Chem-i-Weld Product Information

How and where Chem-i-Weld works

When used as directed, Chem-i-Weld will permanently repair existing cracks, flaws and porosity in automotive cylinder heads, blocks and other cooling system castings.

- ❑ Chem-i-Weld is not a cure for overheating, as a result of coolant loss caused by cracks, flaws and porosities in castings.
- ❑ Chem-i-Weld will not cure oil-to-water leaks ("oil in the water").

The development of cracks in castings is a type of stress relief, whether through overheating or ice formation in the coolant or as with flaws, poor design, metallurgy, or casting technique - porosity is usually age-related. Chem-i-Weld is effective on aluminium, cast iron, steel, brass, bronze and copper castings and works by hardening on exposure to air in a confined space.

Head gaskets, irrespective of construction or material are joints, not castings - these and other cooling system joints may leak because of: corrosion on the surface clamping the gasket, and/or distortion of the surface clamping the gasket, and/or a reduction of the clamping force on the gasket, and/or deterioration of the gasket itself. Chem-i-Weld may cure head gasket leaks, but this cannot be guaranteed. Head gaskets, unlike castings, are subject to rapid deterioration and although the Chem-i-Weld may seal the immediate gasket leak, deterioration, or further deterioration, of the gasket or clamping surface may introduce a new leak around the initial seal.

Chem-i-Weld will not cure leaks in flexible cooling system seals, e.g. wet cylinder sleeve 'O'-rings, because these are subject to movement caused by heat/cold expansion and compression whilst Chem-i-Weld sets hard. It will not cure leaks in radiators because radiator tubes and tanks are too thin-sectioned for the Chem-i-Weld to effectively adhere to them, but it *will* attempt to seal the exposed end of a radiator tube - for this reason tubes must be kept submerged whilst Chem-i-Weld is being used. ***Boiling the water whilst Chem-i-Weld is being used may block radiator and heater core tubes, and small water galleries in engines.***

Note: For internal leaks into a combustion chamber - removing the spark plug in an affected cylinder (to reduce the cylinder pressure) for the first twenty minutes of Chem-i-Weld use was commonly done, but this practise is discouraged on vehicles with high energy ignition systems -.unless the correct procedure is used, damage to the system may result.

- ❑ Chem-i-Weld and oil do not mix - if it gets into an oil sump in quantity; i.e. a noticeable dipstick oil level increase or oil colour change, drain the sump, fill it with fresh oil and change the oil filter before proceeding.
- ❑ Chem-i-Weld splash is best removed whilst still wet with hot water - there is no known solvent once it has set.
- ❑ Chem-i-Weld on the skin or clothes should be washed off with soap and water.
- ❑ Chem-i-Weld in the eyes should be flushed out with cold water.

Tips for effective Chem-i-Weld use

* Clean the cooling system before use - Chem-i-Weld requires a clean surface to adhere to. When flushing the cooling system, switch the heater control to full hot for maximum water flow. Follow vehicle manufacturer's procedures for most efficient flush.
* Use Chem-i-Weld with clean water only - never use more than one active chemical in the cooling system at any time. Once the Chem-i-Weld hardens, there is no known cooling system additive which will adversely affect it.
  If the system incorporates a filter, remove it while using Chem-i-Weld.
  Note: Some cooling systems require bleeding when refilling - follow the vehicle manufacturer's procedures.
* Chem-i-Weld is most effective when the water, and therefore the engine, is at a higher than normal temperature (not boiling!) - the hotter the engine is, within reason, the greater the expansion of cracks, flaws and porosities: if the leak is sealed at the greater expansion, the more effective and permanent the seal will be. When using Chem-i-Weld, the water temperature must be higher than that experienced during normal running to attain the best result. One way to achieve this is to restrict the airflow through the radiator, but not block it off completely, by using a piece of cardboard or similar, whilst monitoring the temperature gauge - remove the cardboard before attempting to drive the vehicle. Leave the system filler cap off during this process.
* Drain sufficient water to add the Chem-i-Weld - on vehicles without a cap on the radiator, i.e. with the pressure cap on an expansion tank, drain the expansion tank plus sufficient to add the Chem-i-Weld to the *radiator*, not just the expansion tank.
* Shake the Chem-i-Weld bottle vigorously and then slowly pour the contents into the radiator or expansion tank: there may be some sludge left in the bottom of the bottle - hot water will generally soften this if necessary. Top up the water (and bleed the system if necessary) so that there is no air in the system whilst it contains Chem-i-Weld.
  Use Chem-i-Weld at the rate of one bottle (325 ml) for each 10 litres of cooling system capacity, with a maximum dilution of one bottle per 12 litres and a maximum concentration of one bottle per 8 litres.
* Run the engine (at a fast idle if possible, to aid circulation) for approximately twenty (20) minutes – leave the system filler cap off to monitor the water level - the Chem-i-Weld will usually seal the leak in this time.
* The water level MUST cover the radiator tubes while Chem-i-Weld is in the system: it will attempt to seal the end of any exposed radiator tube because it hardens on exposure to air in a confined space.
* Use the vehicle normally until the leak is known to be sealed: this will vary with the nature of the leak and vehicle usage, but will usually occur within one (1) week.

