

Rattling pump – 03L 130 755 – 2.0l 4V longitudinal CR TDI



History:

- 1st failure – [redacted] power test bench: WK 38 (problem number in VDS-Win: 4466942). After commissioning and engine start, the pump was immediately noisy (running time of pump approx. 2 minutes).

-> Sent to [redacted] for analysis.

First statement from [redacted] typical sliding wear on roller assembly, possibly lack of lubrication, dirt etc. Pump sent to [redacted] to Mr. [redacted] analysis results to follow.

- 2nd failure – [redacted] power test bench: WK 39 (problem number in VDS-Win: 4466957). After commissioning and engine start, the pump was immediately noisy. Fault symptoms similar to the 1st pump (running time minimal).

-> Sent to Bosch for analysis. Analysis results expected.

Labeling of 1st pump:



Labeling of 2nd pump:



INFORMATION Redacted PURSUANT TO THE FREEDOM OF INFORMATION ACT (FOIA), 5 U.S.C. 552(B)(6)

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Rattling pump – 03L 130 755 – 2.0l 4V longitudinal CR TDI



- 3rd and 4th failures: WK 41 (problem number in VDS-Win: 4467636). After commissioning and engine start by HT, the pump became noisy during the HT test on an engine (3rd failure). Engine was then checked in the [REDACTED]. The noise was established and pump changed. After 30 minutes running time, the engine became loud again and the noise again originated from the HPP (4th failure).

-> 3rd pump was dismantled in [REDACTED].

Labeling of 3rd pump:



Labeling of 4th pump:



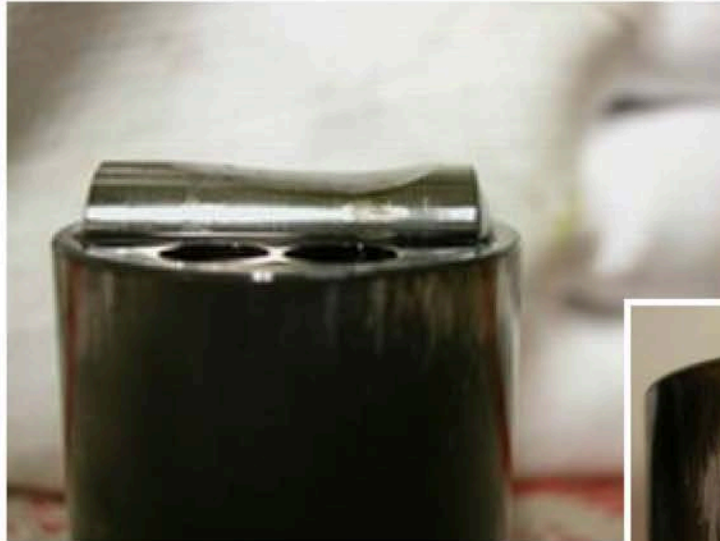
- Fuel system in [REDACTED] on [REDACTED] power test bench: 2 fuel filters are integrated in the supply of the system with quality 3 - 5 µm.
- Today the engines turned first on the HT, or in the [REDACTED] after commissioning.

Rattling pump – 03L 130 755 – 2.0l 4V longitudinal CR TDI



- Photographs of 3rd failure:

Drivetrain damage: Wear on cams, on the roller, on the slide shoe, on the spring washer:



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Rattling pump – 03L 130 755 – 2.0l 4V longitudinal CR TDI

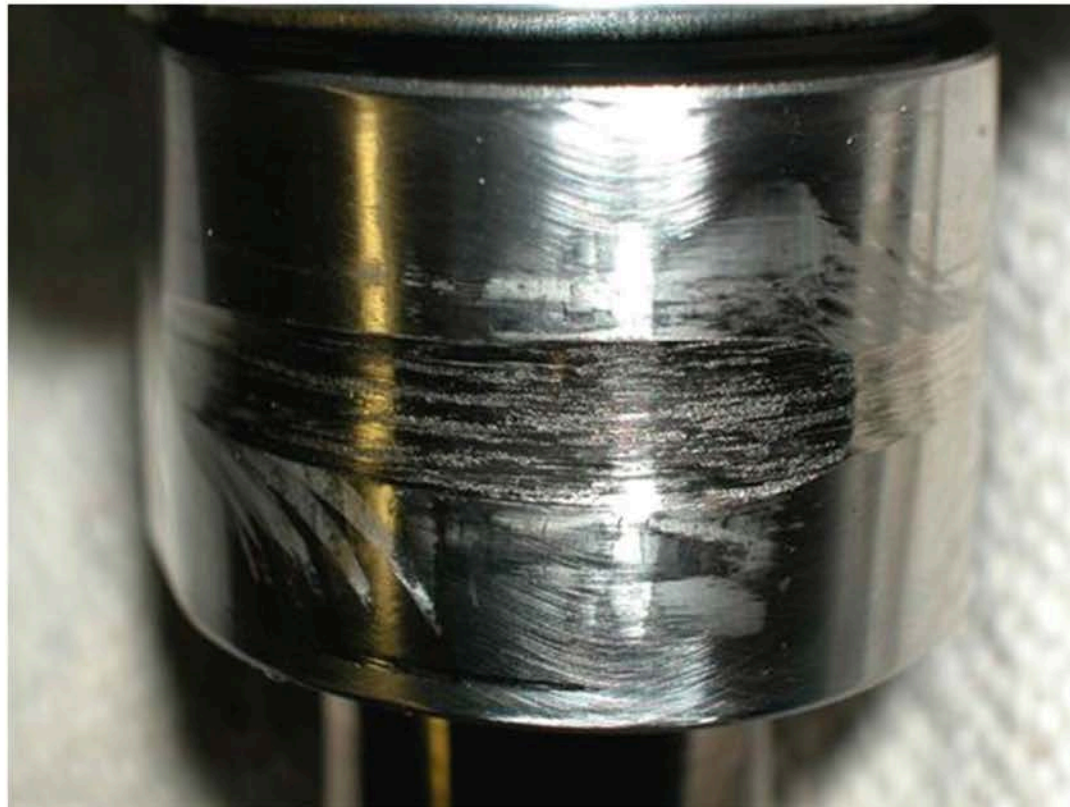


- Photographs of 3rd failure:

Large chips in the area of the MU:



You can see from the wear on the cams that the roller has turned in a clockwise direction several times:



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From: Non-responsive content removed

To:

CC:

Date: 7/13/2009 8:36:00 AM

Subject: Regarding brand acceptance run: Breakdowns Q verification run 2.0l TDI BIN5 in Audi A3 - AU 353 08050

Attachments: [Übersicht HDP.pdf](#)

Hi Non-responsive content removed

All USA pumps have a C coating on the pistons, both with the V6-TDI as well as the R4-CR. Unfortunately, this extra coating on the (element) pistons is not helping us with the problem of damaged CP4 drivetrains.

