



# *XK Coolant Flush and Fill, Thermostat Replacement*



## **A Jaguar XK Repair Guide**

**By MrTexasDan**

## Jaguar XK Coolant Flush and Fill, Thermostat Replacement

To maintain the long term reliability of the XK cooling system, it must be periodically flushed, the thermostat must be replaced, and new coolant must be added. This document gives some information on coolant type and flush interval, and pictorially shows the step by step coolant flush and thermostat replacement procedure.

The procedure and pictures are from my own 2000 XKR. The procedure for other XKRs is the same, as far as I know. However, XK8s have a substantially different cooling system due to the absence of the supercharger intercooler. I have marked steps that should be omitted when flushing a normally aspirated XK8 engine with a (\*\*\*) .

Corrections or suggestions for improvement are sincerely appreciated.

This document may be freely distributed in its complete and unaltered state, with the author's name and email addresses included.

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### Revisions:

December 26, 2006 – Version 0.0

- Initial version

January 17, 2006 – Version 1.0

*Many thanks go to Dennis07, Gary61, SidVaga, and MarkyM for taking the time to review this guide and offer their valuable feedback.*

- Added text on reason for adding coolant full strength and letting it mix with the water in the engine.
- Added text on only using chemical flush when changing coolant type or when clogged cooling system is suspected.
- Added (\*\*\*) indicator to steps that should be omitted when flushing a normally aspirated XK8 engine
- Added use of safety glasses and gloves when draining coolant.
- Added labels on a few pictures to clarify orientation of view.
- Added note about keeping an old thermostat as an emergency spare.
- Made some clarifications, fixed a few typos and grammatical errors.

July 9, 2010 – Version 1.1

- Removed references to specific forums.
- Removed some “opinions” on coolant type that have lost some credibility.
- Made a bunch of clarifications.

## **General Information**

I will give my opinions on coolant type and flush interval below. The very last thing I want to do here is to start another discussion on these points. The readers are encouraged to research the collective wisdom of the forums and other sources and make their own choices.

### **Coolant Type**

The types and choices are rather confused. Major coolant types include Dexcool products (in a few colors, but usually associated with orange), G-05 products (usually yellow), and the green stuff (originally marketed to be environmentally safe, but I wouldn't take a bath in it).

Check out this paper on antifreeze colors found by Dennis07:

<http://filtercouncil.org/techdata/tsbs/05-2.html>

Jaguar themselves have switched colors numerous times. It is not apparent which type of coolant Jaguar colors represent.

In my opinion, there are no fundamental problems with any major type of ethylene glycol based coolant. However, **the coolant Prime Directive is never to mix types**. A reaction can take place that causes the solution to gel and clog heater cores and radiators. After a thorough chemical flush (like the one outlined in this document), you are free to use Dexcool, G-05, or even the very-expensive Jag type (whatever it is).

I chose Zerex G-05 (yellow), though recently this type is becoming more difficult to find.

### **Flush Interval**

Flush the cooling system and replace the thermostat **every 2 years**.

*From a post from Bloodworm, "Do NOT wait five years between coolant flush and fills. Even in a perfect world these NEW coolants just don't make it to five years and it even states it on the bottle. Five years is the SHELF life, the operating life is more like 2-3 years just like the green was. Although ALL coolants will still COOL the car for as long as it is a liquid, the anti-corrosive chemicals break down much sooner than that."*

Use a chemical flush only when changing coolant type, or if cooling system clogging is suspected.

### **Parts and Supplies Needed:**

- One 25mm to 50mm long M12 diameter Hex Head Bolt and two Hex Nuts (all should fit a 19mm wrench)  
\*OR\*  
One 1" to 2" long ½" diameter Hex Head Bolt and two Hex Nuts (all should fit a ¾" wrench).
- Distilled water, 2 gallons or 8 liters (readily available in the water section of your local market)
- Coolant , 2 gallons (I use Zerex G-05 yellow)
- Thermostat (for my 2000 XKR - Jaguar #AJ86484, \$52.61)
- Shop towels
- Empty gallon containers for pouring water and storing drained coolant.

