Engine ATU

January 2018

Introduction of new coolant for A8 and R8 in 2017

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01.
Requirements which modern coolant must fulfill

02.
G12evo as successor to G13

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Handling G12evo during servicing

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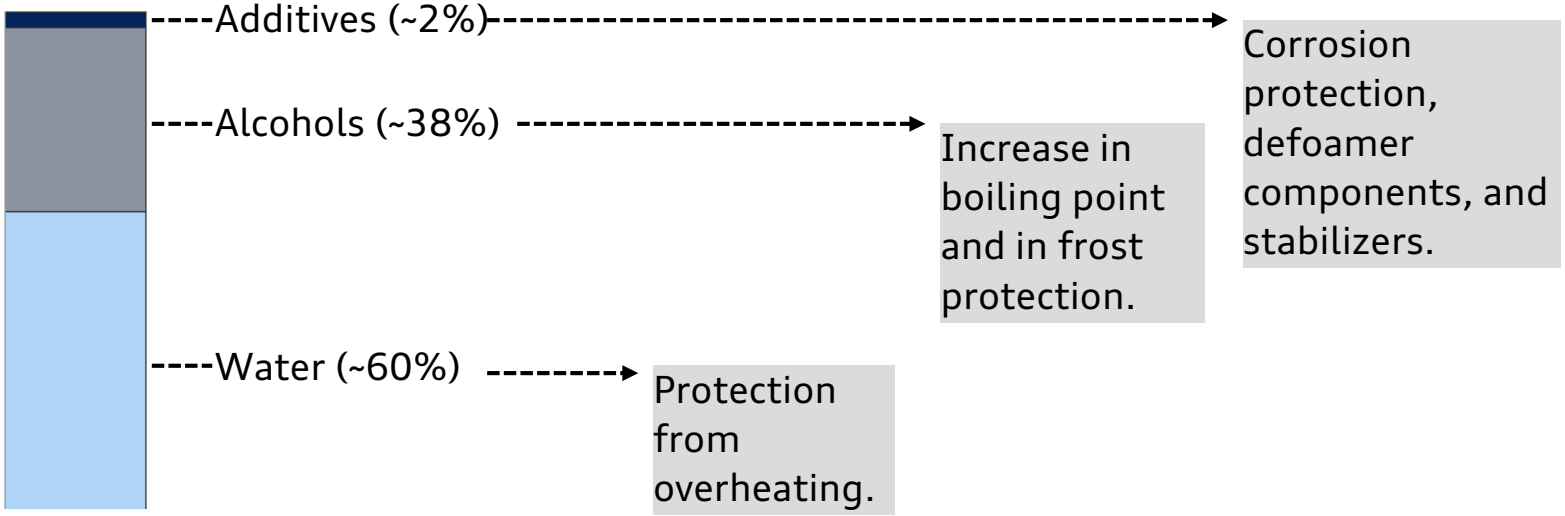
Summary

Requirements which modern coolant must fulfilll

Coolant make-up and tasks



IMPORTANT! Mixture ratio must be observed:

- Not enough coolant concentrate → danger of freezing, corrosion, and boiling.
- Too much coolant concentrate → danger of overheating.

Requirements which modern coolant must fulfill

Rising complexity of cooling systems:

- Increasing number of components in coolant circuit.
- Increasing range of materials.
- Thermal management with brief temperature fluctuations:
  - Switchable coolant pump.
  - Separate cooling for cylinder head/block.
  - Map-controlled thermostat.
  - Electric auxiliary coolant pumps.
  - Start/stop system.
- *The next generation of coolant must fulfill all these requirements.*

G12evo as successor to G13

Use of G12evo in the A8 and R8:

WAUYGB4HXHN023176

WUAKBAFX0J7900292

- Planned for use across the entire Audi fleet.
- Testing and verification will be performed gradually and individually for each engine/model.

G12evo must NOT be used for

other vehicle models and engines yet!!

Handling G12evo during servicing

Can be mixed with...	Standard initial filling					
	blue/green G11 1994 onwards	red G12 1996 onwards	violet G12+ 2000 onwards	violet G12++ 2005 onwards	violet G13 2012 onwards	violet G12evo 2017 onwards
G11						
G12						
G12+	brown					
G12++	brown					
G13	brown					
G12evo	brown					

Can be mixed in any ratio

Can be mixed but reduces corrosion protection

Cannot be mixed

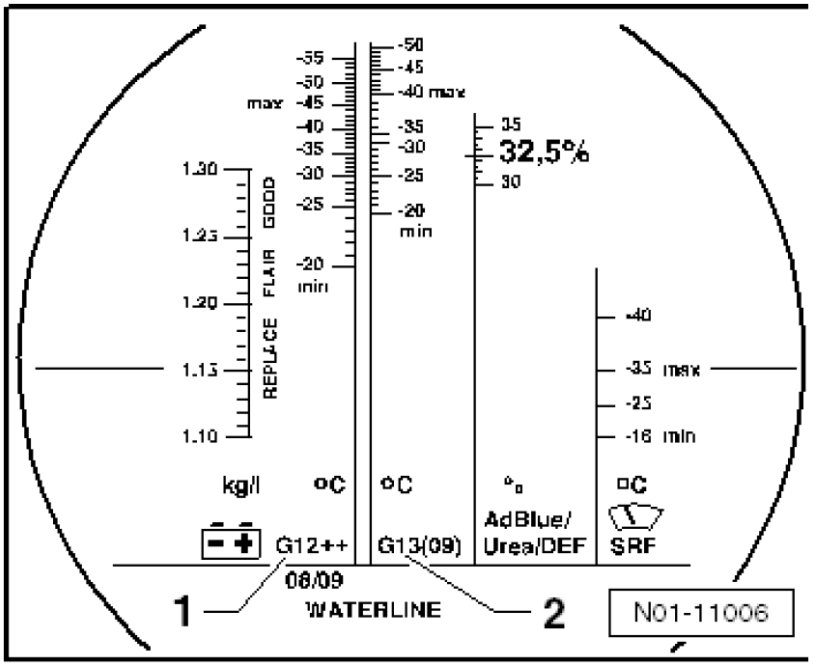
NOTE:

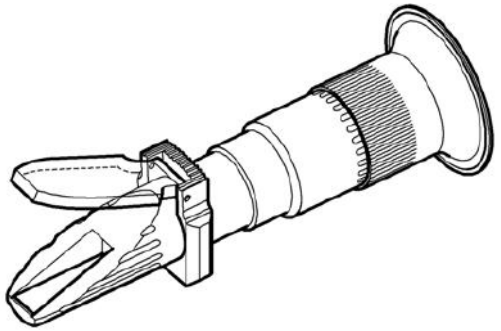
G12evo can only be used for vehicles with the corresponding approval (select coolant by accessing ETKA using chassis number or model selection).

