

COOLTOP

**High Performance
Nonflammable Refrigerant**

COOLTOP R-134a Replacement Q & A's
Revised 4/22/01

Q. What is Cooltop refrigerant?

A. Cooltop is a non-flammable, high performance refrigerant that is designed for the R-134a system and will result in 10° F colder duct temperature. Cooltop must have PAG or POE (ester) oils commonly used with R-134a. DO NOT use Cooltop to REPLACE R-12. R-12 with out the proper oil installed will have compressor failure from no oil return, (use Autofrost X3 /R-406A to replace R-12 in systems using mineral oil). Cooltop is made from hydrofluorocarbons (HFCs) and offers zero ozone depletion. Cooltop and Autofrost X3 / R-406A are manufactured by Peoples Welding Supply. To order call 1-800-424-3836

Q. Are these products legal to use?

A. Yes. Cooltop is not governed by EPA SNAP rules since no ozone depleting substances are being replaced. (Not EPA SNAP legal to replace R12).

Q. Does this refrigerant have to be charged as a liquid?

A. Yes. This refrigerant and all other zeotropic blends (R-400 series) must be charged as a liquid to prevent change in composition. Cooltop is supplied in 12 ounce small cans which are equivalent to 14 ounces of R-134a. Cans are packaged twelve cans to a case. One case will service approximately six vehicles. There are also plans to market Cooltop in 25 pound cylinders. The 25 pound cylinders contain a "dip" tube to withdraw the product as liquid with the cylinder upright. If charging from an 12 oz small can, make sure you withdraw the product as liquid.

Q. How much Cooltop do I need to charge in?

A. If you are using scales to weigh it, then start with 90% of the R-134a weight amount. If you are using a liquid charging cylinder such as DIAL-A-CHARGE™, use the same liquid amount as you would R-134a. Some systems will perform better with less than the recommended charge. A few will work best with 93% of the R-134a charge. It is better to use a heat blanket on a supply cylinder to fill a DIAL-A-CHARGE™ rather than venting the DIAL-A-CHARGE™.

Q. What is the best procedure for charging?

A. Before starting engine, charge up to 90% (2.5 lb. R-134a X .90 = 2.25lb. Cooltop) of determined amount through the low or high side port as a liquid only. DO NOT TURN CYLINDER UPSIDE DOWN! (Cyl. has a pickup tube and must remain "valve up"). Allow the system to stabilize for 3 minutes, then start engine. Turn A/C on Max., wait 3 more minutes and then add up to 20% (2.5 lb. R-134a X .20 = 0.5 lb.) more Cooltop through low side port only. Performance may be acceptable at less than 90%. Total maximum charge is 93%! (2.5 lb. R-134a X .93 = 2.325 lb. Cooltop) **DO NOT OVER CHARGE!!! TOO MUCH IS WORSE THAN TOO LITTLE!!!**

Q. Do any valve, switches or other sensing devices need to be changed or adjusted?

A. Cooltop was blended to operate in R-134a systems under about the same pressures and temperatures as R-134a. Therefore no switch changes or adjustments are necessary. Cooltop is one of the only replacements that will work properly in a system with a variable displacement compressor such as the Harrison V5 found on 1988 and newer GM's. These systems are non-adjustable and will often offer better performance with Cooltop than with R-134a. Late model Fords have been experiencing leakage or premature release of refrigerant through their "pop off valve". We have seen three designs of this valve that have been defective. The best solution to the problem is to use a GM valve, part # 6552743 or A C Delco part # 15-5415.

Q. Should I always vacuum the system before charging?

A. YES! Air will not condense and will cause excessive high side pressures! This can cause damage to the system, especially the hoses. Moisture is also very damaging to the system. When mixed with refrigerant, it becomes very acidic and will eat away at system components. Always pull a vacuum at 29.9 inches of mercury for at least 30 minutes before charging. 45 min. to 1hr is better. The preferred method of getting a good known vacuum is to use a "micron" gauge. A micron reading of 700-1000 microns (with the pump blanked off from the system) indicates a good "dry" system. Higher than 1500 microns, all the moisture won't be removed. If your pump cant make 1000 microns, then change the oil one or more times. Many compressor manufacturers specify about 700 or lower micron vacuums for warranty coverage.

