The Service Sector Prepares for HFO-1234yf

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Agenda

- HFO-1234yf Review
- Service Differences
- Technician Training
- Recovery/Recycle/Recharge Equipment
- Storage and Handling
HFO-1234yf has vapor pressure, toxicity class A, similar to R-134a, but has mild flammability.
Some potential service differences for HFO-1234yf are:

- Service shops and technicians may need to purchase/use new equipment (flammability/product differences)
  - Recovery/recycle/recharge equipment
  - Refrigerant identifiers
  - Leak detection equipment

- HFO-1234yf refrigerant system components should not be replaced with ones removed from a system that uses another type of refrigerant, or from a salvaged vehicle
  - Replacement evaporators should meet SAE J2842

- HFO-1234yf is mildly flammable
  - Precautions used with other flammables (gasoline, oil) are applicable to HFO-1234yf
Servicing Differences

Some potential service differences for HFO-1234yf are:

- Lubricants used with HFO-1234yf systems may be different than those currently used
  - Hybrid compressors, driven by high-voltage electric motors, or equipped with hermetic mobile A/C systems, use different oils
  - Necessary to check oil requirements

- Do-it-yourselfers may charge non-approved refrigerants into HFO-1234yf systems
  - Result – refrigerant cross contamination
  - Could cause system failure and/or system misdiagnoses
Servicing Differences

Typical OEM R-134a Label

Proposed OEM HFO-1234yf Label

Additional Information:
- Refrigerant flammability symbol
- J2845 Technician Training for Safe Service and Containment of Refrigerants
Servicing Differences

R-134a Valve

1/2" ACME
(CGA 167)

Prop HFO-1234yf Valve

SAE J639 AC System Low Side Quick Connect

NOT FINALIZED
Servicing Best Practices

- In general, low lying areas, (such as workshop pits, shafts or cellar exits), may cause released refrigerant to pool as it is heavier than air
  - Current regulations require work areas to be adequately ventilated and extraction units switched on if available.
  - Refer to local, state and federal rules and regulations regarding ventilation.

- Care should be taken to avoid over-charging of the refrigerant system.

- Service technicians should not smoke or have any open flame present while working on refrigerant containing systems
Technician Training per SAE J2845

**Service Related**
(1) Understand unique differences between R-1234yf and HFC-134a;
(2) Identification of unique fittings/labels for each refrigerant along with tank identification;
(3) How to use refrigerant identification equipment;
(4) How to use leak detection equipment and/or fluorescent dyes to identify leaks with each refrigerant;
(5) System servicing practices (incl. proper recovery/recycling/recharge)

**Safety and Environmental Related**
(6) Follow vehicle manufacturer recommendations, to promote technician safety and minimize environmental impact using appropriate recovery, recycling and charging equipment;
(7) Technicians must have a good understanding of the safety requirements defined in SAE J639.

*OEM’s have requested this standard to provide similar basis for technician refrigerant training*
**Technician Training per SAE J2845**

- Intent of J2845 is to provide sufficient technician training, and to highlight refrigerant handling differences.

<table>
<thead>
<tr>
<th>Flammability</th>
<th>HFC-134a</th>
<th>HFO-1234yf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Flammability Level</td>
<td>N/A</td>
<td>6.2%</td>
</tr>
<tr>
<td>Upper Flammability Level</td>
<td>N/A</td>
<td>12.3%</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>AC System</th>
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</thead>
<tbody>
<tr>
<td>AC Type</td>
<td>Vapor Compression</td>
<td>Vapor Compression</td>
</tr>
<tr>
<td>AC Components</td>
<td>Can use either R-134a evaporator or HFO-1234yf evaporator</td>
<td>Use only evaporators which meet J2842</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Storage, Handling</th>
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<tbody>
<tr>
<td>Container Type</td>
<td>Light Blue Container, PMS Color 2975</td>
<td>White Container with Red Band</td>
</tr>
<tr>
<td>Product Storage</td>
<td>Do not expose to open flames, red hot surfaces, or temps in excess of 52C</td>
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</tr>
<tr>
<td>Personal Protective Equipment</td>
<td>gloves, goggles</td>
<td>gloves, goggles</td>
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</tbody>
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<thead>
<tr>
<th>Equipment</th>
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<tbody>
<tr>
<td>Recovery/Recycling Equipment</td>
<td>Only use equipment that meets J2210, superseded by J2788 and is for use with R-134a</td>
<td>Only use equipment that meets J2843 and is for use with HFO-1234yf</td>
</tr>
<tr>
<td>Recovery Only</td>
<td>Only use equipment that meets J1732, superseded by J2810 and is for use with R-134a</td>
<td>Only use equipment that meets J2851 and is for use with HFO-1234yf</td>
</tr>
<tr>
<td>Leak Detectors</td>
<td>Only use equipment that meets J1627 or J2791 and is for use with R-134a</td>
<td>Only use equipment that meets J2913 and is for use with HFO-1234yf</td>
</tr>
</tbody>
</table>
R/R/R Equipment-J2843

J2843 HFO-1234yf Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems

Highlights
- Machines’ internal components reduce/minimize arcing/sparking
- Machines will have additional cabinet ventilation
- New hose connections will be required with HFO-1234yf (J639)
- HFO-1234yf refrigerant cylinder color white with red band per J639
- New equipment will prevent re-charge if system has a leak.
- Machine has 2-step process
  1. Vacuum Check
     - Pull vacuum, check for decays
     - If system decays, will stop machine
  2. Pressure Check
     - If vacuum does not decay, will add 10% charge
     - Monitor pressure, check for pressure decay
     - If the pressure decays, remaining 90% of the refrigerant will not be administered.
Recovery Equipment-J2851

J2851 HFO-1234yf Recovery Only Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems

Highlights:
• Machines’ internal components reduce/minimize arcing/sparking
• Machines will have additional cabinet ventilation
• New hose connections will be required with HFO-1234yf (J639)
• HFO-1234yf Refrigerant cylinder color- white with red band per J639
• New equipment will prevent re-charge if system has a leak.
• Machine will RECOVER, even if there is a system leak
HFO-1234yf package options exist for both disposable and returnable containers

- Disposable packages limited to about 2 lb size
  - Current DOT regulations prohibit packaging flammable gases in DOT 39 disposable containers beyond 0.75 in³ interior volume.
- Returnable packages available in 2, 5, 10, 20 and 30 lb size

Currently working with DOT to understand additional HFO-1234yf disposable packaging options.

Check with your local, state or federal agencies, as storage of multiple containers of refrigerant may be subject to regulation.

- Refrigerant should always be stored in a cool, dry location, out of direct sunlight
Storage and Handling Information

- R-134a
  - 30 lb disposable containers
  - Light blue package color

- HFO-1234yf
  - 30 lb returnable containers
  - White with red band package color

Packages have about the same footprint, ie. They take about the same floor space.
Summary

To prepare for HFO-1234yf service technicians will need.....

- New recovery/recycle/recharge or recovery-only equipment
- New refrigerant identifier
- New leak detection equipment
- Assure adequate ventilation and follow flammable storage practices per local, state and federal regulations
- Appropriate technician training
Thank You!

Please contact us at....

- [www.MACSW.org](http://www.MACSW.org)
- [www.refrigerants.dupont.com](http://www.refrigerants.dupont.com)
- [www.SmartAutoAC.com](http://www.SmartAutoAC.com)