Remove the Chem-i-Weld from the system when the leak is known to be sealed, i.e. when the symptom(s) which caused its use are no longer evident - flush the cooling system with clean water and use a reputable corrosion inhibitor/coolant, following the manufacturer's instructions. Re-bleed the system if necessary. Leaving Chem-i-Weld in the system will not cure future leaks and it is not a corrosion inhibitor or system conditioner.

Important: Chem-i-Weld must be flushed from the cooling system before dismantling to avoid it hardening in heater cores or other confined spaces.

Chem-i-Weld Product Information

Troubleshooting - FAQs

The following are the most frequently asked questions regarding the use of Chem-i-Weld. (Note that the term 'coolant' refers to the normal cooling system contents.) ***See page 4 for Chem-i-Weld bottle text.***

"Will Chem-i-Weld work with my 'XYZ' (brand) coolant/inhibitor/additive?"
Chem-i-Weld is known to work with clean water, but its compatibility with every other cooling system additive that's been on the market, is on the market, or may come on to the market 'tomorrow', is unknown. To confirm compatibility would be impossible – manufacturers of other cooling system additives may change their product's chemical formulas at any time.

"How clean does my cooling system have to be?"
For a late model vehicle that has had a properly maintained cooling system - using a suitable coolant or inhibitor - a single drain-and-refill, or a single flush-and-refill with clean water will usually be sufficient. As most cooling system additives use a distinctive colorant, a lack of colour will generally indicate a sufficiently clean cooling system.

"How does Chem-i-Weld work?"
Chem-i-Weld hardens on exposure to air in a relatively confined space. As the Chem-i-Weld seeps through the leak and is exposed to air, it begins to harden and will continue to harden in the leak area back to the main body of water. *Chem-i-Weld will not harden unless exposed to air*.
Chem-i-Weld contains a 'meal' which acts as a filler to restrict the water flow through large leaks (much the same as the bush remedy of sealing radiator leaks with pepper) so that the Chem-i-Weld has a chance to reduce the liquid flow and harden. Chem-i-Weld's red colour comes from ferric oxide, a powder which acts as a much finer filler, hence **CHEMI**CAL **WELD**ING COMPOUND.

"What's in Chem-i-Weld?"
The active constituents of Chem-i-Weld are:

* *Sodium silicate* - a clear liquid which sets "glass hard"
* *Linseed meal* - a relatively coarse powder which disintegrates in hot water and acts as an initial suppressant of coolant flow through larger cracks, flaws and porosities
* *Ferric oxide* – a fine red powder which acts as a finer flow suppressant and filler

"My car overheats - will Chem-i-Weld fix it?"
Coolant loss and overheating have two distinct causes:

1. **Overheating leading to excessive coolant expansion with a resultant loss of coolant**
   This type of overheating can be caused by either:
   - An inefficient cooling system, e.g. restrictions, slipping pump drive belt, eroded/corroded pump impeller, etc, or
   - An engine performance deficiency which makes the engine run hotter, e.g. tight tappets, lean mixture, retarded ignition timing, etc.