-optional-

- Chemical flush (I used Zerex Super Flush)
- Intercooler plug sealing washer (Jaguar, #JWV130001, \$3.36)
- Coolant pressure cap (Jaguar, #MJA4440BA, \$17.67)

### **Tools Needed:**

- Floor jack (preferred), or use Jaguar scissor jack
- Jackstands
- Wheel chocks or wood blocks.
- Fender protectors
- Coolant Drain pan (dish washing pan or similar)
- 7mm nut driver or socket
- Large flat head screwdriver
- 19mm (or ¾") box end wrench
- 8mm box end wrench
- Torque wrench with 19mm (or ¾") socket and 8mm socket
- Garden hose (optional)
- Goggles or Safety glasses
- Nitrile, Latex, or Vinyl gloves
- Funnel

## Procedure:

### General:

- This is a good time to perform a thorough inspection of all coolant hoses, connections, and seals. This should include the mass of heater hoses behind the engine by the firewall. Leaks, seeping seals, or cracked, bulged, or weak hoses should be replaced prior to, or during this procedure.
- Care should always be taken to protect the paint while you lean over the fender. Wash dirt off of the bodywork \*first\*, remove belt buckles, and watch for rivets in jeans or metal zippers, or other potential hazardous bits.
- Take care to dispose of coolant properly. Disposal methods vary widely by location, so check your local guidelines. I poured the used coolant from the drain pan into gallon containers as it filled.
- This procedure requires at least 2 engine cool-down periods. Be prepared for each of these to take 1-2 hours. I did other maintenance items while the engine was cooling (with the hood open to speed the process).
- For the very first draining, I raised the car and got underneath to locate the drain plug and remove the alternator air duct. If you already know where the drain is, it is not at all necessary to raise the car to access it.
- Use a chemical flush only when changing coolant type, or if cooling system clogging is suspected.
- The (\*\*\*) indicator is prefixed to steps that should be **omitted** when flushing a normally aspirated XK8 engine, instead of the supercharged XKR engine.
- When draining coolant, wear goggles or safety glasses to protect your eyes from accidental coolant splattering.
- Wear nitrile, latex, or vinyl gloves when handling used coolant to protect skin against toxins.

\*\*\* **Step 1)** Make a tool to remove and install the intercooler coolant plug, as shown. Install two hex nuts on an M12 or ½” hex head bolt. Tighten the nuts firmly against each other. Try to align the flats so that a box end wrench can be used on the inside nut.



