Refrigeration and Air Conditioning Flushing Compound

R_x11- Flush™

R_x11-flush is an ozone-safe solvent engineered specifically for flushing refrigeration and air conditioning systems. Used exactly like the old R-11 flushing process, R_x11 is strong enough to rinse away particulate, sludge, carbon residues, acids, oils and water. It enhances system service and avoids the need for time-consuming repeat visits. R_x11-flush should become an Integral part of standard procedures for any major system repair, oil change-out or retrofit.

DESCRIPTION

Based on new and patented HFC solvents developed by DuPont, R_x11 is ozone-safe, non-toxic, nonflammable and compatible with most materials in a refrigeration system. The cleaner itself has excellent solvency characteristics and it is packaged in a convenient pressurized container, sufficient to purge a moderately contaminated five to seven ton air conditioning or refrigeration system.

APPLICATION

From time to time, refrigeration and air conditioning systems suffer failures which result in contamination. The most common such failure is a compressor burnout. During such an event, the refrigeration system becomes contaminated with large quantities of disintegrating particulate, sludge, acids, carbon residues and possibly moisture. All of these contaminants must be removed before the system is returned to duty.

In earlier years, these systems were flushed with the popular CFC-based solvent R-11. Nonflammable, plastic-safe and having a very low boiling point, this material was favored because it was safe to use, cleaned efficiently and was easily removed from the system. Unfortunately, R-11 was a major ozone-depleter and was gradually phased out of production. Since that time, many companies have attempted to market alternative flushing agents based on terpene, hydrocarbon cleaners, acid flushes and oil additives. To date, none

of those contenders have enjoyed the success of R-11 simply because none are as effective, as fast, as affordable nor as safe.

Enter R_x11-flush, pioneered by the same chemists who produced the original R_x11. R_x11-flush offers all of the benefits of R-11 without the environmental concerns. This is a totally new chemical formulation based on new HFC technologies. It is a powerful cleaner, stronger than R-11 ever was, and it is the best prescription to effectively scrub the inside of the refrigeration system. It dries quickly, has a low boiling point (106ºF), has no aroma, will not attack components, offers great worker safety ratings and is affordable priced. R_x11-flush is the industry's best answer for major system overhauls.

FEATURES AND BENEFITS

- Safe, nontoxic, and nonflammable
- Used the same way as R-11
- Low Boiling point enhances complete evaporation
- Cleaning is fast, efficient and verifiable
- Can be used for new system cleaning or retrofits
- Modern packaging minimizes solvent exposure to hands, eyes, and lungs
- The solvent is approved as part of the U.S. EPA's Significant New Alternatives Program (SNAP)

GENERAL GUIDELINES

1. Use only the appropriate refrigerant, proper recovery equipment, component parts, tools and lubricants as established in the industry and as listed in this service bulletin.

2. Do not inject the solvent into the compressor itself; only the supporting refrigeration system should be flushed.

3. Large systems or systems with unusual configurations that could trap the solvent should be disassembled and flushed section by section.

4. A single canister will flush a five to seven ton AC/R system. However, the exact amount of R_x11-flush required will vary by the internal design of the system, the nature of the system failure, the degree of contamination trapped in the system, and the temperatures at which the failure occurred.

5. If the system to be flushed includes larger components such as a receiver we recommend a visual inspection. If these components appear to be contaminated, and are small enough to be flushed with R_x11-flush, then do so. If they are too large to economically flush with R_x11-flush, then the use of the traditional degreasing solvent, such as Degreasing Solvent ef (Part No. 4162-07), should be considered for them.

EQUIPMENT REQUIRED

1. The following equipment will be required for each flushing operation:

2. New canisters (Part No. 4300-11) of flushing solvent. For typically soiled system, you will need one canister for every 5-7 tons of cooling capacity.

3. An Injection Tool (Part No. 4300-99) and standard refrigerant charging hose to inject the solvent into the AC/R system. The charging hose and injection tool should be dedicated and retained for future flushing.

4. A small, resealable, waste container that will hold the solvent after it is flushed through the system. Ideally the solvent in the container must be visible so it can be inspected during the flushing process. This enables a technician to determine when the solvent begins to run clean, indicating that the system has been thoroughly purged.

5. A tank of clean compressed nitrogen, regulated to 120-150 psig. This tank should be equipped with a dispensing hose and will be used to purge the solvent from the system.

6. A vacuum pump with the appropriate hoses and clamps.

7. Clean wipes or swabs to remove any residual oils or liquids that may drip or be spilled while purging the system.

8. Safety equipment: Never flush a system without eye protection and rubber gloves. Convoluted piping in certain systems can cause momentary spikes in the solvent flow during the flushing process, resulting in erratic purges, which could splash into eyes and onto skin.

SPECIFIC INSTRUCTIONS

- Confirm you have all the required components for the service as well as for the flushing operation prior to beginning.
- If system is still operational, remove the existing refrigerant and lubricant using the appropriate methods and recovery equipment.
- Review the configuration of the system. On larger systems, disassemble sections of the system so those individual portions can be cleaned section by section.
- De-energize all of the electrical leads and ensure they are safely positioned. Remove the following components:
- Disconnect the old compressor and remove it from the system.
- Remove filter drier cores. If it is easier or more cost-effective, install a by-pass loop around the filter drier accumulators, etc.
- On heat pumps, remove check valves and four-way reversing valves.

