the shell.
3. Examine gaskets on the filter cap and on the end of the cartridge. If necessary replace them.
4. Properly wipe internal surface of the shell with clean rag.
5. Replace the core and install cartridge with the new core into the shell. **DO NOT FORGET TO INSTALL FINAL FILTER PADS (final filter pads are supplied with filter cores).** See Diagram (3).
6. Evacuate the unit.

## IMPORTANT RECOMMENDATION

The RAD700 unit was tested to ARI Standard 740 and if properly maintained and operated will clean refrigerant to requirements of ARI Industry Recycling Guideline IRG-2 concerning **WATER, CHLORIDE ION, ACIDITY, NON BOILING RESIDUES AND PARTICULATE/SOLIDS.**

The RAD700 unit (as any other recycling unit) cannot separate mixtures of refrigerants and thus satisfy requirements ARI Standard 700 concerning "OTHER REFRIGERANTS" if Refrigerant designated for recycling contains other refrigerant(s). In this case refrigerant must be sent for reclamation.

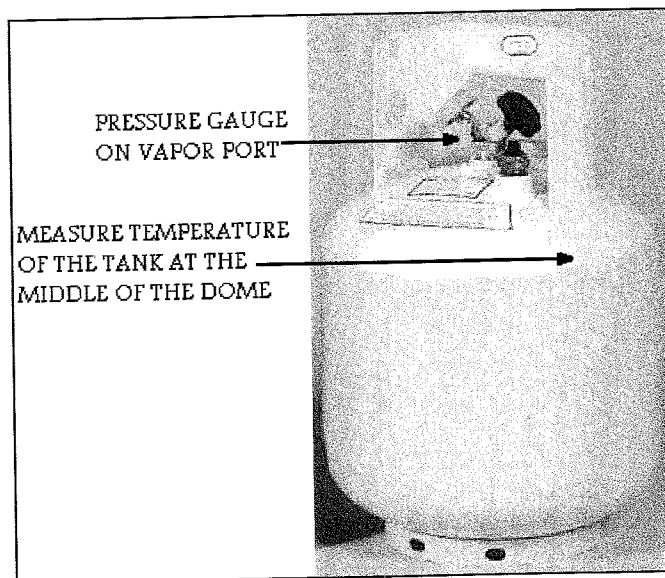
DIAGRAM (3) - FILTER-DRIER CORE ASSEMBLY:



## Checking Your Refrigerant and Purging Non-Condensables

Allow the cylinder, into which you have recycled the refrigerant, to sit for as long as possible. The ambient temperature should be no less than 65° F.

- Install a pressure gauge, with 1 PSIG increments, to the vapor port of your recovery/recycling tank.
- Measure the cylinder pressure.
- Measure the temperature of the cylinder at the middle of the dome. See picture to the right.
- From the chart below, find the expected pressure of the tank from the measured temperature. You may need to interpolate between temperature ranges.
- Compare the measured pressure (from your gauge) and the expected pressure.
- If the measured pressure is within 6 PSI of the expected, the recycled refrigerant is within IRG-2 specifications with respect to non-condensables.
- If the measured pressure is not within 6 PSI, the non-condensables in the tank must be purged. The following procedure for purging should be followed:
  1. Again, allow the cylinder, which you have used for recovery/recycling, to sit for as long as possible. This helps separate the refrigerant gas from the non-condensables. ARI allows 15 minutes to complete the purge cycle.
  2. Slowly open the vapor valve on your recovery tank.
  3. Allow the vapor to escape for no longer than 8 to 10 seconds.
  4. Recheck the refrigerant as stated above.