Drivetrain means the shaft with cams and the roller with the roller support (also always C coated), which transfers the stroke to the tappet body with the pistons.

I'll send you a picture.

I am assuming that the pump was correctly installed in Non-responsive content removed

Even if it had been incorrectly installed, this would still not explain the damage on the drivetrain, as the pump variants do not differ here.

Here is some extra information for you for the brand acceptance run:

A board meeting between Bosch and Audi is planned for September to cover the topic of reliability (field). Non-responsive content removed is coordinating this.

Here, it has been an intention for some time to make the main topic "structural weaknesses and robustness measures", because we have this problem throughout the globe with fuels that do not comply with standards; currently e.g. Non-responsive content removed and also Non-responsive content removed whereby we are still to find out what the differences in the fuel are; it is probably because a poor fuel was used before, the pump was then pre-damaged and when we eventually took a sample after the breakdown damage, proper fuel had already been put in).

... now we are waiting on the results from your fuel sample. Maybe this will shed some light on things.

Hello Non-responsive content removed

Could you please check whether a correct CP4 with index "A" has been built in? Need the info very quickly!

>Best regards

>

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AUDI AG

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>
>From: Non-responsive content removed
>Sent: Monday, July 13, 2009 7:01 AM
>To: Non-responsive content removed
>Subject: Re: Breakdowns Q verification run 2.0l TDI BIN5 in Audi A3 - AU 353 08050

>
>Dear All,
>
>Could you please find out (via Non-responsive content removed) which pumps have been built into the A3 BIN5 that has
broken down with HPP damage.
>
>Vehicle: AU353 08050 (PPS)
>
>Engine number: CBE00155
>
>
>The pump did not have a PNR number. At least, we couldn't see one without dismantling the pump.
>
>Apparently, the BIN5 is supposed to have been fitted with a specially coated pump 03L 130 755A.
>
>The information would be important, as the topic of reliability is being discussed at the brand
acceptance run today.

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><http://www.audi.com>

>

>

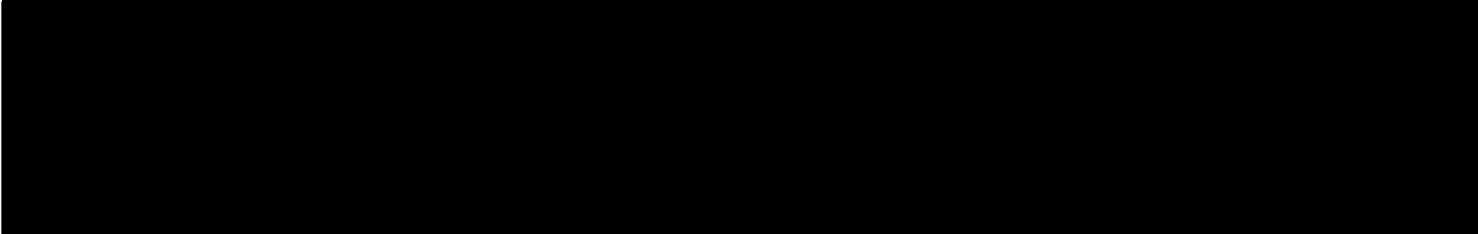
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>



>

>

>From: Non-responsive content removed

>Sent: Saturday, July 11, 2009 2:02 PM

>To: Non-responsive content removed

>Cc: ed

>Subject: ANS: Breakdowns Q verification run 2.0I TDI BIN5 in Audi A3 - AU 353 08050

>

>Hi Non-responsive content removed

>

>The correct HPP for the BIN 5 USA is 03L 130 755A.

>

>What is built into the vehicle?

>

>Regards,



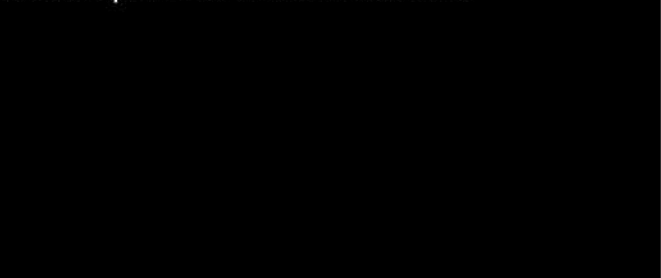
>

>Best regards / mit freundlichen Grüßen

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>From: Non-responsive content removed
>Sent: Friday, July 10, 2009 8:36 AM
>To: Non-responsive content removed
>Subject: Re: Breakdowns Q verification run 2.0l TDI BIN5 in Audi A3 - AU 353 08050

>
>Hi [redacted]

>
>Here's everything concerning the 2.0l BIN with HPP damage.

>
>Vehicle is currently being transported to [redacted]

>
>Information on Saturday.

>
>Then the pump will be dismantled and the fuel sample taken.

>
>We could have the samples analyzed in [redacted] That would be the quickest solution (approx. 1 week)

>
>

[redacted]

>AUDI AG

[redacted]

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>From: Non-responsive content removed

>Sent: Tuesday, July 07, 2009 11:26 AM

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>Subject: ANS: Breakdowns Q verification run 2.0l TDI BIN5 in Audi A3 - AU 353 08050

>

>Hi Non-responsive content removed

>

>You, Job's messenger!!

>

>I have added my comments in blue.

>Please call me back so we can coordinate whether or not the vehicle should be operated again; the repair costs will be considerable (see below).

>I have included Bosch in the list of recipients so they can clarify whether or not more information is required.

>If necessary, Bosch USA could also go there.

>

>Questions to Bosch and AoA:

>Have we got a chance to analyze all the residual fuel in the tank and the filter in the USA in a suitable laboratory (relatively quickly)?

>

>

>Best regards

Non-responsive content removed

>

>AUDI AG

Non-responsive content removed

>Sent: Tuesday, July 07, 2009 7:15 AM

>To: Non-responsive content removed

>Cc:

>Subject: > Breakdowns 2.0l TDI BIN5 in Audi A3 - AU 353 08050

>Importance: High

>

>Hi all,

>

>In order to verify the preparations for the current pre-master data status parallel to brand acceptance run we are currently on a verification trip to USA.

>

>The vehicle failed today with high-pressure fuel pump damage.