   Chem-i-Weld will not cure this type of overheating.
2. **Coolant loss from a leak creating an inefficient cooling system leading to overheating**
   Chem-i-Weld will cure this type of leak if the coolant loss is caused by a crack, flaw or porosity in a casting.

"My car has a leaking head gasket - will Chem-i-Weld fix it?"
Head gaskets, irrespective of construction or material are joints, not castings. These and other cooling system joints may leak because of:

- Corrosion on the (cylinder head or block face) surface clamping the gasket, and/or
- Distortion of the (cylinder head or block face) surface clamping the gasket, and/or
- A reduction of the clamping force on the gasket (e.g. through bolt/stud fatigue or breakage), and/or
- Deterioration of the gasket itself.

Chem-i-Weld may cure 'head gasket' leaks, but this cannot be guaranteed. Head gaskets, unlike castings, are subject to rapid deterioration. Although Chem-i-Weld may seal the immediate leak, deterioration (or further deterioration) of the gasket or clamping surface may introduce a new leak around the initial seal.
If the gasket has deteriorated, Chem-i-Weld may initially seal the existing leak, but if the gasket deteriorates further, the leak will return.

"You say that Chem-i-Weld wouldn't cure my head gasket leak, but it has."
If the gasket has not deteriorated, the leak may be across the gasket face due to a distortion in a clamping surface ("warped head"), or a lessening of the clamping force on the gasket (generally due to overheating). In these cases, the Chem-i-Weld may seep into the space and seal the leak, which may be a permanent seal.

"My radiator leaks - will Chem-i-Weld fix it?"
No - radiator tubes and tanks are generally too thin-sectioned for the Chem-i-Weld to stick to. And because Chem-i-Weld sets hard, the differential expansion/contraction rate of the radiator and the Chem-i-Weld precludes a permanent seal, even though an initial seal may have been effected.

"Will Chem-i-Weld seal the leak from my wet cylinder liner O-ring seal/gasket?"
No, because Chem-i-Weld sets hard and liner O-rings are flexible seals.

Continued/

Chem-i-Weld Product Information

Troubleshooting – FAQs (continued)

“My radiator has oil in the water - will Chem-i-Weld fix it?”

If the oil source is a pressurised oil gallery, Chem-i-Weld will not fix it because the pressure in the oil gallery will be higher than that in the cooling system, and the Chem-i-Weld will not be able to penetrate the leak. However, if the oil source is an oil pool adjacent to the leak, e.g. a crack on the top of a cylinder head casting, Chem-i-Weld should seal the leak. In a leak of this nature, the pooled oil, rather than coolant (from a recovery tank) or air (non-recovery system), is drawn into the cooling system as the coolant cools and contracts after the engine is shut down.

"My car doesn't have a radiator cap - how do I get the Chem-i-Weld into the cooling system?"

If the vehicle’s cooling system fill/pressure cap is on an expansion/overflow/recovery tank, drain sufficient water out of the system to drain the tank *plus* at least 325 ml. Shake the bottle of Chem-i-Weld and pour the contents into the tank. Add water to the normal level in the tank – this should flush the Chem-i-Weld into the cooling system.

Note that cooling systems on late model Fords, and some other vehicles, require bleeding if they've been drained and refilled, because the top of the radiator is lower than the highest parts of the engine cooling system. On Falcons, the bleed screw is located on top of the thermostat housing (engine side of the top radiator hose). Bleeding should be carried out to the vehicle manufacturer’s procedure when the system is refilled with clean water after initial flushing, after the Chem-i-Weld has been added, and when the system is refilled after the Chem-i-Weld has been flushed, i.e. any time the system has been disturbed.

"Chem-i-Weld blocked up my radiator."

Chem-i-Weld can ONLY cause restrictions in radiators which have a severe build-up of contaminants in the radiator tubes. The first direction for use on the bottle states: “The system MUST BE CLEAN.” Flushing the radiator will eliminate this problem, but the radiator must be cleaned before Chem-i-Weld is used again. The radiator must not be drained and left dry before flushing – any residual Chem-i-Weld in the system *will* harden on exposure to air.

"The Chem-i-Weld has gone hard in the radiator."

The ONLY way this can happen is if air has been introduced into the system whilst Chem-i-Weld is present - either by allowing the water level to drop below the top of the radiator tubes, or by allowing the water to boil.