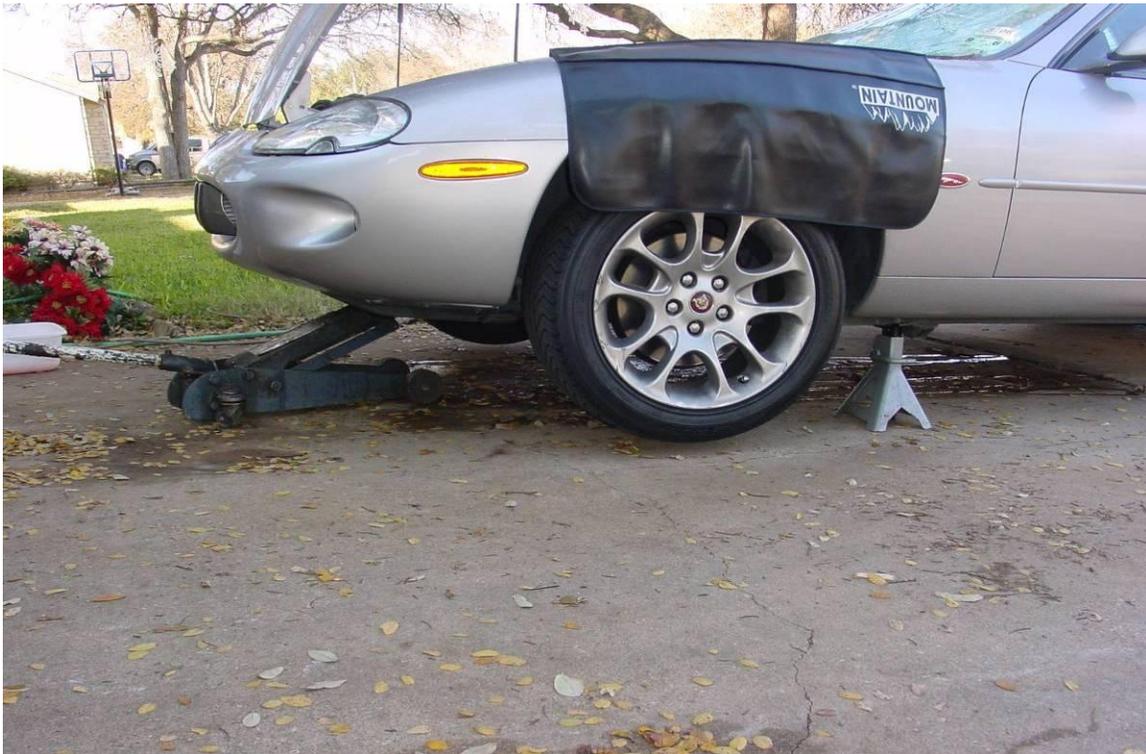
**Step 2)** Park on level ground or better yet, nose down to aid draining. Turn off engine and allow it to cool. Block the rear wheels with boards or wheel chocks.

Note: If the car is parked even slightly uphill, **the coolant will not drain properly.** I found this out the hard way.

**Step 3)** Position the jack under the front body crossmember as shown. Raise the car and support with jackstands at the jacking points just behind the front wheels.

Note: JTIS recommends never putting the jack under the aluminum suspension crossmember further back from the body crossmember.

Note: NEVER TRUST THE JACK ALONE TO HOLD UP THE CAR! I have seen hydraulic jack seals fail with immediate gravity issues. The mechanic gives thanks to this day that he wasn't under the car when it hit the floor.