>

>
>The following information about the vehicle / damage:
>
>
>Vehicle: AU353 08050 (PPS)
>
>Engine number: CBE00155
>
>Pump status: no part number to be found. 1008 is engraved on the pump housing.
>Non-responsive content removed Is there no type plate on the housing (see my e-mail from yesterday)?
>As the vehicle came off the assembly line at the start of 2009, I assume that the pump was built at the end of 2008 / start of 2009 and, as a result, should already have an improved status (since May 2008). In the meantime, however, further improvement measures have been added, so that we are monitoring again
as of June 2009 (see my e-mail from yesterday).
> < Message: Status and failure list of CP4 drivetrain damage >>
>
>
>Mileage at time of damage: 83,726 km
>
>Data status at time of damage: Z929
>
>
>
>In a verification run, the vehicle ran up until 83,343 km with various Z states (last Z925) with no striking features.
>
>
>Today (at 83,343 km) the vehicle was updated with the status Z929 and fueled at a Mobile Oil gas station (approx. 50l).
>
>I.e. the damage occurred just 400 km after the update / fueling.>
>
>When traveling on the interstate at approx. 75 mph in ■ the MIL came on suddenly and the vehicle lost power. After stopping, the engine died immediately.
>
>Among others, the error memory saved the following fault:
>
>P0087 Fuel rail/system pressure too low
>1110 0000 conditions met
> static
> Indicator light on
>
>Details, see:
>
> < File: AU353 08050_06.07.09_20.33.txt >>
>
>
>Then the vehicle would not start. In the starting process, the HPP developed max. 40 bar pressure but then very quickly fell to below 10 bar.
>
>We then ran an actuator test on the EFP and the inline EFP - > both pumps ran. We also ran the initial filling procedure again.
>
>The vehicle still didn't start after that. .

>

>

>Then we dismantled the flow control valve of the HPP. The strainer at the end of the FCV was entirely filled with metal chips. A large amount of chips were also in the blind hole in which the valve sits. I.e. most probably pump damage.

> [Non-responsive content removed] It concerns 100% a so-called CP4 drivetrain damage! (see TPI below).

>

>

>The vehicle is currently being brought to the station by truck and it will be analyzed in detail there by the end of the week.

>

>Until then, the following questions must be answered:

>

>

>

>1. Data status influence

>

>Were any changes made to the Z929 data status (increase in pressure level or the like) which could clarify such damage?

> [Non-responsive content removed] can't really imagine that that is the case! It must have something to do with the fuel.

>

>2. Design status of pump

>

>Please use the engine number to clarify which design status the pump has. Are / have there been problems with pumps of a certain design status?

> [Non-responsive content removed] Yes, unfortunately too many; see my e-mail from yesterday.

>

>3. Which analyses are necessary on the vehicle / engine - the pump?

>

>I.e. who needs what when and where / which parts / measurements etc.. Is it possible for experts to analyze the damage in detail on site in the USA?

> [Non-responsive content removed] I mean, it isn't necessary for experts to be on site. >I would personally like to have from you, if possible:

>* the fuel filter contents completely shaken in a suitable 1-liter transport bottle and topped up with fuel from the inline EFP (briefly activate), labeled and then sent to us.

>* the fuel filter with inlet and outlets obturated, so that no residual fuel or vapors can escape and sent to us (please first e-mail me the part number of the filter!).>

>* fill up an additional 1 liter of fuel via EFP in a 2. liter bottle and send (I would like to get the fuel from the tank base; i.e. water is lighter than diesel).

>* of course, also send us the HP fuel pump.

>

>4. What will have to be replaced on the engine in order to prepare for a verification run?

>

>Will it suffice to just replace all the high-pressure components or must the low-pressure ones also be replaced? If possible organize / provide the parts

> [Non-responsive content removed] you must also have the low-pressure lines and the tank replaced, because the entire system is contaminated; although in the past we have suctioned, cleaned and rinsed the tank, but therefore you must be incredibly clean and conscientious. See TSB from customer services.

>

> < File: 2020693_ZME_Späne.pdf >>

>

>Please provide feedback on the above questions.

>


>

>Thank you.

>

>

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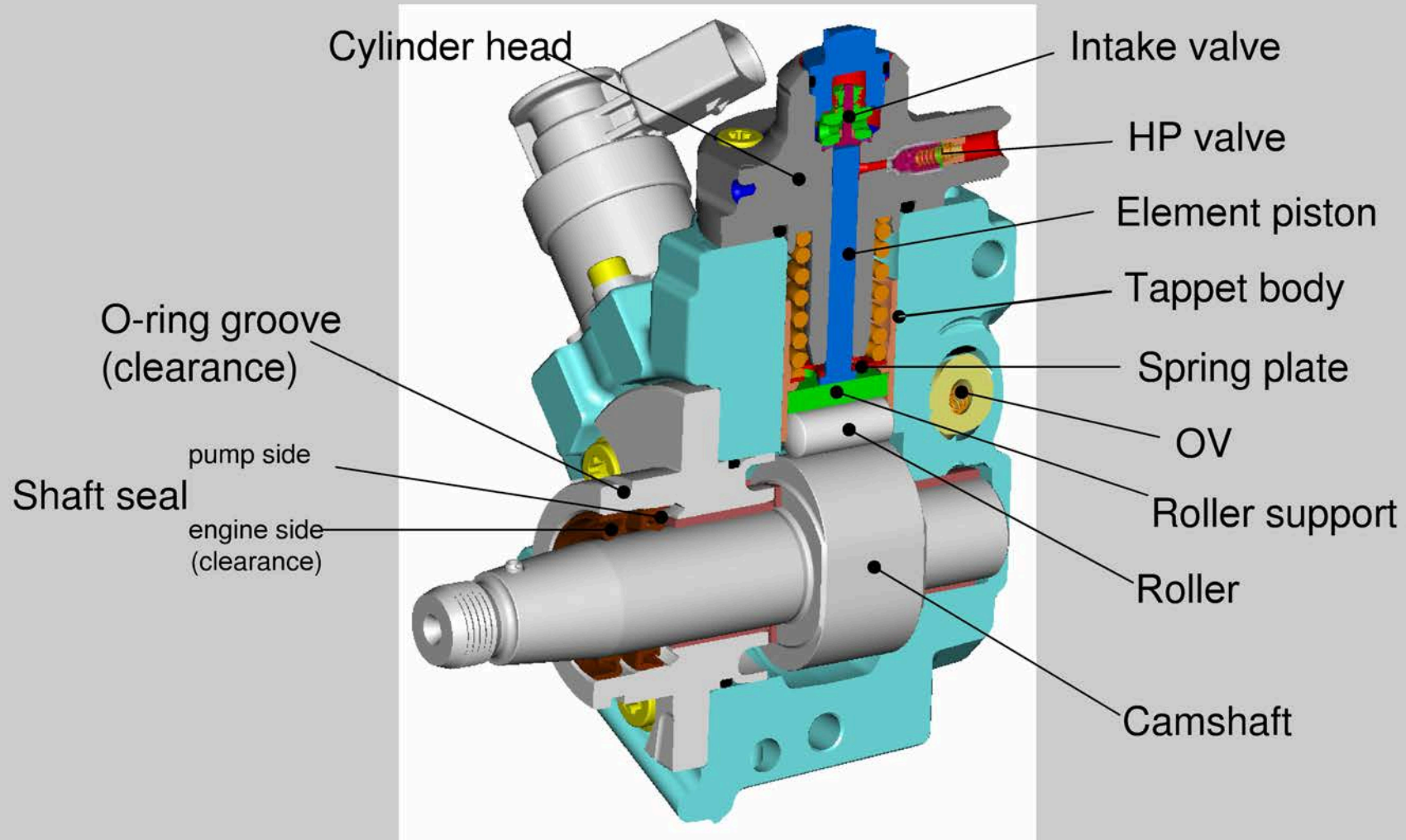
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Audi A4 / A5 CR High pressure fuel pump CP4 failure focuses