Q. Which of the three oils available in the automotive industry is the best, PAG, POE (also known as ester), or mineral?

A. The oils used by R-134a, both PAG and POE (ester) are much less stable than R-12 mineral oil and are very hygroscopic, (absorb moisture 10-10000 times more than R-12 mineral oil). Cooltop will solve the moisture problems of "wet" systems. Extreme service vigilance is required to keep R-134a systems "dry". Cryo-Chem, Inc., offers a product called "DRY-PAK(R) that is metered into every can of Cooltop in order to remove moisture to stop corrosion and acids. Cryo Chem's toll free phone number is 1-800-237-4001. Web: www.cryochem.com.

Oil should be changed to about a 300 viscosity mineral oil, such as Ford Part # YN9. Some R-134a compressors are too "tight" for the usual 525 viscosity oil and will immediately fail. To flush the compressor, it must be removed and put on the bench, and turned over by hand for 40-50 turns while pouring mineral oil into the intake to wash out any PAG/POE oil. Use a good high power liquid flush to clean all other components. Recharge system with Cooltop. Any PAG oil remaining (unless Daphne brand) will be destroyed by this process and could cause system problems if not completely flushed out. Some technicians see this as a big hassle, labor intensive and is the very reason COOLTOP was developed. A fast and simple improvement in performance (10° F colder air), no ozone depletion, and system compatibility (PAG and POE oils). Cooltop is miscible in PAG (poly alkylene glycol) and POE (polyol ester). Autofrost X3 / R-406A is miscible in R-12 mineral oil and POE (polyol ester).

Q. How should the system perform?

A. If you did a performance check on the same system with R-134a and Cooltop, you would see a ten degree improvement with Cooltop. No two systems will perform exactly the same, but the readings will be very close on the suction side. High side pressures will be within 15% of R-134a pressures depending on condenser design, airflow and ambient temperature. If you experience excessive head pressure, check for a dirty radiator. Small debris can get through condenser fins, get caught in the smaller fins of the radiator, and is undetectable without removing top covers and visually inspecting.

Dirty radiators, inside and out will cause heat to soak into the condenser and cause excessive pressure in the system even after the vehicle is parked! It is wise to always measure refrigerant charge. If using 25lb. cylinders, something as simple as a digital bathroom scale will be closer than guessing. Also, check the fan-clutch if present. A number of high head pressure problems were traced to worn out fan clutches that caused the fan to spin slowly. Remember too much can do damage!

Q. What about the old "feel the evaporator outlet line" and charge "until it gets cold" method of charging?

A. Blends such as Cooltop sometimes need two or three minutes (at idle speed) to become thoroughly mixed throughout the system. Often, when the evaporator outlet line begins to get cold, the system will be overcharged. Solution: as you near the end of charging, stop charging for 2 or 3 minutes and let the system continue to run at idle before performing further charging or diagnosis. If a large part of the initial charge is dumped into a suction (low side) accumulator, such as on a typical GM CCOTsystem, the higher boiling components of the blend will hang around in the accumulator longer than R-134a would. Please take an extra 2 to 3 minutes to let the blend mix completely before proceeding.

Q. What is the best procedure for leak checking a system?

A. Most any leak detector currently on the market will sense Cooltop. Leak detection methods are the same, however there is one procedure that is superior to any other which involves the use of dry nitrogen. The vehicle should be emptied of all refrigerant and a vacuum pulled for at least five minutes to remove air. Three or four ounces of refrigerant should then be installed as a tracer for the leak detector to pick up on, and then the system pressurized to 175-200 psi with dry nitrogen. After all the leaks have been located the charge can then be released into the atmosphere making leak checking less expensive and much quicker. Dry nitrogen is non-flammable and is available at any welding shop. It comes in tanks similar to oxygen and acetylene that can be purchased or leased and are very cheap to have refilled.