**PRESSURE-TEMPERATURE CHART**

PRESSURES (PSIG)									
TEMP. (° F)	R11	R12	R22	R113	R114	R500	R502	R134a	R123
-50	<b>28.9</b>	<b>15.4</b>	<b>6.2</b>		<b>27.1</b>		0.0	<b>18.7</b>	
-45	<b>28.7</b>	<b>13.3</b>	<b>2.7</b>		<b>26.6</b>		1.9	<b>16.9</b>	
-40	<b>28.4</b>	<b>11.0</b>	0.5		<b>26.0</b>	<b>7.6</b>	4.1	<b>14.8</b>	
-35	<b>28.1</b>	<b>8.4</b>	2.6		<b>25.4</b>	<b>4.6</b>	6.5	<b>12.5</b>	
-30	<b>27.8</b>	<b>5.5</b>	4.9	<b>29.3</b>	<b>24.6</b>	<b>1.2</b>	9.2	<b>9.9</b>	
-25	<b>27.4</b>	<b>2.3</b>	7.4	<b>29.2</b>	<b>23.8</b>	1.2	12.1	<b>6.9</b>	
-20	<b>27.0</b>	0.6	10.1	<b>29.1</b>	<b>22.9</b>	3.2	15.3	<b>3.7</b>	<b>27.8</b>
-15	<b>26.5</b>	2.4	13.2	<b>28.9</b>	<b>21.8</b>	5.4	18.8	0.6	<b>27.4</b>
-10	<b>26.0</b>	4.5	16.5	<b>28.7</b>	<b>20.6</b>	7.8	22.6	1.9	<b>26.9</b>
-5	<b>25.4</b>	6.7	20.1	<b>28.5</b>	<b>19.3</b>	10.4	26.7	4.0	<b>26.4</b>
0	<b>24.7</b>	9.2	24.0	<b>28.2</b>	<b>17.8</b>	13.3	31.1	6.5	<b>25.9</b>
5	<b>23.9</b>	11.8	28.2	<b>27.9</b>	<b>16.2</b>	16.4	35.9	9.1	<b>25.2</b>
10	<b>23.1</b>	14.6	32.8	<b>27.6</b>	<b>14.4</b>	19.7	41.0	11.9	<b>24.5</b>
15	<b>22.1</b>	17.7	37.7	<b>27.2</b>	<b>12.4</b>	23.4	46.5	15.0	<b>23.8</b>
20	<b>21.1</b>	21.0	43.0	<b>26.8</b>	<b>10.2</b>	27.3	52.4	18.4	<b>22.8</b>
25	<b>19.9</b>	24.6	48.8	<b>26.3</b>	<b>7.8</b>	31.5	58.8	22.1	<b>21.8</b>
30	<b>18.6</b>	28.5	54.9	<b>25.8</b>	<b>5.2</b>	36.0	65.6	26.1	<b>20.7</b>
35	<b>17.2</b>	32.6	61.5	<b>25.2</b>	<b>2.3</b>	40.9	72.8	30.4	<b>19.5</b>
40	<b>15.6</b>	37.0	68.5	<b>24.5</b>	0.4	46.1	80.5	34.1	<b>18.1</b>
45	<b>13.9</b>	41.7	76.0	<b>23.8</b>	2.0	51.6	88.7	40.1	<b>16.6</b>
50	<b>12.0</b>	46.7	84.0	<b>22.9</b>	3.8	57.6	97.4	45.5	<b>14.9</b>

PRESSURES (PSIG)									
TEMP. (° F)	R11	R12	R22	R113	R114	R500	R502	R134a	R123
55	<b>10.0</b>	52.0	92.6	<b>22.2</b>	5.8	63.9	106.6	51.3	<b>13.0</b>
60	<b>7.8</b>	57.7	101.6	<b>21.0</b>	7.9	70.6	116.4	57.5	<b>11.2</b>
65	<b>5.4</b>	63.8	111.2	<b>19.9</b>	10.1	77.8	126.7	64.1	<b>8.9</b>
70	<b>2.8</b>	70.2	121.4	<b>18.7</b>	12.6	85.4	137.6	71.2	<b>6.5</b>
75	0.0	77.0	132.2	<b>17.3</b>	15.2	93.5	149.1	78.8	<b>4.1</b>
80	1.5	84.2	143.6	<b>15.9</b>	18.0	102.0	161.2	86.8	<b>1.2</b>
85	3.2	91.8	155.7	<b>14.3</b>	20.9	111.0	174.0	95.4	0.9
90	4.9	99.8	168.4	<b>12.5</b>	24.1	120.6	187.4	104.4	2.5
95	6.8	108.3	181.8	<b>10.6</b>	27.5	130.6	201.4	114.1	4.3
100	8.8	117.2	195.9	<b>8.6</b>	31.2	141.2	216.2	124.3	6.1
105	10.9	126.6	210.8	<b>6.4</b>	35.0	152.4	231.7	135.1	8.1
110	13.2	136.4	226.4	<b>4.0</b>	39.1	164.1	247.9	146.5	10.3
115	15.6	146.8	242.7	<b>1.4</b>	43.4	176.5	264.9	158.6	12.6
120	18.2	157.7	259.9	0.7	48.0	189.4	282.7	171.3	15.1
125	21.0	169.1	277.9	2.2	52.8	203.0	301.4	184.7	17.8
130	24.0	181.0	296.8	3.7	58.0	217.2	320.8	198.9	20.6
135	27.1	193.5	316.6	5.4	63.4	232.1	341.2	213.7	23.6
140	30.4	206.6	337.3	7.2	69.1	247.7	362.6	229.4	26.8
145	34.0	220.3	358.9	9.2	75.1			245.8	30.2
150	37.7	234.6	381.5	11.2	81.4			263.0	33.9

**BOLD ITALICISED NUMERALS** -In. of Hg, BELOW 1 ATM