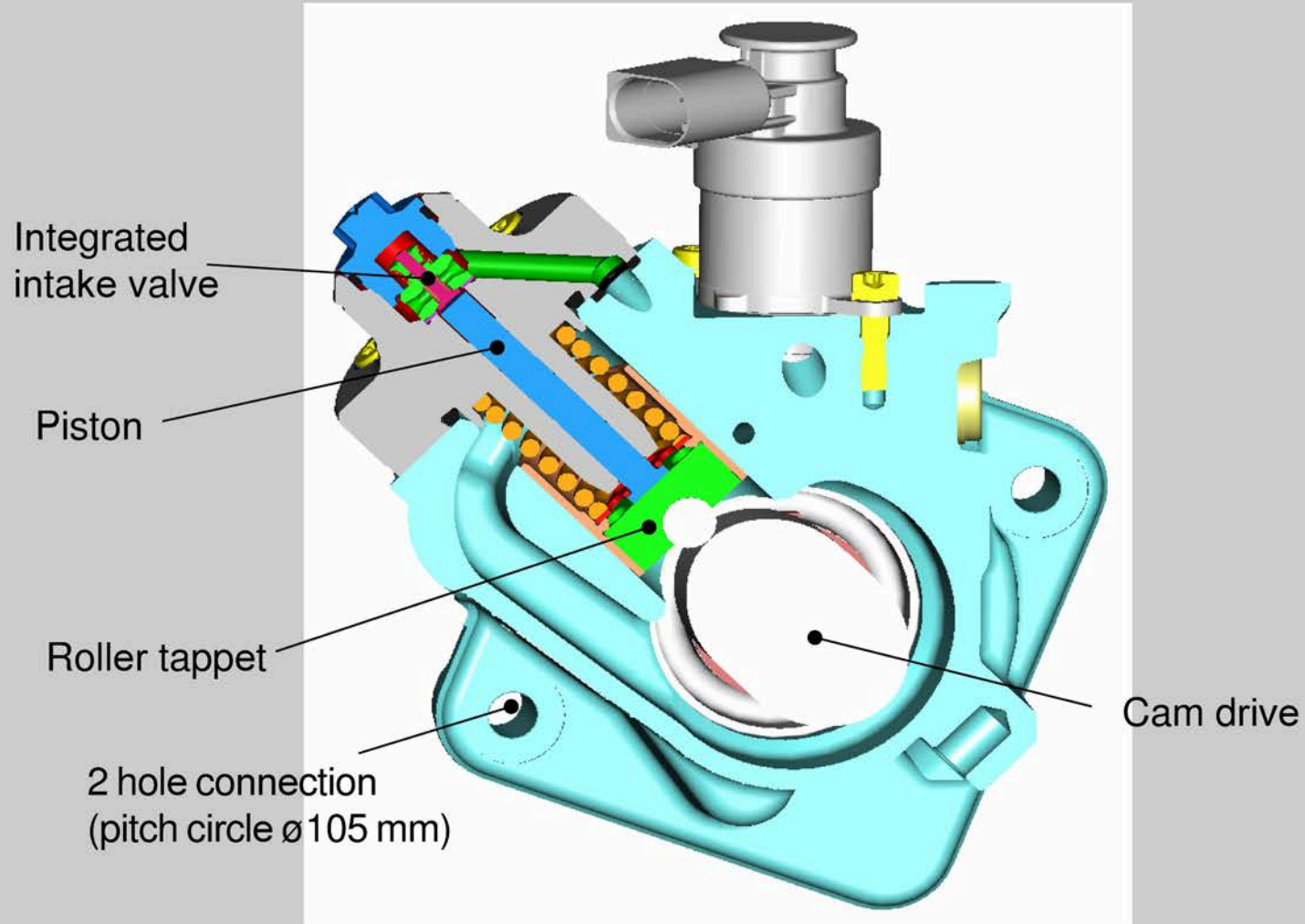
Technical information CP4.1



Audi A4 / A5 CR High pressure fuel pump CP4 failure focuses

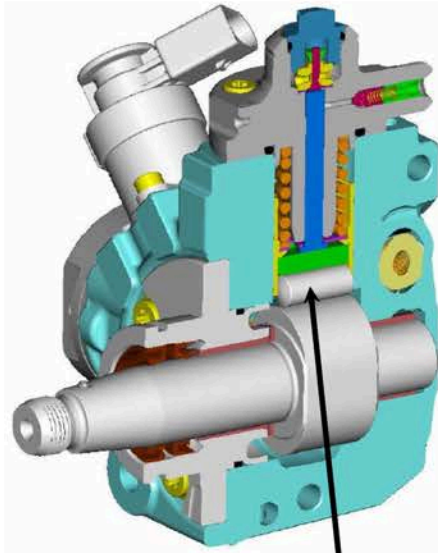


Technical information CP4.1





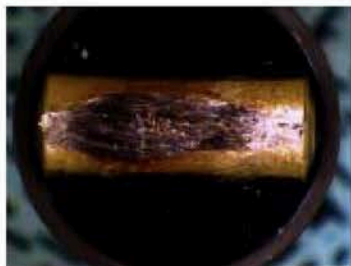
High pressure fuel pump CP4.2



Right roller tappet



Left roller tappet



EA11003EN-0

To: [Redacted]
 From: [Redacted]
 CC: [Redacted]