Handling G12evo during servicing

Hand-held refractometer T10007A is suitable for G12evo generation:

› The G12++ scale must be used to read off the frost protection for G12evo.

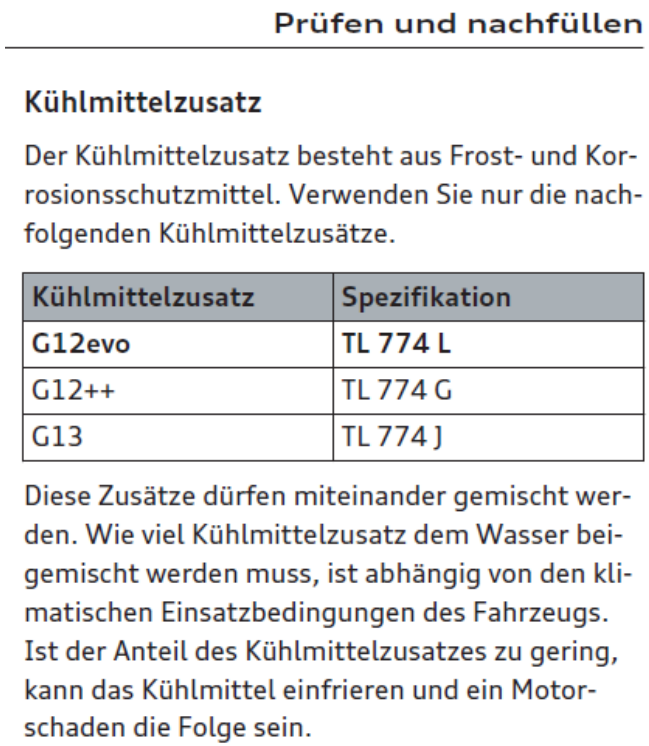




› For mixtures (e.g. with G13 added) the G13 scale should always be used.

Handling G12evo during servicing

Corresponding information already incorporated in Owner's Manual:



Prüfen und nachfüllen

Kühlmittelzusatz

Der Kühlmittelzusatz besteht aus Frost- und Korrosionsschutzmittel. Verwenden Sie nur die nachfolgenden Kühlmittelzusätze.

Kühlmittelzusatz	Spezifikation
G12evo	**TL 774 L**
G12++	TL 774 G
G13	TL 774 J

Diese Zusätze dürfen miteinander gemischt werden. Wie viel Kühlmittelzusatz dem Wasser beigemischt werden muss, ist abhängig von den klimatischen Einsatzbedingungen des Fahrzeugs. Ist der Anteil des Kühlmittelzusatzes zu gering, kann das Kühlmittel einfrieren und ein Motorschaden die Folge sein.

The information can be found here:

Service and care >> Checking and topping up fluids >> Cooling system.

Introduction of new coolant for A8 and R8 in 2017
Summary

- Thermal management in engines requires a more robust coolant.
- G12evo is (currently) approved for the A8 and R8 only.
- G12evo is compatible with earlier generations of coolant:
  - To select coolant or check approval, access ETKA using chassis number or model selection.
- Gradual introduction for other vehicle models and engines.
- Hand-held refractometer T10007A can still be used.

