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**HIGHWAY
VEHICLE
RECOMMENDED
PRACTICE**

SAE J1989

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RECOMMENDED SERVICE PROCEDURE FOR THE CONTAINMENT OF R-12

1. SCOPE:

During service of mobile air-conditioning systems, containment of the refrigerant is important. This procedure provides service guidelines for technicians when repairing vehicles and operating equipment defined in SAE J1990.

2. REFERENCES:

SAE J1990, Extraction and Recycle Equipment for Mobile Automotive Air-Conditioning Systems

3. REFRIGERANT RECOVERY PROCEDURE:

3.1 Connect the recovery unit service hoses, which shall have shutoff valves within 12 in (30 cm) of the service ends, to the vehicle air-conditioning system service ports.

3.2 Operate the recovery equipment as covered by the equipment manufacturers recommended procedure.

3.2.1 Start the recovery process and remove the refrigerant from the vehicle AC system. Operate the recovery unit until the vehicle system has been reduced from a pressure to a vacuum. With the recovery unit shut off for at least 5 min, determine that there is no refrigerant remaining in the vehicle AC system. If the vehicle system has pressure, additional recovery operation is required to remove the remaining refrigerant. Repeat the operation until the vehicle AC system vacuum level remains stable for 2 min.

3.3 Close the valves in the service lines and then remove the service lines from the vehicle system. Proceed with the repair/service. If the recovery equipment has automatic closing valves, be sure they are properly operating.

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4. SERVICE WITH MANIFOLD GAGE SET:

- 4.1 Service hoses must have shutoff valves in the high, low, and center service hoses within 12 in (30 cm) of the service ends. Valves must be closed prior to hose removal from the air-conditioning system. This will reduce the volume of refrigerant contained in the service hose that would otherwise be vented to atmosphere.
- 4.2 During all service operations, the valves should be closed until connected to the vehicle air-conditioning system or the charging source to avoid introduction of air and to contain the refrigerant rather than vent open to atmosphere.
- 4.3 When the manifold gage set is disconnected from the air-conditioning system or when the center hose is moved to another device which cannot accept refrigerant pressure, the gage set hoses should first be attached to the reclaim equipment to recover the refrigerant from the hoses.

5. RECYCLED REFRIGERANT CHECKING PROCEDURE FOR STORED PORTABLE AUXILIARY CONTAINER:

- 5.1 To determine if the recycled refrigerant container has excess noncondensable gases (air), the container must be stored at a temperature of 65°F (18.3°C) or above for a period of time, 12 h, protected from direct sun.
- 5.2 Install a calibrated pressure gage, with 1 psig divisions (0.07 kg), to the container and determine the container pressure.
- 5.3 With a calibrated thermometer, measure the air temperature within 4 in (10 cm) of the container surface.
- 5.4 Compare the observed container pressure and air temperature to determine if the container exceeds the pressure limits found on Table 1, e.g., air temperature 70°F (21°C) pressure must not exceed 80 psig (5.62 kg/cm²).

TABLE 1

TEMP°F	PSIG								
65	74	75	87	85	102	95	118	105	136
66	75	76	88	86	103	96	120	106	138
67	76	77	90	87	105	97	122	107	140
68	78	78	92	88	107	98	124	108	142
69	79	79	94	89	108	99	125	109	144
70	80	80	96	90	110	100	127	110	146
71	82	81	98	91	111	101	129	111	148
72	83	82	99	92	113	102	130	112	150
73	84	83	100	93	115	103	132	113	152
74	86	84	101	94	116	104	134	114	154

TABLE 1 (Metric)

TEMP°C	PRES								
18.3	5.20	23.9	6.11	29.4	7.17	35.0	8.29	40.5	9.56
18.8	5.27	24.4	6.18	30.0	7.24	35.5	8.43	41.1	9.70
19.4	5.34	25.0	6.32	30.5	7.38	36.1	8.57	41.6	9.84
20.0	5.48	25.5	6.46	31.1	7.52	36.6	8.71	42.2	9.98
20.5	5.55	26.1	6.60	31.6	7.59	37.2	8.78	42.7	10.12
21.1	5.62	26.6	6.74	32.2	7.73	37.7	8.92	43.3	10.26
21.6	5.76	27.2	6.88	32.7	7.80	38.3	9.06	43.9	10.40
22.2	5.83	27.7	6.95	33.3	7.94	38.8	9.13	44.4	10.54
22.7	5.90	28.3	7.03	33.9	8.08	39.4	9.27	45.0	10.68
23.3	6.04	28.9	7.10	34.4	8.15	40.0	9.42	45.5	10.82

PRES kg/sq cm

- 5.5 If the container pressure is less than the Table 1 values and has been recycled, limits of noncondensable gases (air) have not been exceeded and the refrigerant may be used.
- 5.6 If the pressure is greater than the range and the container contains recycled material, slowly vent from the top of the container a small amount of vapor into the recycle equipment until the pressure is less than the pressure shown on Table 1.
- 5.7 If the container still exceeds the pressure shown on Table 1, the entire contents of the container shall be recycled.
6. CONTAINERS FOR STORAGE OF RECYCLED REFRIGERANT:
- 6.1 Recycled refrigerant should not be salvaged or stored in disposable refrigerant containers. This is the type of container in which virgin refrigerant is sold. Use only DOT CFR Title 49 or UL approved storage containers for recycled refrigerant.
- 6.2 Any container of recycled refrigerant that has been stored or transferred must be checked prior to use as defined in Section 5.
7. TRANSFER OF RECYCLED REFRIGERANT:
- 7.1 When external portable containers are used for transfer, the container must be evacuated to at least 27 in of vacuum (75 mm Hg absolute pressure) prior to transfer of the recycled refrigerant. External portable containers must meet DOT and UL standards.
- 7.2 To prevent on-site overfilling when transferring to external containers, the safe filling level must be controlled by weight and must not exceed 60% of container gross weight rating.

8. DISPOSAL OF EMPTY/NEAR EMPTY CONTAINERS:

- 8.1 Since all the refrigerant may not be removed from disposable refrigerant containers during normal system charging procedures, empty/near empty container contents should be reclaimed prior to disposal of the container.
- 8.2 Attach the container to the recovery unit and remove the remaining refrigerant. When the container has been reduced from a pressure to a vacuum, the container valve can be closed. The container should be marked empty and is ready for disposal.

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