Date: 10/14/2009 5:43:00 PM
Subject: Feedback regarding trouble ticket - failure to high-pressure fuel pump in [Redacted] Q7 with V6-TDI Bin5
Attachments: [Status V6-TDI Bin5 - Blaue Meldung Kraftstoff-Hochdruckpumpe KW42.ppt](#)
[Bosch-Audi Top-Gespräch 2009 neu2.ppt](#)

>
 Dear Sirs,
 >
 >In the [Redacted] there are currently 2 failures of high-pressure fuel pumps CP4.2 - see trouble ticket from 09/21/2009.
 >Here is the current status as prior information:
 >
 >The failures are not Bin5-specific, they are pump-specific.
 >
 >In principle, we can differentiate between 2 causes of failure:
 >
 >1) Production tolerances: These have been mainly remedied by means of several packages of measures introduced by Bosch.
 >
 >2) Critical fuel qualities: The focus being water and lubrication.
 > An investigation program to find out more information about the cause is currently running at Bosch.
 > An anti-wear package has been introduced to cover the poor lubrication properties of EN590.
 >
 >This topic will be tracked intensively by [Redacted] and [Redacted]. See the summary from [Redacted] for Audi / Bosch. Top meeting:
 >
 >
 >Best regards

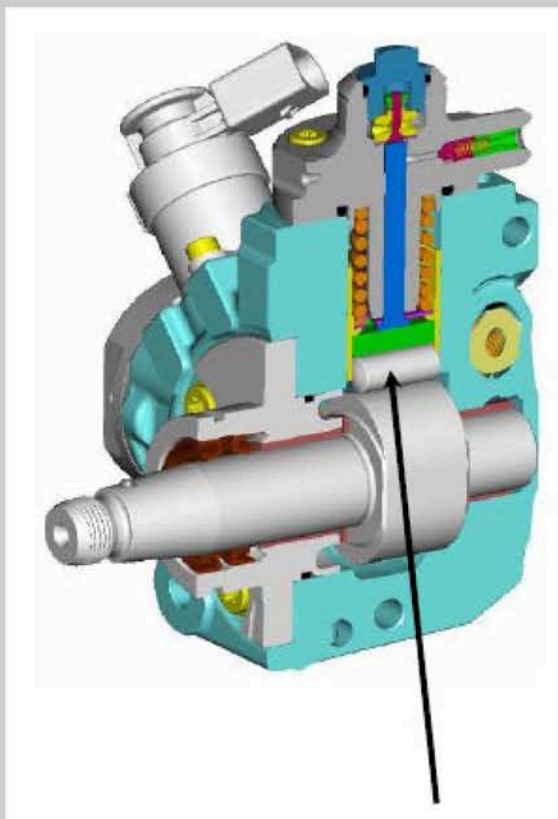
[Redacted]
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>
 >AUDI AG
 [Redacted]
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Audi - Bosch reliability program

CP4 Diesel high-pressure fuel pump in CR injection systems from 1800 bar (EU5)



The "sensitive heart" of the pump is the drivetrain with:

- Roller
- Roller support
- Twin camshaft



The roller with its extremely smooth surface, over the entire lifetime and under all operating conditions, must:

- glide smoothly in the C coated roller support
- roll over a very smooth cam without slippage

If this is not achieved in all situation, the **drivetrain damage** can occur in case of:

- **Sluggishness** of the roller in the roller support due to manufacturing variances (largely eliminated).
- **Critical fuel qualities** in various **markets** although the fuel properties that result in damage have not been analytically proven to date:

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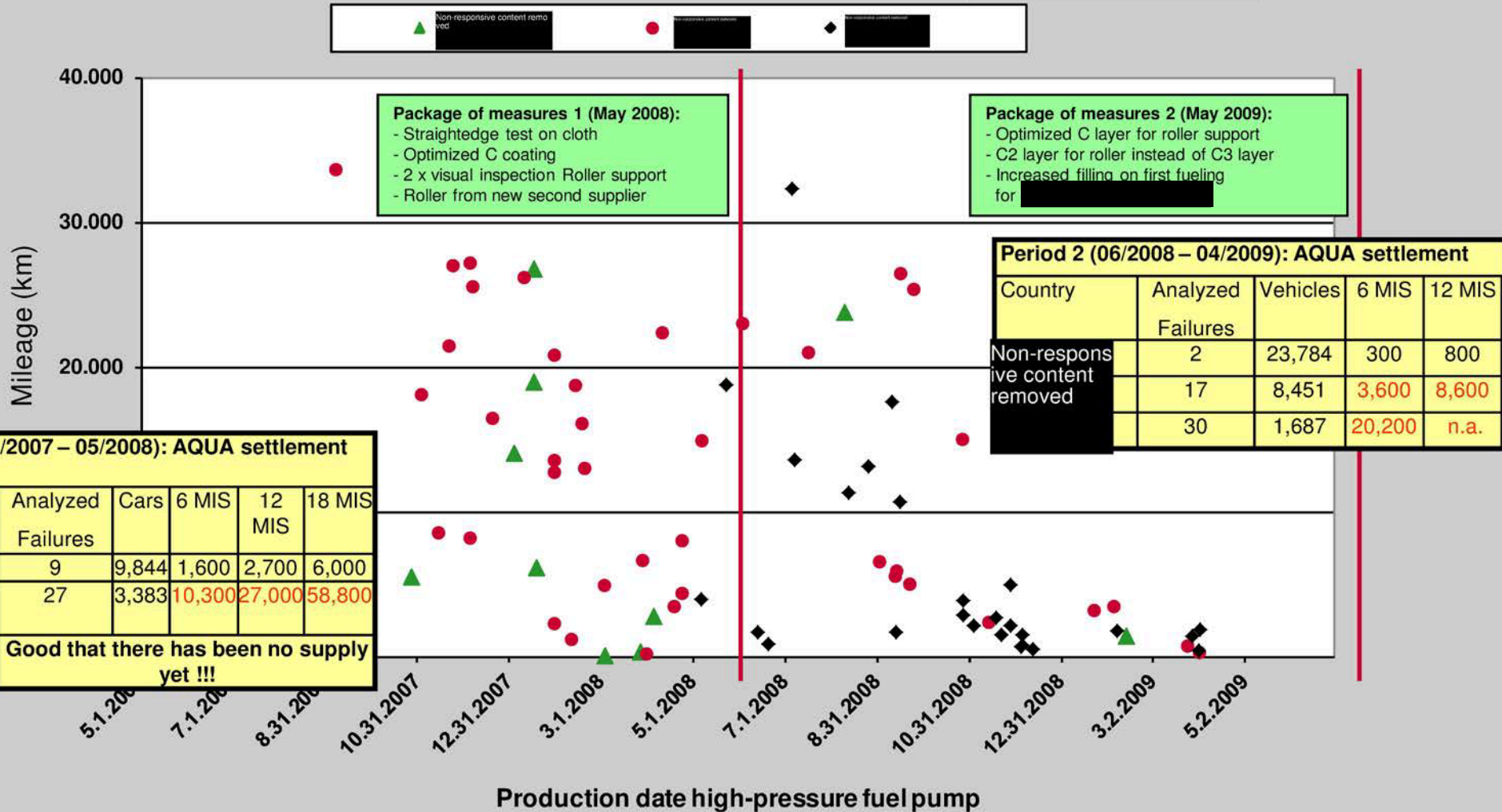
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- **U.S.!**