R8 (new model) – checking engine oil level

Agenda

01.
Engine oil system of R8 (new model)

02.
Determining oil level using MMI

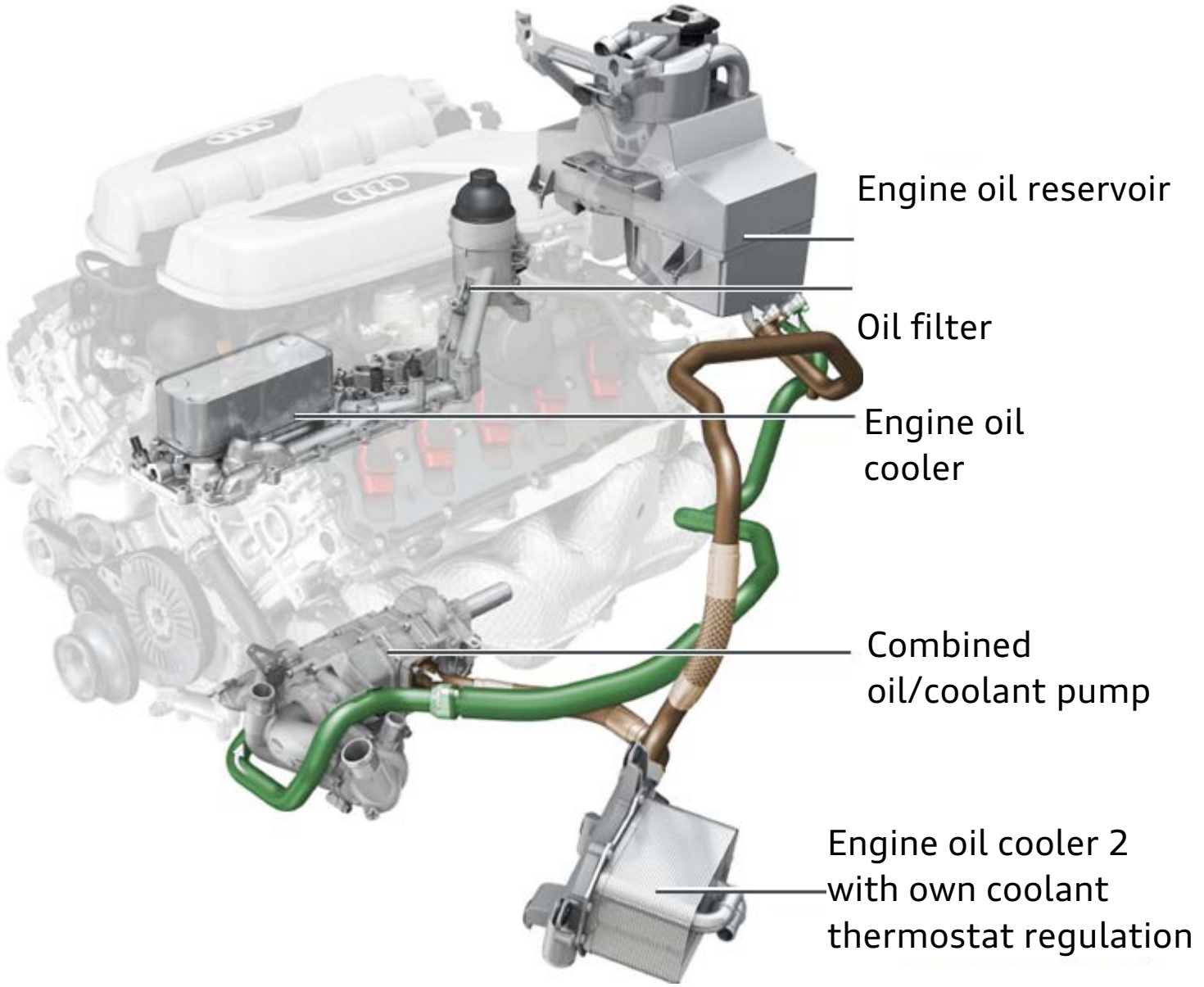
03.
Determining oil level using oil gauge tester

04.
Summary

05.
Backup

Engine oil system of R8 (new model)

Dry sump lubrication



Determining oil level using MMI

The customer can only check the engine oil level via the MMI.

Opening and closing the engine lid resets the engine oil display.

Requirements for generating engine oil level:

- Engine lid must be closed (or engine lid lock engaged).
- Engine speed must be ensured: measurement between idling and 4500 rpm.
- Engine oil temperature: between 140 and 248 °F.
- Longitudinal and lateral acceleration: between +/- 0.2g.
- This means: depending on the test conditions, the amount of time required for the oil level to be shown on the MMI may vary.

Note:

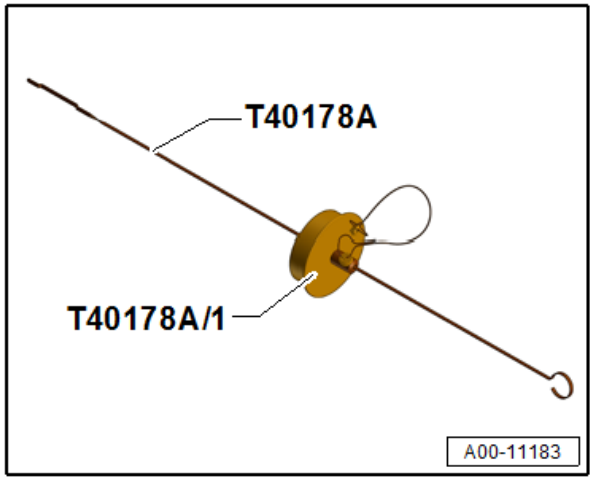
The oil level is determined most quickly with the engine idling or when driving at a constant speed on level roads.

Special considerations:

The engine oil system requires a minimum of approximately 9 quarts of oil to generate an oil level reading and display this on the MMI.

Determining oil level using oil gauge tester

Two different oil gauge testers are available:

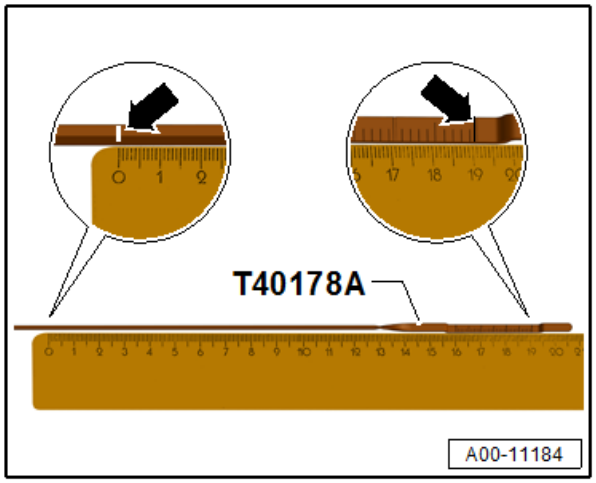


- Oil gauge tester T40178 with test adapter T40178A/1.

Adjustment value	Min. oil level	Max. oil level
378	0	17

- Oil gauge tester T40178A with test adapter T40178A/1.

