

# Flushing and Cleaning the A/C System

Once an AC system has been contaminated or has suffered a failure, the most important part of the AC service to restore the cooling performance to the system = **FLUSHING**

WITHOUT proper flushing procedures, seizing a new or rebuilt compressor is a real possibility.

## What is flushing ?

Flushing is performed in order to remove all contamination (dirt) from the system. The smallest particle of contamination cause restriction and problems for a good function of the replaced compressor. It takes less than 1/10 of a teaspoon of debris (dirt) to completely restrict flow of refrigerant and oil in the typical auto AC system.

Cleanliness and proper flushing procedures are very important

## Why / When flushing ?

The AC compressor must be lubricated at all times. The AC compressor is the only moving part in the entire system and the only reason for oil in the system. The oil is being circulated throughout the system, that means that all the components (condenser, hoses, tubes, evaporator, drier, accumulator) have some coating of oil internally. If any dirt, debris or contamination happened in the system all components are affected . Removing the oil (and oil film inside the components) will eliminate all of the contamination from the AC system. It's the oil that attracts and holds contaminants within the system. *Remove the old oil = remove the contamination.*

The AC system must be flushed whenever the AC compressor is being replaced/removed or whenever there is indication of contamination within the system. Make it a habit to remove and inspect the orifice tube (if the system is so equipped). The orifice tube inlet filter screen will always tell a story about the condition of the auto AC system. Any debris or foreign material found on the orifice tube should cause you to look for other indications of contamination . (see picture)



## How to Flush :

1. **Remove Refrigerant**  
Recover all of the refrigerant according to local requirements/laws
2. **Dismantle AC system and remove components not being flushed**

**Never attempt to flush the following :**

1. High side muffler assemblies
2. Receiver driers
3. Accumulators
4. Compressor
5. Expansion valves or orifice tubes

## Components that should never be flushed



### Conventional and Block type Expansion Valves :

The Block type valve as pictured and illustrated on the left should never be flushed. If you think on a restriction at this valve, it will have to be replaced by a new one.



### Driers and accumulators :

**DRIERS AND ACCUMULATORS MUST BE REPLACED WHENEVER FLUSHING THE SYSTEM**



### High side muffler assemblies

This is used on some car applications in order to reduce the so called "pumping" noise from a compressor. The design of this part makes it impossible to flush it, clean and remove all the debris. Older muffler designs even includes internal small parts that held even more debris when a compressor failed. If you think on a restriction of this part, don't take any risk and replace it by new one



### Orifice tube

Orifice tubes exist in different colors depending of the application.

Note : not all systems are equipped with a orifice.

**Orifice must be replaced whenever flushing the system**



### Compressor

**Never flush the AC compressor.** At no time, for no reason should you **ever put any flushing solvent into the compressor**

### 3. **Dismantle the system components being flushed**

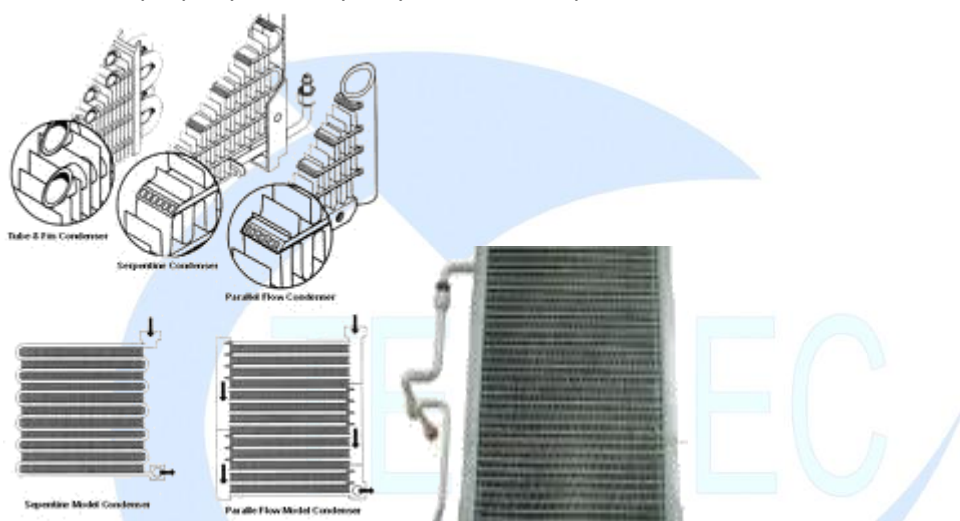
For the best result , you should flush each of the AC system components individually.

Doing that will provide better results and will actually be quicker.

For most common failures you have to concentrate on flushing the high side of the system plus the low side hose connected to the compressor.

#### Therefore you have to flush following :

1. **AC hose from the compressor to the condenser** (if this hose includes a muffler assembly, the muffler should be replaced)
2. **AC condenser.** Most condenser designs can be flushed and cleaned well. On many late model applications using parallel flow or piccolo tube design, tube passages are very small. Depending on the contamination and debris within the condenser, it may be impossible to clean them properly and they may have to be replaced.



