



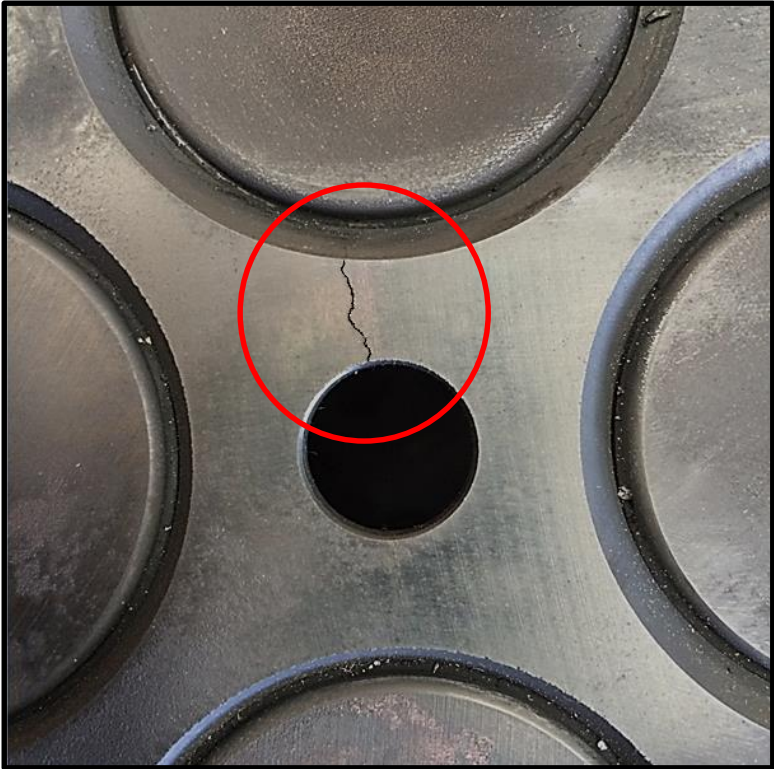
# Service Alert CSP 04-16

## ISX/QSX15 Cylinder Head Combustion Face Cracking

**Description:**

The purpose of this Service Alert is to inform all Cummins repair locations of cylinder head combustion face cracking and the possible root causes on the ISX/QSX15 product.

When an ISX/QSX15 cylinder head is inspected and combustion face cracks are identified the following inspections need to be carried out on the unit to determine the root cause. The image below is an example of cylinder head cracks at the combustion face (injector bore).





**Cause:**

This type of cylinder head crack is usually the result of high temperatures. The crack can happen during an over-heat or hot shutdown situation. When coolant boils in the head, the cracks occur.

As a preventative measure look for proper coolant formulation and maintenance and proper operation of the radiator pressure cap.

Also look for issues like cut injector “O” rings or blown plug balls that would cause a cylinder to over-fuel.

In general you need to look for conditions that cause high temperatures, or low cooling system pressure.

**Preventative measures:**

To assist in the reduction of cylinder head cracking Service Alert CSP03-16 has been introduced to advise repair locations to enable the following Low Engine Coolant Level parameters with Torque De-rate enabled as the recommended setting. Please refer to this service alert before enabling feature, this is only to be complete upon customer request.

Engine Protection	Enable
Engine Coolant Level	Enable
Time Based Shutdown	Disable
Torque Derate	Enable

**Actions:**

When combustion face cracking is present, please refer to the below information to assist in identifying possible causes

**Air intake system**

A leaking or flow restricted charge air cooler will affect the air/fuel ratio in the engine increasing the cylinder temperature.

- Inspect all air intake piping & connections for leaks
- Inspect charge air cooler for any air flow restrictions
- Inspect for internal and external core blockage
- Inspect/pressure test charge air cooler



If the charge air cooler pressure decay is more than 5 psi (35 kpa) in 15 seconds using 30 psi (207 kpa) air pressure then it is considered a major leak.



## Fuel system

- Inspect fuel system for any over fuelling devices, refer service alert CSP093-13

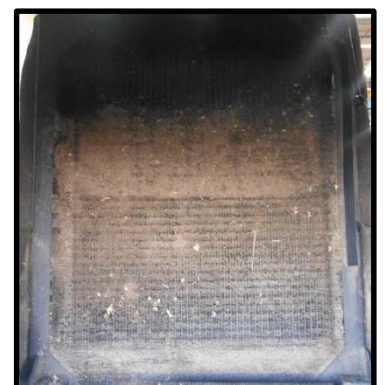


- Inspect injectors for damaged "O" rings or missing plug balls



## Cooling system inspection

- Inspect radiator cap for damage
- Pressure test radiator cap and check pressure rating is correct for engine model  
Minimum recommended pressure  
ISX CM570 – 10 psi (70 kpa)  
ISX CM871/CM2250SN – 15 psi (103 kpa)
- Check system bleed lines are present and not blocked
- Check coolant formulation and maintenance
- Check radiator for any air flow restrictions





## Insite Engine Protection Data

- Inspect the Engine Protection Data for current fault codes 151/2963 relating to high coolant temperatures

Description	Fault Code	Occurrence	Value	Duration	ECM Time (Key On Time)	ECM Real Time
Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Most Severe Level	151	Newest	137.0 °C	000036:06:40	012944:23:50	Not Applicable
	151	2	119.0 °C	000008:03:20	010711:03:34	Not Applicable
	151	3	117.0 °C	000017:30:00	007248:33:31	Not Applicable
	151	Oldest	129.0 °C	000067:46:40	007248:26:15	Not Applicable
Engine Oil Temperature - Data Valid But Above Normal Operating Range - Most Severe Level	214	Newest	124.0 °C	000015:33:20	002986:21:41	Not Applicable
Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Least Severe Level	2963	Newest	137.0 °C	000035:33:20	012944:23:46	Not Applicable
	2963	2	112.0 °C	000028:03:20	010852:02:11	Not Applicable
	2963	3	112.0 °C	000039:26:40	010851:55:55	Not Applicable
	2963	4	111.0 °C	000009:10:00	010851:54:47	Not Applicable
	2963	Oldest	112.0 °C	000008:53:20	010851:51:42	Not Applicable

## Insite Fault Code Data

- Inspect fault codes for counts of low coolant level and high coolant temperature fault

Fault Code	Status	Count	Lamp	Description
	Fault Parameters	First	Last	Units
CM871	ECM Time (Key On Time)	012948:02:20		HHHHHH:MM:SS
	Engine Hours	012824:51:20		HHHHHH:MM:SS
	Keyoffs	1913		
0197	Active	15	Amber	Coolant Level - Data Valid But Below Normal Operating Range - Moderately Severe Level
2646	Inactive	1	Amber	Engine Coolant Temperature - Condition Exists
2963	Inactive	1	None	Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Least Severe Level
0151	Inactive	1	Red	Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Most Severe Level
2448	Inactive	5	Maintenance	Coolant Level - Data Valid But Below Normal Operating Range - Least Severe Level

**Technical Assistance:** Please call your DFSE or 1300Cummins for Technical Assistance.