Adjustment value	Min. oil level	Max. oil level
191	0	17



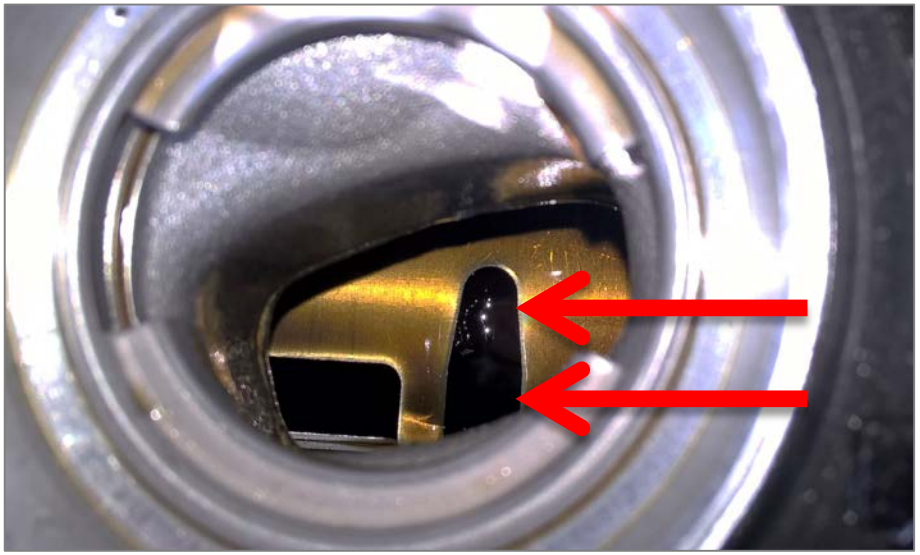
Determining oil level using oil gauge tester

Test requirements:

- Vehicle must be level.
- Engine oil temperature between 212 °F and 230 °F.
- Allow engine to run at idling speed for approximately two minutes.
- Wait approximately two minutes after switching off engine.

! Special considerations:

For a correct reading on the oil gauge tester, position the scale of the tester in the opposite direction of vehicle travel. Otherwise the measured value may be smudged.



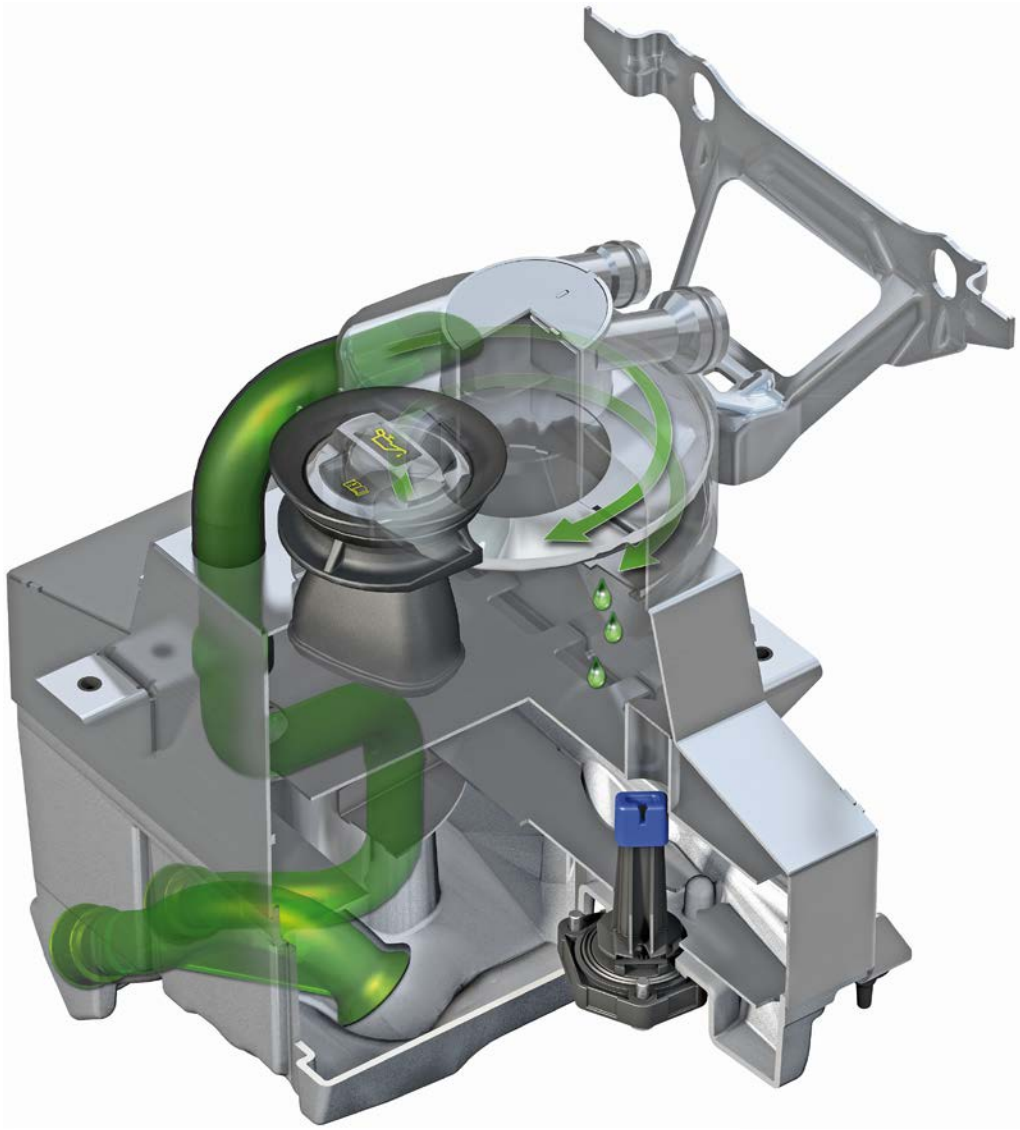
R8 (new model) - engine oil level
Summary

- Engine oil level can only be measured with engine lid closed.

- Oil level display on MMI depends on a number of factors:
  - Depending on driving profile and operational status of engine, time required to generate oil level display may vary.
  - Engine oil system requires a minimum of approximately 8.98 quarts of oil to generate an oil level reading and display this on MMI.