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Audi - Bosch reliability program

Field failures of V6 high-pressure diesel pump CP4.2 - Markets: Non-responsive content removed



Audi - Bosch reliability program

CP4 Diesel high-pressure fuel pump in CR injection systems from 1800 bar (EU5)

Summary:

Global settlements Audi MY2008 – MY2010 (Date: 09/09/2009):

V6-TDI: **394 cases** Non-responsive content removed
 R4-TDI: **193 cases**

7.0 DC / 1,000 veh. (22 MIS) Non-responsive content removed
 1.1 DC / 1,000 veh. (24 MIS)

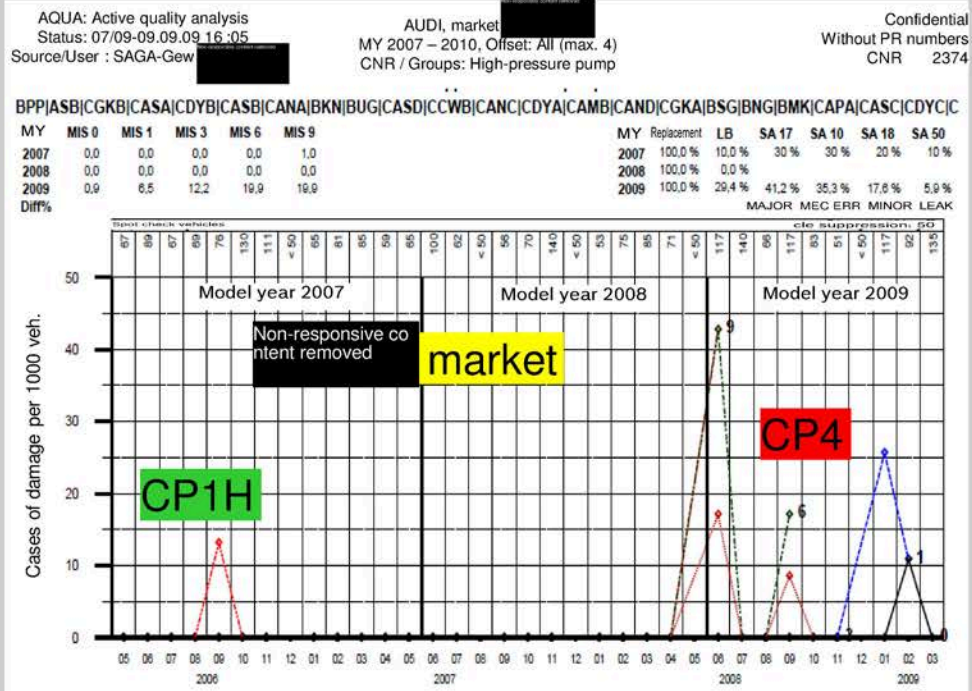
Pump robustness:

In comparison to the predecessor pump types CP1H and CP3 with excenter/polygon drive, the CP4 with roller/cam drive is not sufficiently robust for global fuels.

Recommended decision:

The CP4 should be developed further for a "defined poor fuel" such that all approval checks that are passed today with standard EN590 fuel are also fulfilled with this special fuel.

Start trial program and introduce robustness measures by mid-2010. If not fulfilled, Audi demands conversion back to CP1/3.



TOP meeting on 9/24/2009



V6-TDI Bin5 – MY09 / MY10

WK 42/09

Trouble ticket – Failure of high-pressure fuel pump in EC ER

V6-TDI – Bin5 MY09/10**WK 42/09****Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5**

Vehicle 1: Q7 AU716 90390 MY10 (Engine CAT 582) Mileage: 88,427 mls (141,925 km)

Drive profile: NK6 48,907 km, KL1 20,202 km, KL4 28,623 km, WL1 44,988 km

Problem: The high-pressure fuel pump does not build up pressure.

Analysis: Visual check reveals chips in high-pressure fuel pump HPP and metering unit MU. The maintenance intervals of the fuel filter has been observed.

Visual check of fuel in fuel filter indicates no water deposits

Fuel sample: Lubricity HFRR=549 OK (Anti Wear Package)

Water content OK (35 mg/kg), no FAME

Analysis by Bosch: Date of manufacture 04/2008 (**prior to introduction of the “straightedge test”**)

Failure of the high-pressure with drivetrain damage confirmed (see 3-4):

- Circumferential abrasive wear on cam track and roller
- Large areas of C coating in roller support worn
- Slight signs of corrosion

“Cause no longer apparent, indicators of periods of use with water in fuel”

Further action:

