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/ / / / / / / *Tech Tip* / / / / / / /

## A/C SYSTEM FLUSHING

The reason for flushing the A/C system is to remove oil and contamination. When it comes to maintaining your warranty the choice is the use of an in-line filter or component flushing. Be aware that there are a limited number of Four Seasons approved flush chemicals and flush methods.

This tech tip will focus on both non-approved and approved flush chemicals and methods.

### NON-APPROVED FLUSHING:

- Closed loop refrigerant flushing using R12 or R134a with a recycling or re-charging machine.
- Open loop flushing (hand held flush gun) with terpene based flush.
- Any flushing chemical that is oil, alcohol, mineral spirits, isopropanol, acetone, toluene, or heptane based.
- Any flush chemical that has a known health hazard (1.1.1. trichloroethylene, trichloroethene, tetrachloroethylene).
- Any other cleaning agent such as brake clean, degreasers, carburetor cleaners, etc. that can deteriorate rubber components and reduce lubrication.

### APPROVED FLUSHING:

- *The flush chemical marketed under the names DURA FLUSH or HCFC 141B.* This flush chemical utilizes the Open Loop procedure. The open loop procedure requires that the flush chemical be placed into a tank, and that the tank is pressurized with clean shop air. The flush chemical is then pushed through the component being flushed, using adapters and a disposal bottle to collect the flush as it leaves the component. The flush kit (includes the tank, hose, gun and rubber tip) and disposal tank are all available through Four Seasons.
- *The flush equipment manufactured by Ciplight.* This unit is a Continuous Flow Power Flush system that is constantly moving the Ciplight flush chemical through the component being flushed. The use of a small amount of flush chemical is one of the benefits of the Continuous Flow System. The equipment uses shop air to drive a pump which generates 50 pounds of pressure. The flush process, takes 15 minutes to flush, and 45 minutes to purge the flush chemical from the component being flushed. The flush and purging process must be followed exactly, as recommended by the manufacturer, in order for the vehicle A/C system to work properly.
- *Both designs of flush equipment manufactured by Hecat.* These units are Pulsing Flow Power systems that start and stop (pulse) the flow of the Hecat flush chemical, through the component being flushed. Both units use shop air to pulse the flush chemical through the part being flushed with the total flush and purge time taking less than 30 minutes. The flush and purging process must be followed exactly, as recommended by the manufacturer, in order for the vehicle A/C system to work properly.
- Other O.E. approved power flush equipment, of similar design to the approved Ciplight and Hecat units. The flush chemical used must be the approved flush chemical provided by the flush equipment manufacturer. *Use of a flush chemical that is not approved by the power flush equipment manufacturer or use of an approved flush chemical without the use of the manufacturers power flush equipment are not acceptable flush methods under the Four Seasons warranty policy.*

### APPROVED FLUSHING PROCEDURE:

Flushing the A/C system (or installation of an in-line filter) is now a required service procedure, in order to protect the warranty of all Four Seasons replacement compressors. Flushing the condenser, evaporator, refrigerant lines and hose assemblies (without mufflers and or orifice tubes) is the best way of removing residual oil and contaminants, when performing a compressor replacement. Flushing condensers where the compressor has sustained a catastrophic failure is generally not an effective repair process and may require condenser replacement. This is especially true in the case of late model multi-flow condenser designs which are less responsive to flushing.

There are a variety of flushing chemicals available in the aftermarket and their chemical properties differ greatly. The differences in their properties are highlighted in the following chart.

| Chemical Properties:           | 141b Dura Flush                                                                                                            | Oil Based                                                                                                               | Terpene Based                                                                                                            | Solvent Based                                                                                                  |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Flammability:                  | No Flash Point                                                                                                             | High Flash Point                                                                                                        | Low Flash Point                                                                                                          | Flammable                                                                                                      |
| Cleaning Ability:              | Excellent                                                                                                                  | Fair                                                                                                                    | Good                                                                                                                     | Good                                                                                                           |
| Compatibility with A/C System: | Good                                                                                                                       | Good                                                                                                                    | May attack o-rings & hoses                                                                                               | May Attack o-rings & hoses                                                                                     |
| Ease of Use:                   | <u>Easy to Use.</u><br>Can be utilized in a <i>Hand Held Flush Gun System</i> since the chemical <u>evaporates easily.</u> | Extremely difficult to remove. Chemical will be retained with the remaining contaminated oil that is in the A/C system. | <u>Must be used with Power Flush Systems Only.</u><br><br><u>Not approved for use with a Hand Held Flush Gun System.</u> | Extremely difficult to use as extra care must be taken, in order not to ignite this very combustible material. |
| Cost Effectiveness:            | Proven track record,<br><br>“ Will Reduce comebacks”.<br><br>Utilizes inexpensive equipment.                               | Extra time needed to remove flush, residues that are present.<br><br>Risk of premature compressor failure.              | Significantly longer service time.<br><br>Requires the use of Costly Equipment.                                          | Flammability risk is hard to ignore.<br><br>Extra time is required to remove flush.                            |
| Evaporation Rate:              | High – Easy to remove from system.                                                                                         | Poor - Will remain in the A/C system.                                                                                   | Poor - Difficult to remove from the A/C system.                                                                          | Medium – Need extra time to insure removal                                                                     |

**ALWAYS REMEMBER:**

- To flush the required components or install an in-line filter.
- When utilizing power flushing, be sure to refer to the particular manufacture’s instruction material for the correct operating procedure when using power flush equipment and use only the equipment manufacture’s approved flush chemical.
- The use of non-approved flush chemicals can cause harm to you, your equipment and/or the vehicle.
- The use of non-approved flush chemicals will void your Four Seasons compressor warranty.
- The Four Seasons approved flush methods, equipment and chemicals are:
  - Open loop with Flush Kit and DURA FLUSH or HCFC 141b.
  - O.E. approved equipment similar to the Cliplight and Hecat designs.
  - Power Flushing with the Cliplight equipment and Cliplight’s approved flush.
  - Power Flushing with the Hecat equipment and the Hecat approved flush.



DURA FLUSH



CLIPLIGHT



HECAT FAC-500



HECAT PULSATOR II