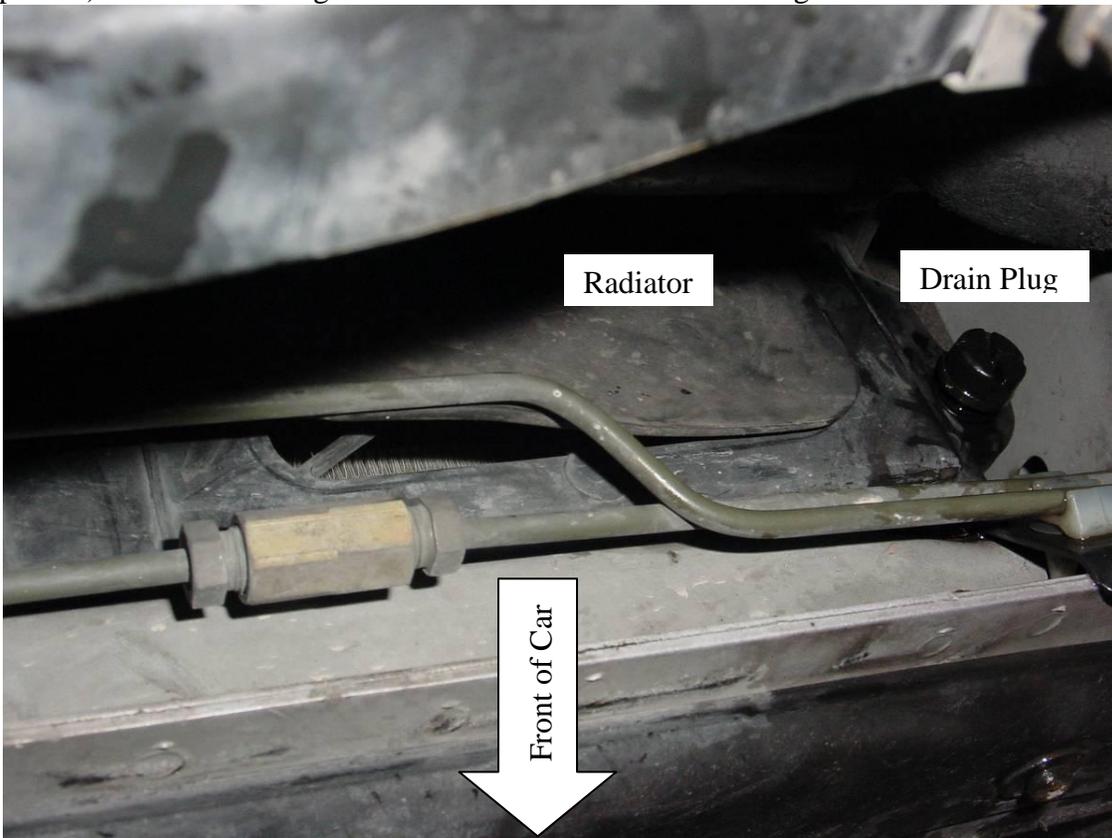


**Step 4)** With a 7mm nut driver or socket, remove the screw securing the alternator air duct, and remove the duct. For later installation, note how the front of the duct hooks onto the body crossmember under the radiator.





... and with the duct removed, we can now see the radiator drain plug (at right in the picture). This is on the right-hand end of the radiator on the engine side.



**Step 5) \*ENGINE MUST BE COOL\*** (switch ignition on and make sure temperature gauge is showing *\*at most\** in the “blue” region, then turn ignition off).

Wear safety glasses and gloves. Place a drain pan under the radiator drain plug. Using a flat-head screwdriver, loosen the drain plug to start the coolant draining. The liquid will tend to splatter, so position the pan to catch as much as possible. Loosening the coolant pressure cap now may speed the draining.



**Step 6)** Remove jackstands and lower car to the ground to assist draining.

**Step 7)** Remove the coolant pressure cap.



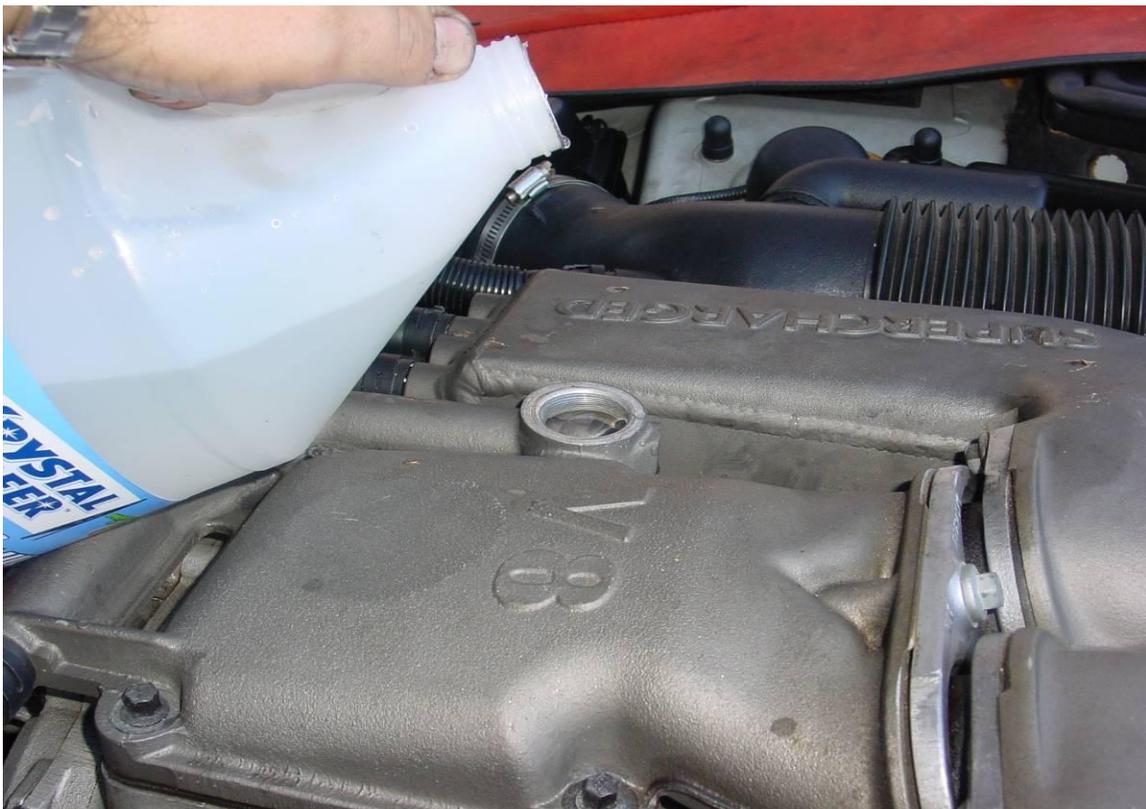
**\*\*\*Step 8)** Using the tool made in Step 1, remove the intercooler coolant plug.