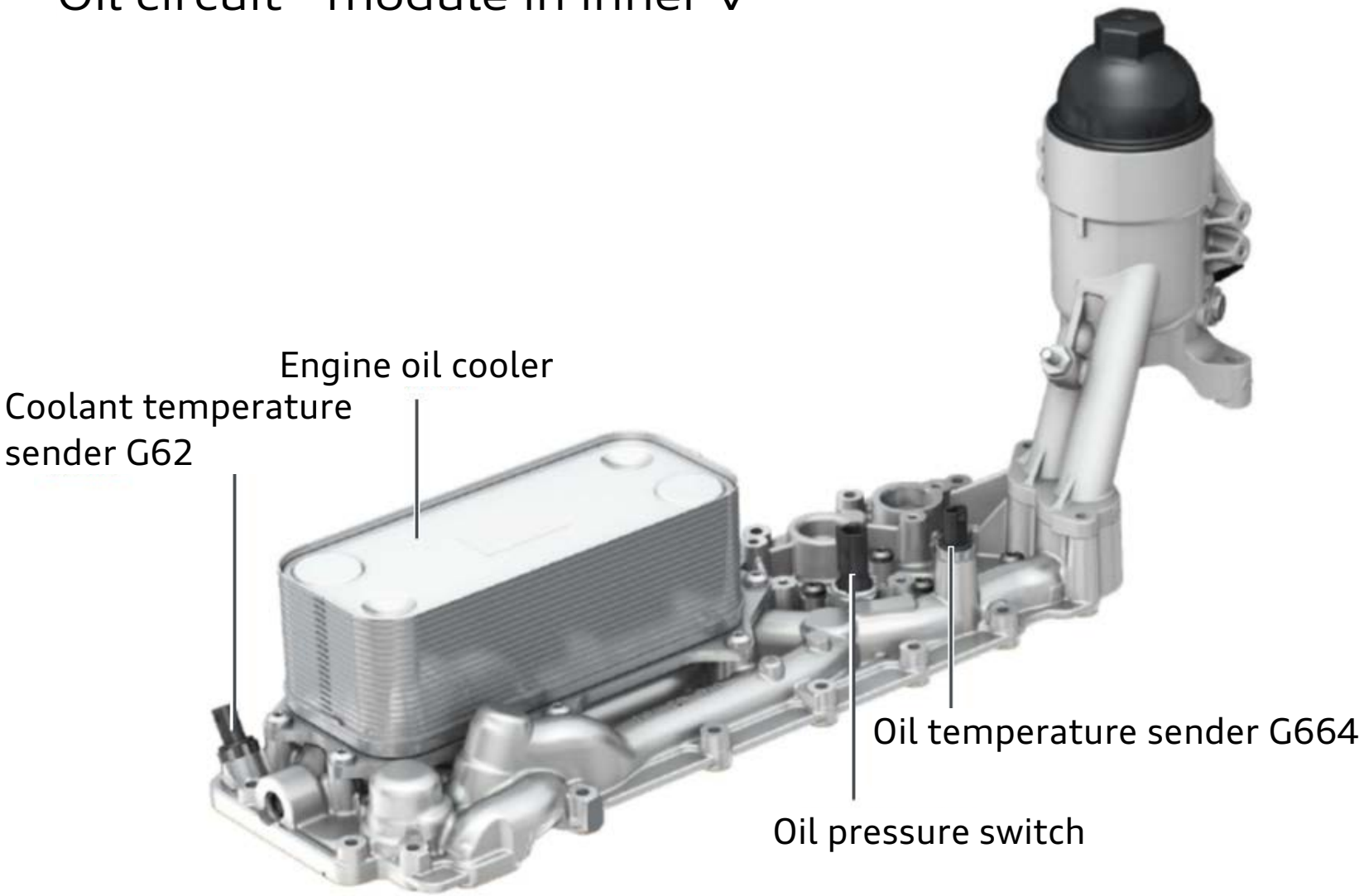
- Two different oil gauge testers available:
  - Note the different adjustment values.
  - Due to the construction, test gauge scale must face opposite direction of travel to avoid smudging measurement result.