“The Chem-i-Weld has gone hard in the bottle.”

Over time, the Chem-i-Weld solution may saturate the coarse meal at the bottom of the bottle. Following the last statement on the bottle - “* Chem-i-Weld may thicken in the bottle – if so, place bottle in hot water for a few minutes, then shake well before use” - will usually soften it. If the bottle has been emptied, adding hot water to it and then agitating the mixture will normally soften thickened meal. There is sufficient meal added to each bottle of Chem-i-Weld that if some remains in the bottle it will not compromise the effectiveness of the Chem-i-Weld.

"The Chem-i-Weld has gone hard in my heater core."

This will occur if the cooling system has been drained before the Chem-i-Weld has been flushed from the system.

"What is the solvent for Chem-i-Weld once it sets hard?"

Although Chem-i-Weld has been around since the 1940s, no solvent has been found to soften it once it sets hard. The solvent listed for the active ingredient in Chem-i-Weld is "steam under pressure", but this does not work on hardened Chem-i-Weld. Its best removed *before* it hardens.

“The Chem-i-Weld bottle used to be 250 ml – it’s now 325 ml – what’s the difference?”

Times change and more information is now required to be placed on the bottle – the 250 ml bottle was simply too small to do it effectively. The 325 ml bottle contains the same amount of active Chem-i-Weld ingredients as the 250 ml bottle.

Chem-i-Weld Product Information

Chem-i-Weld bottle text

When used as directed, Chem-i-Weld

- Will permanently seal cracks, flaws and porosities in cylinder heads, blocks and other castings and is effective on iron, aluminium, brass, bronze and steel.
- Will not clog cooling systems.
  Chem-i-Weld is not a cure for overheating, except overheating due to coolant loss caused by cracks, flaws and porosities in castings.

  Chem-i-Weld will not cure oil-to-water leaks ("oil in the water").

  Note: Use one bottle of Chem-i-Weld per 8 to 12 litres of cooling system capacity.

Risk

Harmful if swallowed, irritating to eyes and skin.

Directions For Use

Do Not Swallow

- Drain and flush the cooling system, including heater. The system **must be clean**. If the system incorporates a filter or system conditioner, temporarily remove or bypass it. Refill with clean water only.
- Leave the system filler cap off, bleed any air out of the system, and run the engine until hotter than normal, but **not boiling**. This may be done by partially restricting the airflow through the radiator core.
  Drain sufficient water to add Chem-i-Weld. The water level must be above the radiator core tubes. Do not allow the water to boil.
- Shake the Chem-i-Weld bottle well and **slowly** pour contents into system.
- Continue to run the engine at the hotter water temperature with the cap off for approximately 20 minutes.
  The water level must remain above the radiator core tubes. Do not allow the water to boil. Top up the cooling system and remove the radiator airflow restriction before driving.
- Use the vehicle normally until original symptoms are no longer evident. Drain and flush the cooling system, including heater, and fill with clean water. Refit filter/conditioner as necessary. Add corrosion inhibitor, anti-freeze or other desired additive.

Safety Directions

Strongly alkaline. Avoid contact with eyes and skin. When using this product do not eat or drink. Wear suitable protective clothing.

First Aid Instructions

For advice, contact a Poisons Information Centre (phone Australia 131126) or a doctor at once. If swallowed, do **NOT** induce vomiting. If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by the Poisons information Centre or a doctor or for at least 15 minutes. If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water. Continue flushing until advised to stop by the Poisons Information Centre or a doctor. If product mist is inhaled, remove casualty to fresh air. Consult a doctor.

Spills / Leaks

Restrict access to area.
Contain and recover spill.

Fire

Product is not flammable. In general fire fighters to wear full protective clothing and self-contained breathing apparatus.

Additional information is listed in the Material Safety Data Sheet.

For more information, refer to Goss Automotive Catalogue.

- Wash any spillage off skin, paintwork or clothes **immediately** with soap and hot water.
- If Chem-i-Weld gets into the engine oil sump, drain, flush and refill with fresh oil.
- Chem-i-Weld may thicken in the bottle – if so, place bottle in hot water for a few minutes, then shake well before use.

Part No. 13A

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