**Step 9)** After coolant finishes draining, add clean tap water to coolant tank until drain runs clear. (Use a funnel; it's a little less messy).



**\*\*\*Step 10)** ...and add clean tap water to intercooler plug until drain runs clear.



**Step 11)** Here's a little trick I used to flush the system a little quicker. Aim a garden hose down the coolant tank and try to seal the opening. In this case I used a bunched up shop towel as a "gasket" and pressed the spigot over the tank opening. Turn the water on at high volume.



**Step 12)** Close the radiator drain.

Note: Since you now know where the radiator drain plug is located, it is no longer necessary to jack up the car to gain access to it. It is quite easy to reach with the car on the ground.



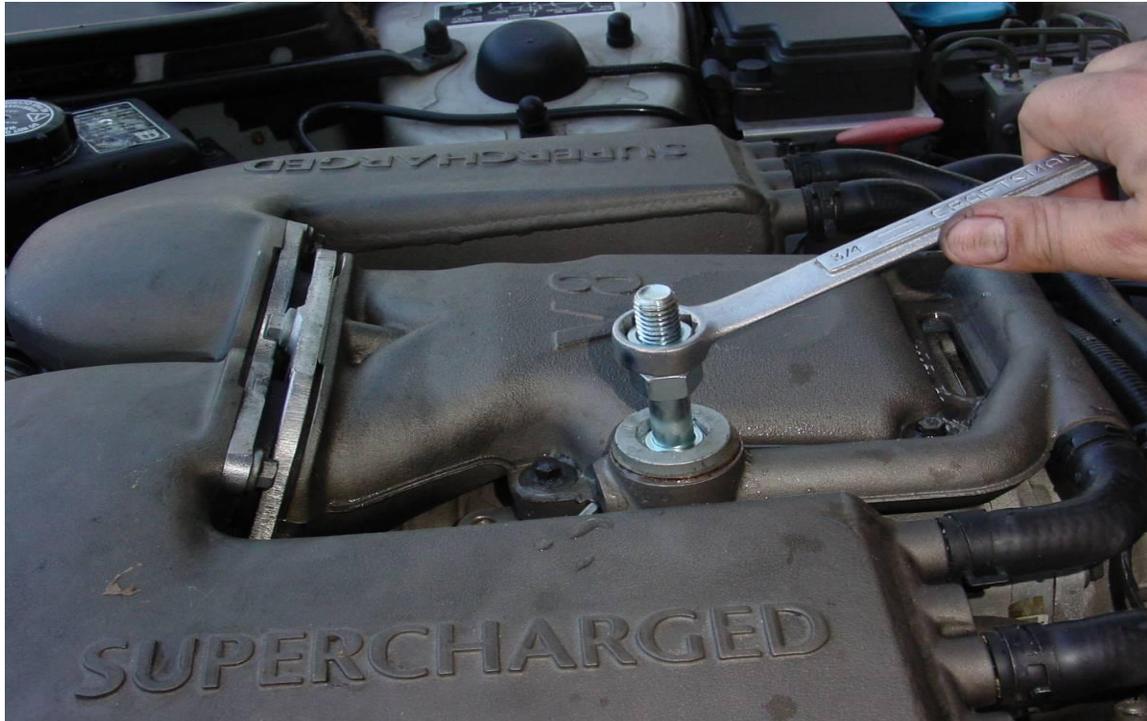
**Step 15)** Install pressure cap.