For best results when flushing a condenser, remove it from the vehicle. Add enough amounts of flush agent to the opening and rock the condenser back and forth. This will help distribute the flush agent and loosen oil and contaminants throughout the condenser. After this procedure, use the regular flush procedure to be sure you have removed all contaminants.

### 3. **High side liquid hose** – from the condenser to :

- The receiver drier (and then the hose from the drier to the expansion valve) or
- To the orifice tube. This will depend on the design of the particular system you are flushing. If you face severe contamination (dark or black oil) it is recommended that you flush the evaporator also.
- Suction hose attached to the compressor.

### 4. **Evaporator** .

When flushing the evaporator( only do it in extreme cases of serious contamination) you have to remove it from the vehicle so that the component can be manipulated to move the solvent throughout and allow for *complete draining of all oil and flush solvent*. Due to the design configurations of evaporators, it is almost impossible to “blow out” all of the oil and flush solvent when they are mounted in the vehicle. After vigorous flushing, leave the evaporator open to atmosphere for at least 24 hours. Leaving an open flow of pressurized gas (air or nitrogen) running through the evaporator will help to evaporate any solvent that may be trapped. Whenever flushing the evaporator, plan to vacuum the system for at least 2-3 hours.

#### 4. **Start flushing**

Depending on the method you are using, start by getting some of the flush agent into the component. Use pressurized gases (dry air or nitrogen) to push the flush agent through the component. Hold a clean wiper on the opposite end of the component you are flushing. This will allow you to apply some back pressure (holding and releasing the wiper to act as a plug). This help to dislodge and remove debris that may be caught in 'hard to get' places. Be sure to perform the same flush procedure in both directions, several times on each component.

After flushing a component, leave it open to air for at least 1 hour to be sure any residual flush agent has been evaporated.

The AC component can never be "too clean". If doubt, flush again in both directions.

#### 5. **Component reassemble / replacement**

Reassemble all components. Replacement receiver driers or accumulators **should be installed last**, just before vacuum. You will also require new o-rings and or gaskets for each connection that you have taken apart. When installing new o-rings or gaskets, **do not use** PAG or ESTER oils for lubrication of the seal. These oils are very hygroscopic (they attract moisture) and applying them to seals on a joint could cause rust or corrosion at that joint. Always use lubricants that are designed for sealing o-rings.

#### 6. **Purge the system**

For the best results, once the system is assembled, but before it is completely sealed, purge the system with nitrogen. Using a rubber tipped blow gun with the nitrogen pressure regulator set between 5,0 – 7,0 bar, blow nitrogen through the system. This will help to eliminate any moisture that may be left in the system after flushing, and also help to reduce the total amount of time required to attain deep vacuum.



#### 7. **Vacuum, leak test and recharge**

With the system completely assembled, you are ready to start vacuum. Deep vacuum should be pulled for at least one hour on any system that has been flushed. When evaporator has been flushed, it is recommended that you vacuum for at least 2 hours.

Once vacuum has been attained, a quick method that you can use for leak testing your work is to check that the system holds vacuum. This method is not 100% reliable because a lot of systems leaks will leak under pressure but not under vacuum, it only require that you shut the vacuum source off for a short time and watch the gauges. If there is a reduction of vacuum, it is possible that there is still moisture in the system or there is a leak. You should operate vacuum for another 15 minutes and retest.

Once vacuum is completed, you are ready to start the charge of refrigerant. Perform a leak test on all joints that have been dismantled. You can use either an electronic leak detector or external leak test fluids that are designed to show the smallest bubble at the point of the leak.

**When recharging, always use the remanufacturers specifications for quantities of refrigerants.**

Once recharged, before starting the AC system, **be sure to “hand turn” the compressor clutch at least 10 times.** That will assure any liquid (refrigerant and oil) is slowly removed from the compressor, and it will not suffer a hydraulic lock upon start up. It is important to monitor the pressure gauge readings after start up.

#### 8. **Oil**

All our TEAMEC compressors are been supplied with the exact amount of oil necessary for the complete system. **Please do not put extra oil in the system.** The total amount of oil added should NOT exceed the total system capacity. By adding extra oil in a system (completely flushed) as explained above would destroy the AC system.

#### **Summary**

The information given in this report clearly details how you can flush any automotive AC system. The importance of flushing and cleaning have also been made very clear. Keep in mind that every system is different. Adding protection in the way of in-line filters is always a wise choice (see extra file), should there be any debris left in the system, we have found that it will usually ‘show up’ on the pressure gauge readings during the testing period after the system has been recharged. Using in-line filters provides your best defense against repeat failures.

#### **Disclaimer**

All of the technical information supplied by us has been gathered from remanufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no guarantee or representations as to its accuracy and we TEAMEC are not liable for any errors or omissions. Therefore, users are responsible for verification of the information and how it should be used or applied under their own operating conditions. The user assumes all risks related to the use or interpretation of the information provided. There is no guarantee that this information supplied is directly related to your specific vehicle or air conditioning symptom or problem.

#### **Caution**

**Always wear eye protection when servicing air conditioning systems. Refrigerants and AC systems are under pressure. Accidental and/or sustained release of any refrigerant can cause personal injury or harm. It is entirely up to the user of this information to take all necessary precautions .**