Again, configure and install by-pass loops.

- Connect a waste container to a discharge port to capture the contaminated flushing solvent. As this solvent exits the system, it will contain oils, condensed water, acids, particulate and possibly other mechanical residues. While not normally hazardous, such residues need to be captured for proper disposal.
- Connect your charging hose onto the system to be flushed. Make sure openings upstream, except discharge port, are closed. Connect the Injection Tool to the R_x11 canister. When ready to inject R_x11-flush, connect the canister to the charging hose. Open valve on tool, the R_x11 will start entering the system.
- Discharging the R_x11-flush should take approximately 10 minutes, depending upon temperature. Before the tank is empty, some small quantity of solvent should begin to flow into the discharge container. Note: The canister has been designed to empty itself completely only when the canister is standing in an upright position. Do not attempt to flush the system with a canister inverted or on its side.
- Using the compressed nitrogen tank, connect the nitrogen tank to the system and blast it into the system behind the R_x11-flush solvent. The nitrogen will push the solvent through the entire system, agitating it and "scrubbing" the inside of the system. Eventually, all of the solvent will flow into the receiving container on the other side of the system.
- Observe the solvent being captured by the receiving container. If it is running clean and clear, the system has been successfully flushed. If the solvent is murky or still containing particulate, flush again.
- Make your repairs. Remove any by-pas loops you installed. Tie-in the expansion devices. Replace the filter/drier cores. Secure the system.
- Evacuate the system to a low micron pressure range with the vacuum pump and leak-check the system. This will evacuate any residual liquid solvent from the system. As the internal pressure drops, the solvent will boil into vapor and be removed from the system. Time for pulling the vacuum should be approximately fifteen minutes for a five-ton system.
- As a final step, recharge the system with refrigerant and lubricants as recommended by the compressor or equipment manufacturer and the system instructions. Reconnect electrical and electronic connections. Test the operation of the system. Wipe down the system, leaving the work area neat and clean.

FOR R-410A CONVERSIONS

- Use R_x11-flush to clean line sets. This is especially beneficial when converting from R-22 to R410A. Establish

one end of the line set as the injection point. Th other end of the line set will be the exit point. Provide for some restriction at the exit point as this will provide for longer contact time and better cleaning. Inject the R_x11-flush in to the line set.

Approximate amount of R_x 11-flush for flushing line set

1/2" tubing	**1 each 2 lb. canister**	**Per 100'**
3/4' tubing	**2 each 2 lb. canister**	**Per 100'**

Using the compressed nitrogen tank, connect the nitrogen tank to the system and inject it into the system behind the Rx11-flush. The nitrogen will increase the mass flow and maximize the cleaning power of the Rx11-flush. Pull a vacuum on the line set, and continue the conversion

SAFETY AND ADDITIONAL POINTS

The waste solvent will contain used oils and other organic contamination. Pour the contaminated solvent into a waste oil drum for proper disposal. If the solvent needs to be transported, care should be taken to ensure the container is properly sealed to prevent spillage.

If a second canister is required to fully purge a larger system, you do not need to disconnect the R_x11

Injection Tool from the refrigeration system. Simply close the valve on injection tool and remove it from the first R_x11-flush canister. Replace it with a new canister to continue flushing.

R_x11-flush canisters may be recycled.

Do not smoke or use an open flame around these materials.

PACKAGING

Description	Size	Part #
NEW!!! R_x11-flush 1 lb. canister	1 Pound	4300-09
Start-up pack – as pictured, contains one Injection Tool and two R_x11-flush canisters, all you will need to flush up to 14 tons	2 Pound	4300-10
R_x11-flush 2 lb. canister (recommended for a 5-7 ton system). Available individually.	2 Pound	4300-11
R_x11-flush 13 lb. canister (recommended for up to 50 ton system). .	13 pound	4300-15
Injection Tool (reusable) Flushing Tool (reusable)		4300-99 4300-50

SHIPPING: R_x11-flush is shipped four (4) canisters per carton. Ground shipments are Classified as

"Consumer Commodity ORM-D". Air shipments are classified as "Aerosols, Nonflammable, (Tetrafluoroethane), Class 2.1, UN=1950, Packing Instructions Y203".

LIABILITY: Nu-Calgon published this data from sources believed to be accurate. This data is intended for persons having technical skills to evaluate and use the data properly. Nu-Calgon does not guarantee the accuracy of the data and assumes no liability in connection with damages incurred using it. Nu-Calgon's liability is limited to the replacement of this product. Specifications are subject to change without notice.

TRADEMARKS: "Calgon" is a licensed trade name. The R_x11-flush formulation is protected under pending U.

S. patents.

Packaging

Description	Size	Part #
See Above		

Product Literature Downloads:

MSDS Information

Rx11-Flush - Application Bulletin

Total System Protection - Application Bulletin