Backup
Oil reservoir



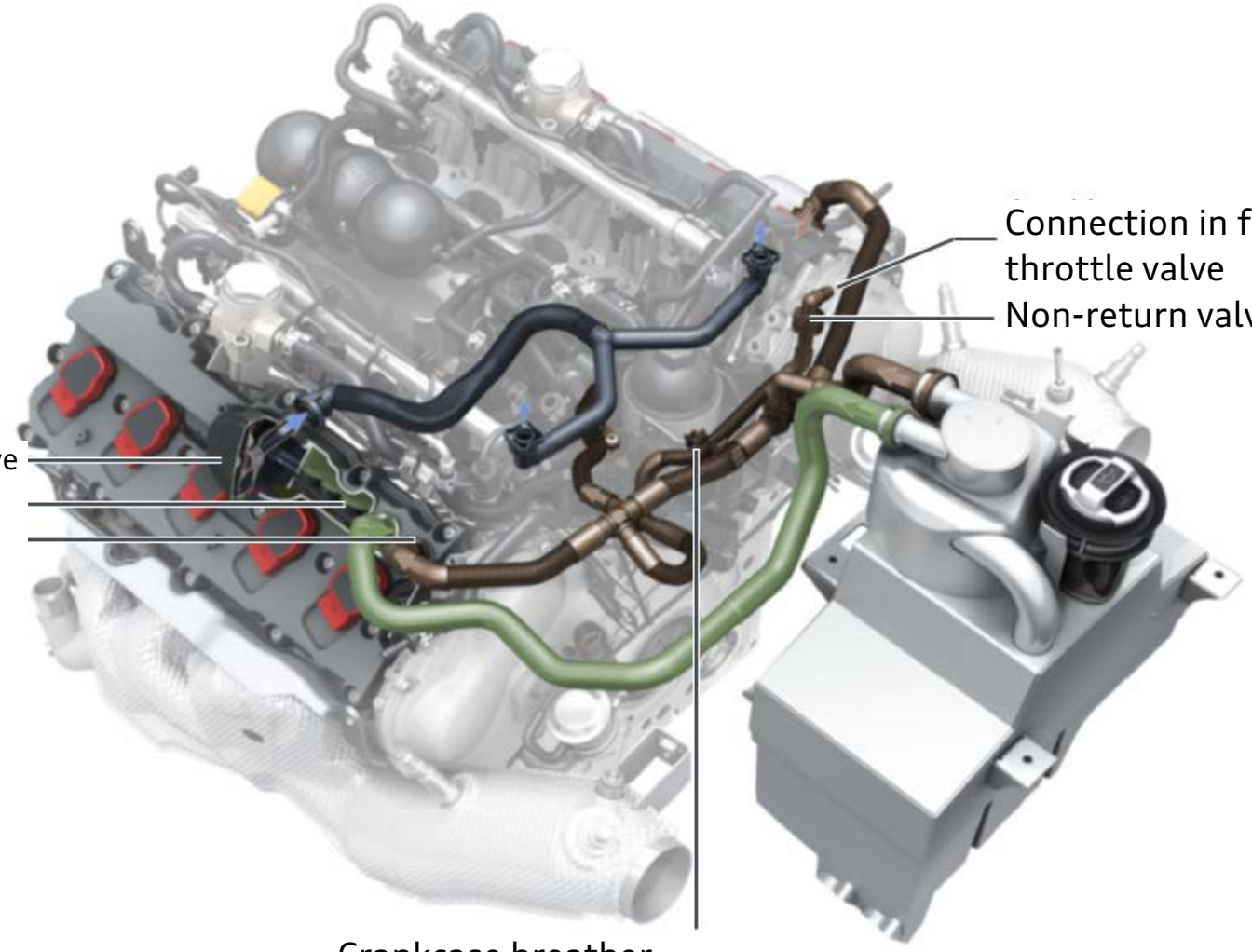
Backup

Oil circuit – module in inner V



Backup

Crankcase breather



V8 TFSI – locating cause for loss of coolant

Contents

01.
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Known leaks

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2.2 ITM valve

2.3 Coolant pump housing

03.
TSB 2048936

TSB 2048936 - 19 Coolant level warning light on, coolant marks on coolant pump - 4.0 TFSI

04.
Summary

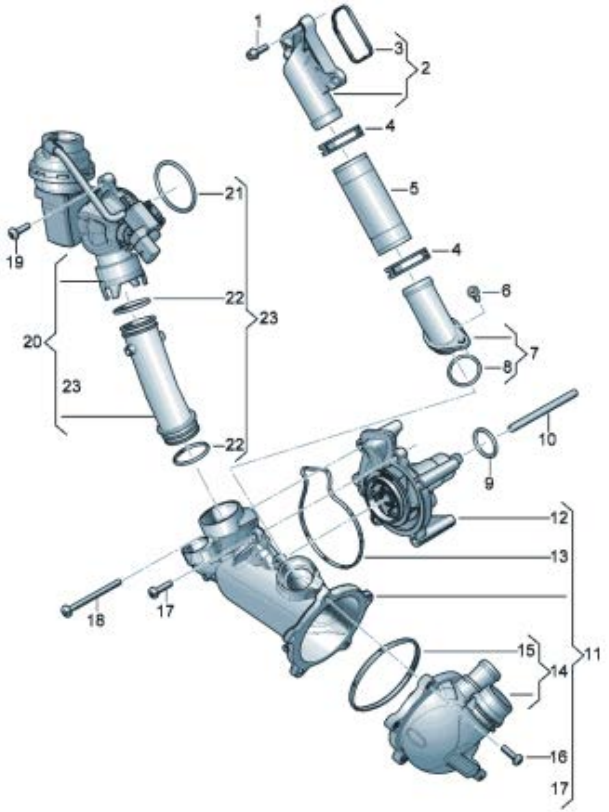
Customer concern

Initial situation:

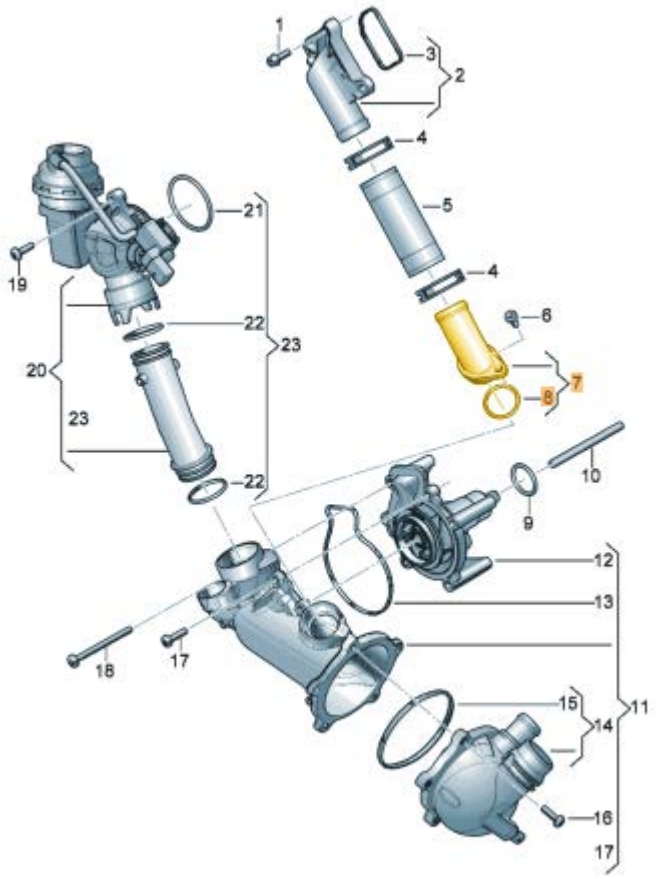
- Customer concerns about coolant escaping in vicinity of coolant pump (item 11) and ITM valve (item 20), with different technical issues in the field.