**\*\*\*Step 16)** Fill the system at the intercooler plug. You can “burp” air out of the system when the water level nears the top by squeezing the intercooler hose as shown.



**\*\*\*Step 17)** Using the tool made in Step 1, install intercooler coolant plug.



**\*\*\*Step 18)** Use the intercooler electric coolant pump to purge air from the system.

- Again remove the coolant tank pressure cap.
- Switch the ignition on (to position two) for two minutes (do not start engine, turn off climate control system), topping off coolant tank as the level drops.
- Switch the ignition off for 1 minute.
- Switch the ignition on (do not start engine) for an additional 2 minutes, topping off coolant tank as the level drops.
- Install pressure cap
- Remove intercooler coolant plug. Top off intercooler coolant level.
- Install intercooler coolant plug.

**Step 19)** Start engine to continue flushing...

- Run at 1500-2000 RPM until temperature gauge reads in the center mark and the electric radiator fans start operating. This assures that the thermostat is open.
- Switch on climate control to max fan and max temperature. Make sure heat is blowing from dash vents.
- Run for about 10 more minutes.
- Switch off engine.
- Allow to cool (leaving the hood open greatly speeds the cooling time).

**Step 20)** To thoroughly rinse the system, Repeat Steps 5 through 19, again filling with only tap water (and with no chemical flush this time).

**Step 21)** After the engine cools, drain the system once more (Steps 5 through 8).

Note: Next I show the thermostat replacement for my XKR. XK8s and late-model XKR have a different configuration than shown. I hope to get pictures of these for a future update. Please consult the JTIS manual for your model.

**Step 22)** With an 8mm wrench or socket, remove the three thermostat housing bolts.



**Step 23)** Pull off housing cover. Remove and discard the old thermostat (or keep it for an “emergency” spare).



**Step 24)** Install the new thermostat with the air bleed valve (brass with ball bearing) at the top, as shown.



**Step 25)** Install cover and torque bolts to 8-10 Nm (6-7.4 ft-lbs).



**Step 26)** Close the radiator drain.

**Step 27)** Install alternator air duct.

**Step 28)** After performing the flushing as described in this guide, there will still be a great deal of pure water left in the system even after the last draining. My 2000 XKR coolant capacity is 11.5 liters (12.1 quarts). To ensure a 50-50 coolant mix, I now add 6 quarts of coolant. This will mix with the water when the engine runs.

Note: Coolant capacity varies by model and year. Find out your capacity from the JTIS manual or from your forum friends, and divide this number by 2 to find the amount of coolant to add.

Note: If only doing a drain and refill with no flush, the coolant left in the system after draining is probably already a 50-50 mixture. Premix the new coolant with water outside the vehicle, and add it as a 50-50 mix.

**Step 29)** Continue the final fill of the system as in Steps 14 through 16 (14 through 15 for XK8), except using **distilled** water.

\*\*\***Step 30)** Add a new sealing washer to the intercooler coolant plug. Install the plug and torque to 45 Nm (33 ft-lbs).



\*\*\***Step 31)** Complete the final fill and air purge as in Step 18, except using distilled water.

**Step 32)** Over the next several days, check the coolant level when the engine is cold. The level may go down a little as more air bleeds from the system. Top off with distilled water.

**A Cool XKR!**