Diagnostic meeting Audi / Bosch

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WK 43

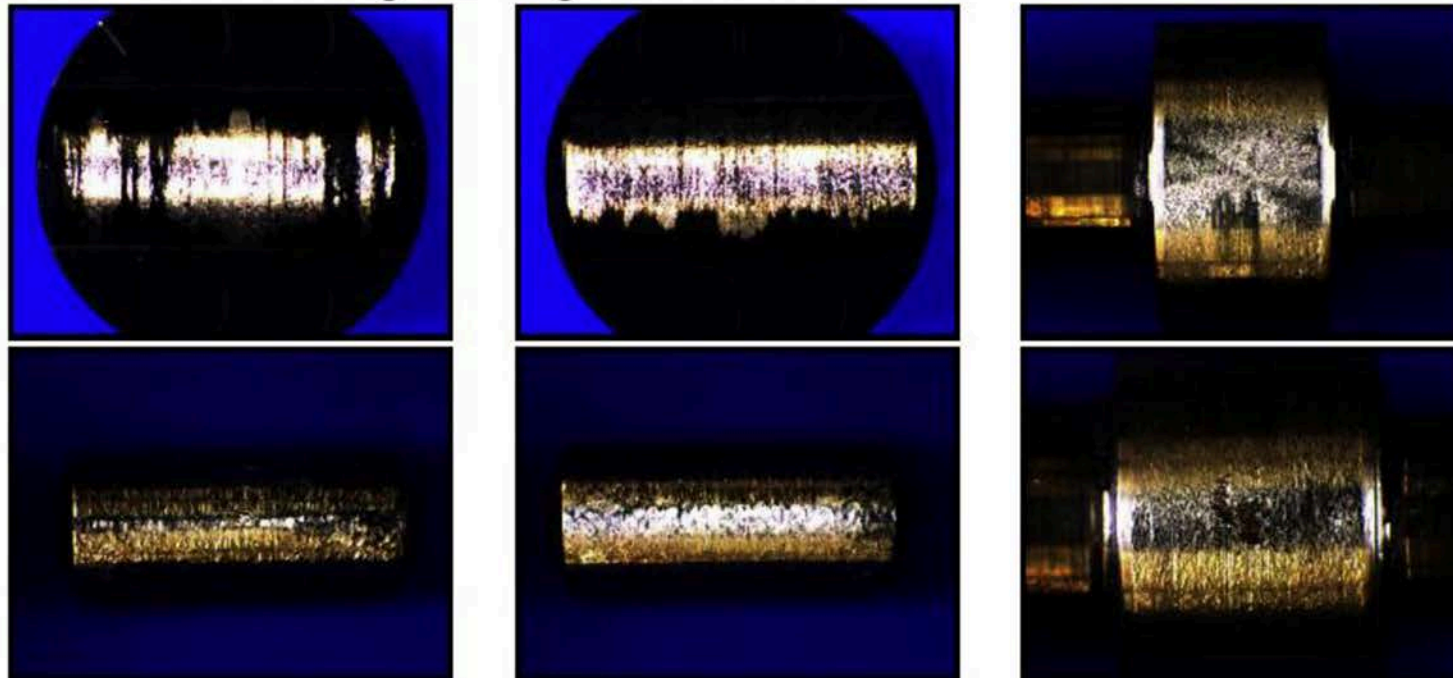
V6-TDI – Bin5 MY09/10

WK 42/09

Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5

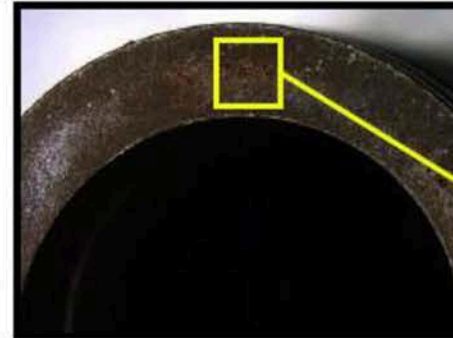
Analysis by Bosch: Q7 AU716 90390 MY10 (Engine CAT 582)

- Standard pump 0445010613
- Date of manufacture 04/2008 (i.e. before the introduction of the straightedge test and further quality improvement measures with respect to metal splashes / fusing on the roller or roller support)
- Drivetrain damage category I
- Circumferential abrasive wear and fatigue breakouts on cam track and roller
- Large areas of C coating in roller support worn

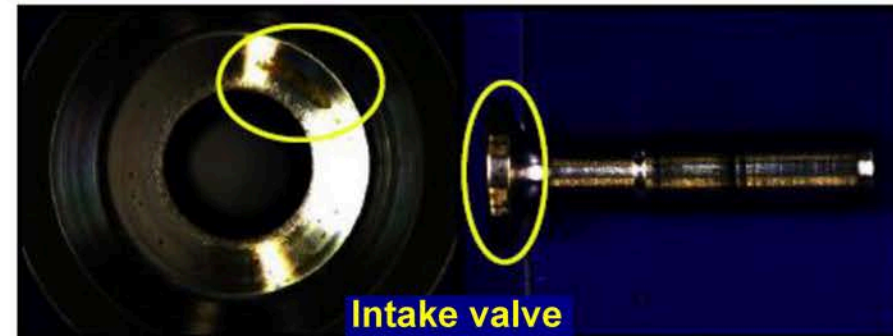


V6-TDI – Bin5 MY09/10**WK 42/09****Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5****Analysis by Bosch:** Q7 AU716 90390 MY10 (Engine CAT 582)

- Little evidence of periods of use with free water in fuel (corrosion)
- The advanced state of the damage means that there is no longer any possibility of identifying anything unusual about the manufacture of the roller support or roller

**Summary:**

- The cause of the damage is no longer ascertainable
- Indications of periods of use with free water in fuel. Evidence is too weak to enable definite conclusions to be drawn in relation to the cause of the damage.



V6-TDI – Bin5 MY09/10**WK 42/09****Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5****Vehicle 2:** Q7 AU716 90229 MY10 (Engine CAT 587)

Mileage Veh.: 89,766 mls (144,075 km)

Mileage HPP: 42,140 mls (67,635km): KL4: 29.979 km, WL1: 37,656 km

Problem: Loss of power while driving on the highway Engine will not start.**Analysis:** Visual check: Chips in high-pressure fuel pump HPP and metering unit MUAt mileage 76,440 km, a pattern type with additional robustness measures was installed (see p.6).

Maintenance intervals for fuel filter observed.

Visual check of fuel in fuel filter indicates no water deposits

Fuel sample: Lubricity HFRR=533 OK (Anti Wear Package)

Water content OK (40mg/kg), no FAME

Analysis by Bosch: Date of manufacture 02/2009 (**pattern type with additional anti-wear measures**)

Failure of the high-pressure with drivetrain damage confirmed (see 6-7):

- Circumferential abrasive wear on cam track and roller
- Large areas of C coating in roller support worn

“Cause no longer apparent, indicators of periods of use with free water in fuel”

Further procedure:

Blocking of additional anti-wear measures until the precise reason for the failure has been identified. Diagnostic meeting Audi / Bosch