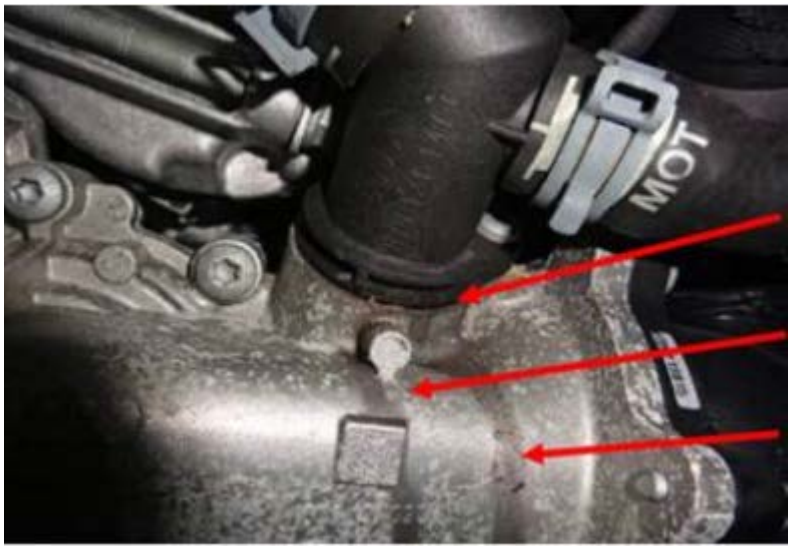
Objective:

- Targeted analysis to find the cause and avoid incorrect replacement or repeat repairs.



Coolant escaping at connection (Item 7)





Connection (Item 7)

Problem reported by customer:

- Coolant loss.

Workshop findings:

- Traces of coolant in vicinity of coolant pump.

Production measure:

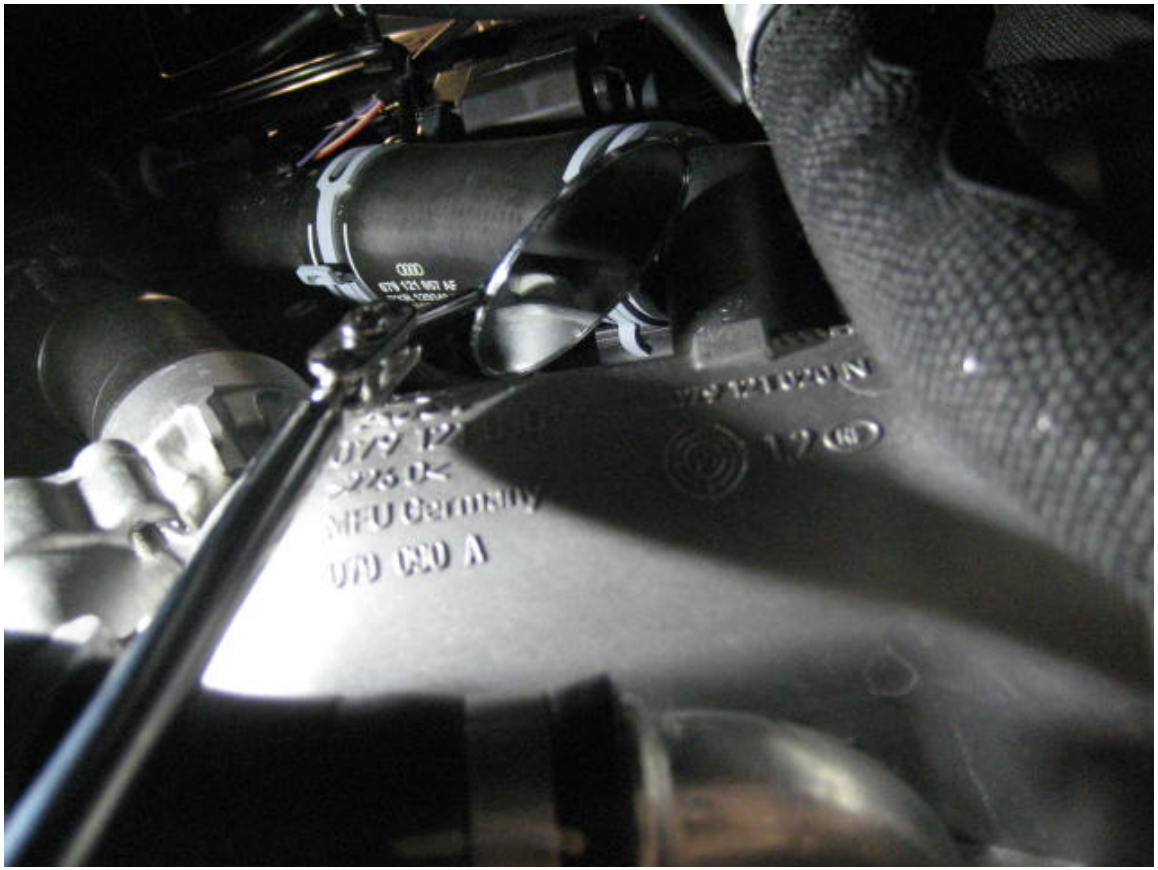
- Replacement of O-ring material (item 8).

Service procedure:

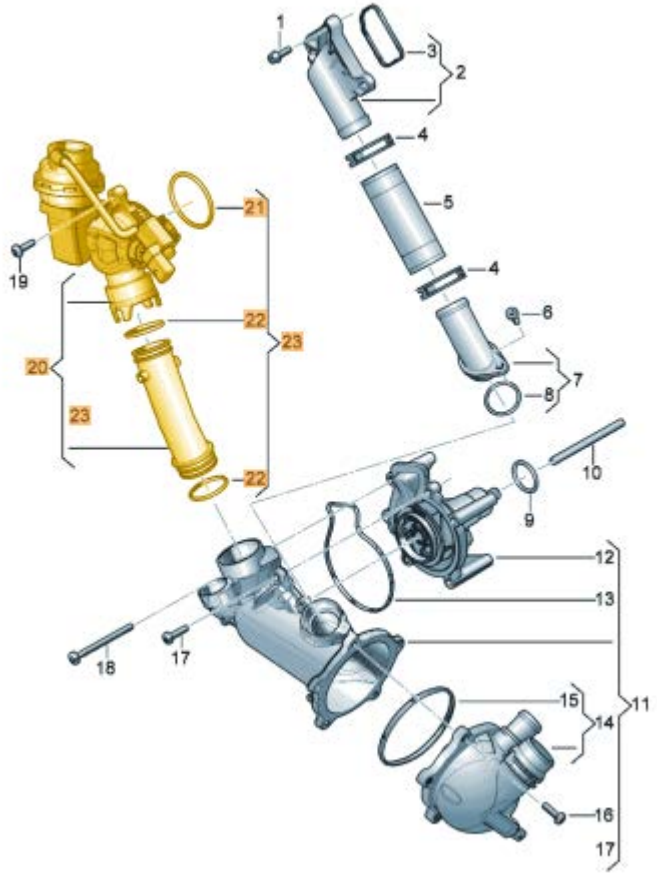
- It is sufficient to replace the O-ring in the event of leaks!!!
- Traces of coolant are often found in the vicinity of the thermostat housing (see next slide, 103). However, the cause for the escaping coolant is further up at the connection. There have not yet been any confirmed instances of thermostat housings which are not leak-tight towards the outside.
- Check for leaks at the connection using an endoscope or a mirror (slide 104).

