



**Service Bulletin Number: CSP SB 05-19**

### **Subject: Troubleshooting Guideline for Engine Coolant Loss**

**Product Affected:** QSK38/45/50/60/78

**Release Date:** 27 March 2019

**Warranty Statement:** The information in this document has no effect on present warranty coverage or repair practices, nor does it authorize TRP or Campaign actions.

**Document Classification:** Internal and external use.

#### **Description:**

Engine coolant loss can be categorised by either internal or external coolant loss. This bulletin is intended to provide a succinct summary of recommended fault finding for use as a practical guide for site maintenance personnel. More detailed information can be found by referencing QuickServe OnLine manuals.

#### **Background information:**

Concern raised by some mine sites relating to coolant loss and difficulty to diagnose the source of coolant leaks, leading to unscheduled downtime.

Operating an engine with internal or external coolant loss can be detrimental to engine health so it is important to identify, diagnose and resolve issues promptly, along with following the recommended QSOL and OEM servicing, maintenance and operation guidelines.

#### **Actions:**

Always follow the QSOL troubleshooting procedures first as this will enable all other possible causes to be ruled out.

Typical methods for identifying coolant leaks can occur:

- During daily maintenance checks suggesting coolant level is low / consumption is high – refer <https://quickserve.cummins.com/qs3/portal/service/manual/en/3666260/>
- From oil sampling analysis results indicating elevated levels of Sodium or Potassium – refer <https://quickserve.cummins.com/qs3/pubsys2/xml/en/bulletin/4022060.html>

#### **External Coolant Loss –**

For external coolant loss Refer QSOL Symptom tree T020

<https://quickserve.cummins.com/qs3/pubsys2/xml/en/manual/4021530/4021530-t020-tr.html>

Visual inspection of engine external hoses, draincocks, coolant manifolds and thermostat housings, expansion and pipe plugs, fittings, radiator core, cylinder head gaskets, water-pumps seals and OEM-mounted coolant flow components may yield clues for external leak paths.



Also check the cooling system pressure cap and refer OEM service manual. If ok, check for air or combustion gases in the cooling system and refer procedure [008-019](#).

### Internal Coolant Loss –

Internal coolant leaks can be more complex to resolve so it is important to refer to QSOL and symptom tree T021.

<https://quickserve.cummins.com/qs3/pubsys2/xml/en/manual/4021530/4021530-t021-tr.html>

Before troubleshooting, it is important to determine the exact complaint by questioning the driver, checking the service history and engine control module (ECM) information. A pressure test of the cooling system may be conducted by referring to [Procedure 008-018 in Section 8](#).

Use tracer dye Part Number 3377438 if required, to identify difficult leaks along with a black light lamp, Part Number 3824754.

As an aid, difficult to detect leak paths may initiate from failed:

- Water pumps: Plugged weep hole, duck bill filter or failed internal seal – see Figure 1 or refer to [Procedure 008-062](#) and [Procedure 008-109 in Section 8](#).
- Cyl head gaskets: Deteriorated grommet seals or blown gasket material – see Figure 2.
- Intake aftercoolers: Cracked core, welds or mounting flanges – see Figure 3 or refer to [Procedure 010-002 in Section 10](#).
- Intercoolers: Cracked core, welds or mounting flanges – see Figure 3 or refer to [Procedure 010-083 in Section 10](#).
- Turbochargers: Damaged seals in bearing housing. Refer to [Procedure 010-033 in Section 10](#)
- Lube oil coolers: Cracked core or welds or leaking seals. Refer [Procedure 007-007 in Section 7](#).
- Cylinder heads: Cracked or porous cylinder head casting or inlet ports – see Figure 4 or refer to [Procedure 002-004 in Section 2](#).
- Cylinder liner seals: Deteriorated liner seals – see Figure 5 or refer to [Refer to Procedure 001-028 in Section 1](#).
- Cylinder liners: Porous or cavitated liners – see Figure 6 or refer to [Refer to Procedure 001-028 in Section 1](#).
- Cylinder block: Cracked or porous casting. Refer to [Procedure 001-026 in Section 1](#).

Note: Always refer QSOL when diagnosing or replacing components.

Figure 1 – example of blocked weep hole and grooved shaft / failed seal.



Figure 2 – example of leaking cylinder head gasket and thermally degraded grommets.