Q. Can I use automatic charging equipment with Cooltop?

A. Cooltop is only packaged in small cans at this time and can be used with your R-134a gauges and can taps. When packaging of cylinders begins, you will be able to use most equipment. Older type automatic charging equipment, which uses a FLOW METER to meter in R-134a at a fixed rate should be checked with a scale. For example, pull a vacuum on an empty recovery tank and place it on a scale. Program 3 lb. on your charging station and note the weight added to the empty tank when the machine stops charging. The number scale on your machine can be altered to the correct amount. Newer type equipment, which contains a set of scales to weigh in a measured charge (remember to only use 90% as much Cooltop as you would R-134a) to a holding tank before charging should work all right. Remember to use the same liquid (level or volume) here as you would for R-134a.

Also, most R-134a automatic charging equipment withdraws the product (R-134a) from a 25 lb. cylinder as a liquid, and the R-134a cylinder must be mounted upside down when attached to charging equipment. Cooltop 25 lb. refrigerant cylinders contain a "pickup-tube" much like a can of spray paint, such that you get liquid out when the can is upright. Cooltop/ Autofrost cylinders MUST BE INSTALLED UPRIGHT when used in charging equipment that is designed to have R-134a cylinders installed upside down. You may have to lengthen or splice in a small piece of hose if needed. Also, use only automatic charging equipment that withdraws the product from the refrigerant supply as a liquid.

Q. Does this refrigerant need to be recovered (captured)?

A. Yes. Under US EPA rules and regulations, all CFC, HCFC, HFC refrigerants and just about anything else needs to be recovered and not be vented into the atmosphere. Refrigerants which require recovery are R-12, R-22, R-134a, , Cooltop, Autofrost, and all the other current "legal" R-12 replacements at the current time. The only refrigerants which may be vented are air (nitrogen), water, CO2, ammonia, and pure hydrocarbons according to US EPA rules. You are not likely to encounter any of these, as they will not work and will damage the system. Cooltop consists of 100% hydrofluorocarbons, so it must be captured and returned to a reclaimer.

Q. What are EPA retrofit fittings?

A. The US EPA is requiring special "uniquely threaded" fittings to be attached to all R-12 service ports. These fittings provide threads which are unique to each type of alternative refrigerant. These fittings are required by law (only for the automotive sector, does not apply to stationary equipment) for refrigerants which have completed the entire EPA approval process and are listed as "acceptable" for mobile A/C. Refrigerants MUST be properly labeled somewhere under the hood. These labels are packaged with Cooltop. All other refrigerant labels must be removed or rendered unreadable.

Since Cooltop is not under the jurisdiction of the EPA SNAP rules, no unique fittings are required by law. However, it is strongly recommended that Labels and service port caps be installed to identify the Cooltop charge and prevent mixing with R-134a.

Q. Are compressor seal kits and system o-rings compatible with Cooltop?

A. We have seen no problems in original factory R-134a cars changed over to Cooltop. Older cars, retrofitted from R-12 to R-134a should have barrier (nylon lined) hoses installed as these were designed to contain R-134a and they work fine on all blends.

Q. What about "topping off" systems low on charge?

A. Current EPA SNAP rules only permit "topping off" with the same type of refrigerant which is already installed in an automotive system. For systems charged with zeotropic refrigerants such as Cooltop or Autofrost X3/R-406A, or almost all other "blends", the recommended procedure is to first remove (recover) the charge and recharge with fresh virgin material. As zeotropic blends vapor leak, they change composition (pressures get lower), and a recharge will result in lower pressures, and some reduced capacity. However, many technicians have topped off Cooltop systems and report greater cooling. The property which makes Cooltop change composition (called fractionation) as it vapor leaks, is also responsible for a big performance gain over single component refrigerants such as R-12 or R-134a. Zeotropic refrigerants exhibit a temperature "glide" (about 16 degrees F for Autofrost), which causes the refrigerant to boil (evaporate) or condense over a range of temperatures instead of a single temperature, thus increasing the heat rejecting capacity of the condenser and increasing cooling performance over R-12 and R-134a.

Since Cooltop is not covered by EPA SNAP rules, it may freely be mixed with R-134a. Adding an 12oz can of Cooltop to a low-on-charge R-134a system, will often produce 10o F colder air. Remember to label what you did. EPA SNAP rules prohibit mixing Cooltop with R-12 or their substitutes (if substitutes contain chlorine atoms i.e. they have a small "ODP" ozone depletion potential.)