Traces of coolant on thermostat housing

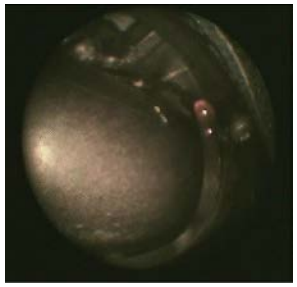
Connection (Item 7)



Coolant escaping at ITM valve (Item 20)



ITM valve (Item 20)



Problem reported by customer:

- Coolant loss.

Workshop findings:

- Traces of coolant in vicinity of coolant pump, on ITM valve.

Production measures:

- Optimization of rubber grommet.
- Optimization of production process.
- Last measures incorporated into production on production date 07/15.

Service procedure:

- Generally clear traces on ITM valve itself, but also on oil cooler and thermostat housing (see next slide).
- Inspect leak with endoscope or mirror.

Traces of coolant on oil cooler and sump

Coolant escaping at coolant pump housing (Item 12)

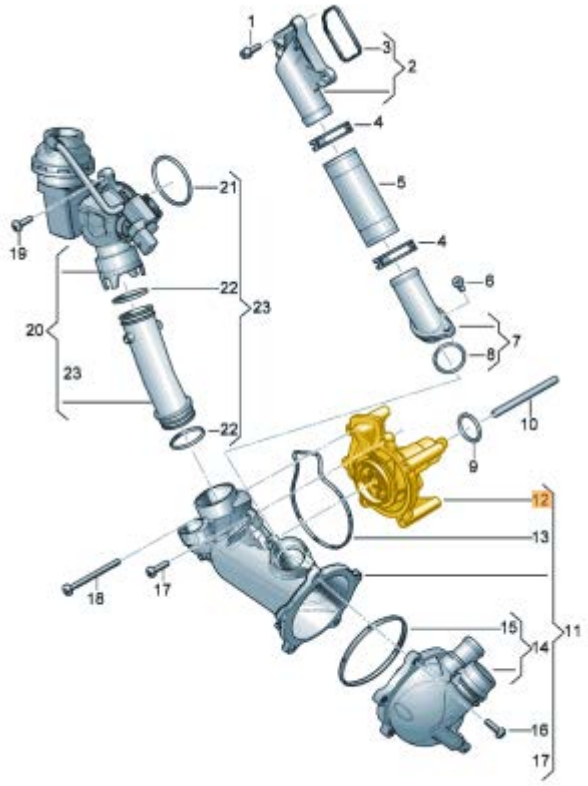
If there are traces of coolant on the coolant pump housing (item 12), this may have two different causes:

Cause 1:

› Major leak at coolant pump.

Cause 2:

› Small leak at cup on coolant pump housing.



Cause 1: Significant amount of coolant escaping at coolant pump housing

- Major leaks at the coolant pump always result in a customer concern.
- The mechanical seal of the coolant pump develops a fault due to being damaged by air in the system → running dry (see next slide).
- Leaks at the coolant pump are therefore generally secondary damage resulting from insufficient bleeding of the coolant system or from a faulty ITM valve.

Service procedure:

- In this case, the coolant pump must be replaced and you must make sure that the ITM valve is not faulty. The cooling system must then be bled correctly in accordance with ELSA.

Faulty mechanical seal (running dry)

Damaged seal

Cause 2: Small leak at cup on coolant pump housing

- The coolant pump housing is sealed at the drive shaft via a mechanical seal. To ensure that the seal does not run dry, a small amount of coolant leakage is necessary to keep the seal lubricated (for design-related reasons).
- Slight traces of coolant on the coolant pump cup can therefore be evaluated as okay (see photographs on next slide).
- Such leaks generally do not result in a customer concern and are found as part of a service inspection or tire change. If there is a slight leak and the coolant level drops significantly, this issue may occasionally result in a customer concern (coolant level warning lamp lights up).

Service procedure:

- In this case, the traces of coolant must be removed and the cooling system must be bled and checked for leaks in accordance with the Repair Manual. Once this has been done, no further repairs should be performed if no fresh traces of coolant are visible.

Cause 2: Small leak at cup on coolant pump housing

TSB 2048936

Refer to TSB 2048936: 19 Coolant level warning light on, coolant marks on coolant pump - 4.0 TFSI .

› Documenting the concern in detail using the checklist in this bulletin assists Product Support in analysing new concerns in the field.

V8 TFSI – locating cause for loss of coolant
Summary

- There are different places in which coolant can escape in the vicinity of the coolant pump.
- Traces are generally first noticed on the thermostat housing, sump or underbody guard. However, the **cause** is mostly located **higher up** at the ITM valve or the coolant connection.
- Slight traces of coolant on the cup of the coolant pump housing should be evaluated as okay, provided that the test showed the cooling system to be free of leaks.
- All cases should be documented precisely via the TSB's instructions to assist with quality improvements.

Thank you!