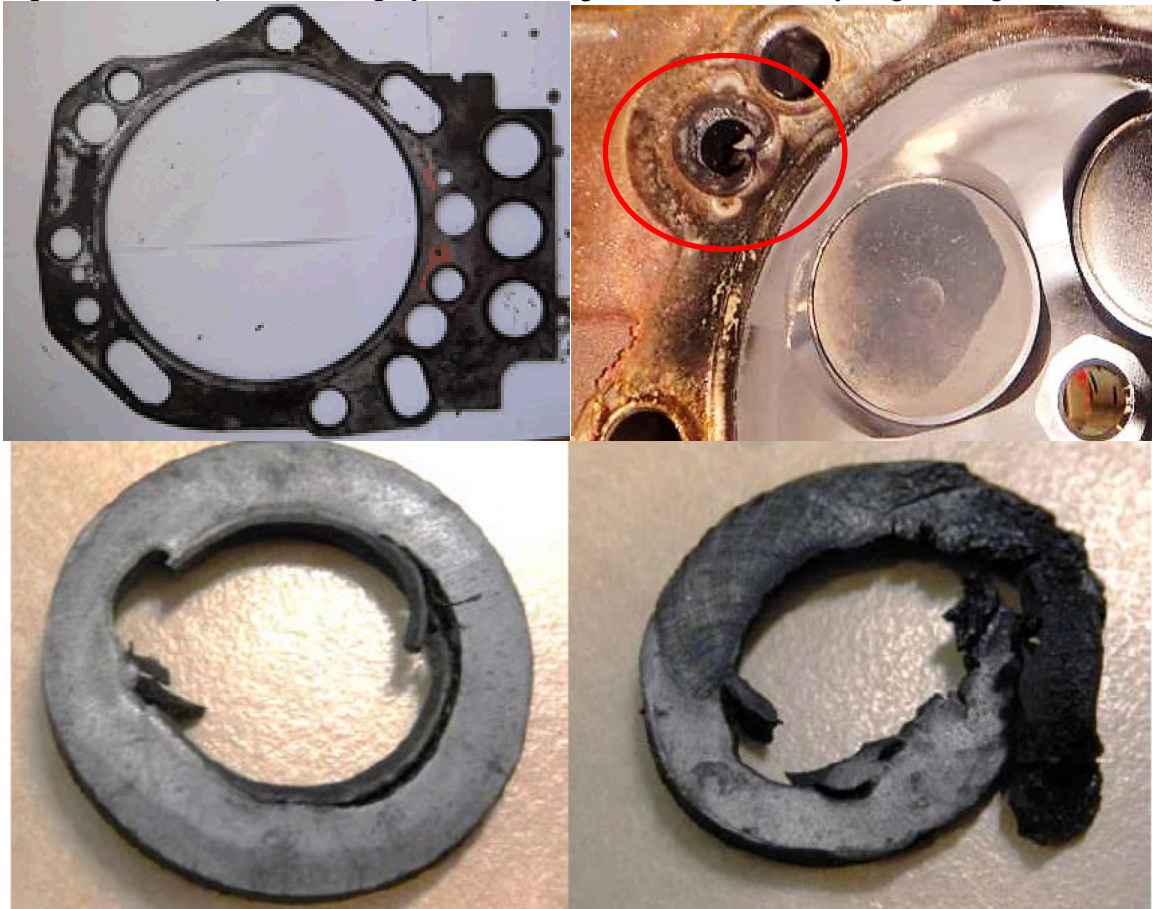


Figure 3 – example of failed intake aftercooler core weld.

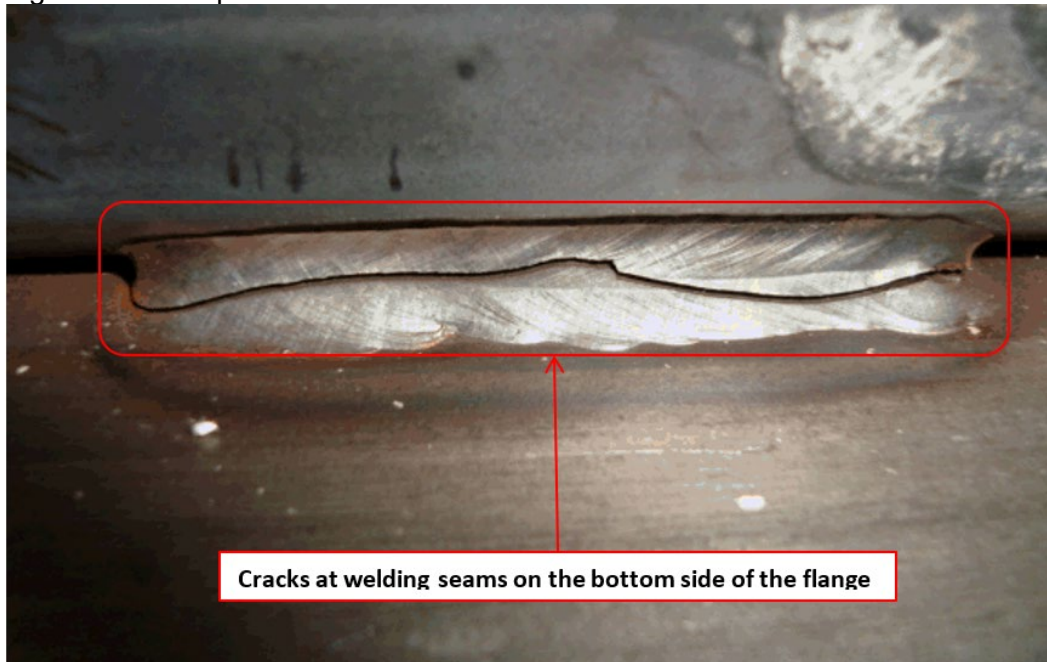


Figure 4 – example of cracked cylinder head intake port.

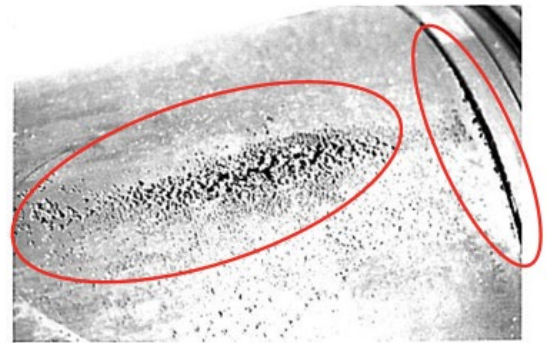


Figure 5 – example of failed cylinder liner seals vs new for reference



Figure 6 – example of cavitated liner

Liner pitting is a form of cavitation corrosion. Cavitation corrosion affects the liners, water pump impeller and housing, and the cylinder block. Cavitation corrosion is controlled by additives which form an invisible but tough protective film.



For technical assistance, please contact your local Cummins Product Support Representative or 1300 Cummins.