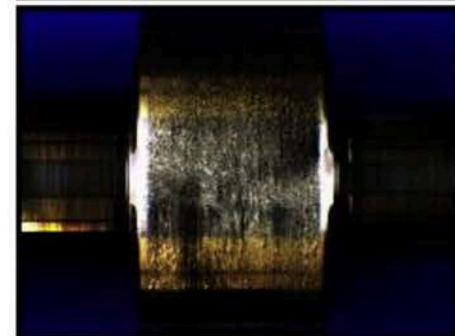
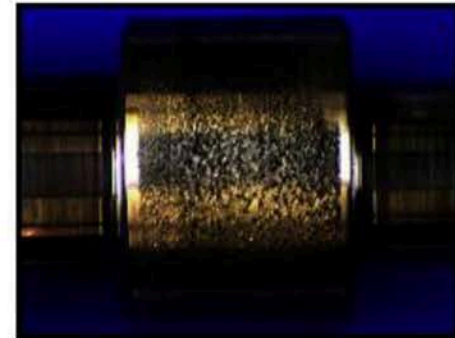
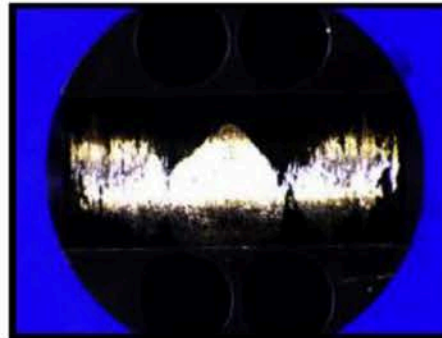
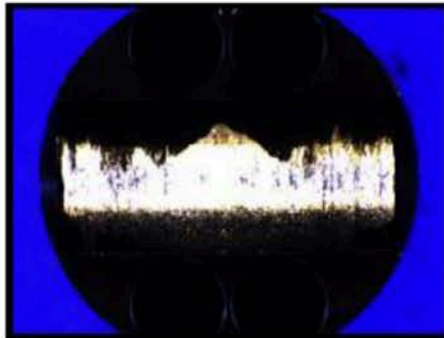
EA/GQ WK 43

V6-TDI – Bin5 MY09/10**WK 42/09****Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5****Analysis by Bosch:** Q7 AU716 90229 MY10 (Engine CAT 587)

- Sample pump 0445B20169_20
- Date of manufacture 02/2009
- Drivetrain damage category I
- Circumferential abrasive wear on cam track and roller
- Large areas of C coating in roller support worn

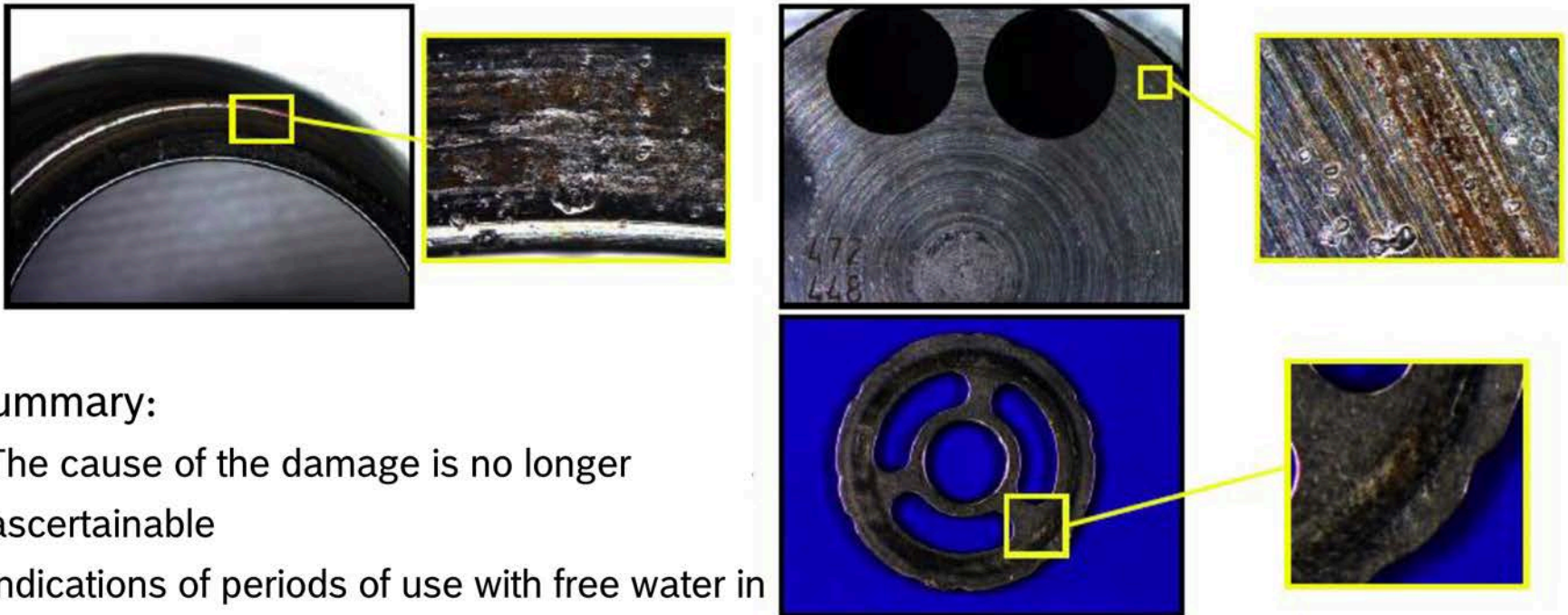
Additional anti-wear measures:

- Roller support with C3 layer
- Roller ends with C3 layer
- Omission of ball peening of camshaft
- Omission of anti-friction coating on spring plate
- Roller support round (instead of partly round)
- Omission of MnPh on tappet body



V6-TDI – Bin5 MY09/10**WK 42/09****Trouble ticket - High-pressure fuel pump EC ER Q7 3.0l TDI Bin5****Analysis by Bosch:** Q7 AU716 90229 MY10 (Engine CAT 587)

- Little evidence of periods of use with free water in fuel (corrosion)
- The advanced state of the damage means that there is no longer any possibility of identifying anything unusual about the manufacture of the roller support or roller

**Summary:**

- The cause of the damage is no longer ascertainable
- Indications of periods of use with free water in fuel. Evidence is too weak to enable definite conclusions to be drawn in relation to the cause of the damage.

From: Non-responsive content removed
To: [Redacted]
CC: [Redacted]
Date: 4/8/2010 2:42:09 PM
Subject: Failure of HPP CP4.1 in vehicle ER in [Redacted]

Hello [Redacted]

The HPP supplied by [Redacted] had dirt particles in the intake valve.

These particles are sand grains with a size in the area of 200 to 300 µm.

With best wishes

Non-responsive content removed



EA11003EN-00800[1]

CDC14 RPU
VN [REDACTED]
Running time: 5,645 km
Veh. ER in [REDACTED]
[REDACTED] Diesel
Bosch CP4.1 ...507
BPT 1380 260109

Particles from the intake valve seat

Length: 270.15 μm

Length: 200.98 μm



EA11003EN-00801[0]

CDC14 RPU

VN [REDACTED]

Mileage: 5,645 km

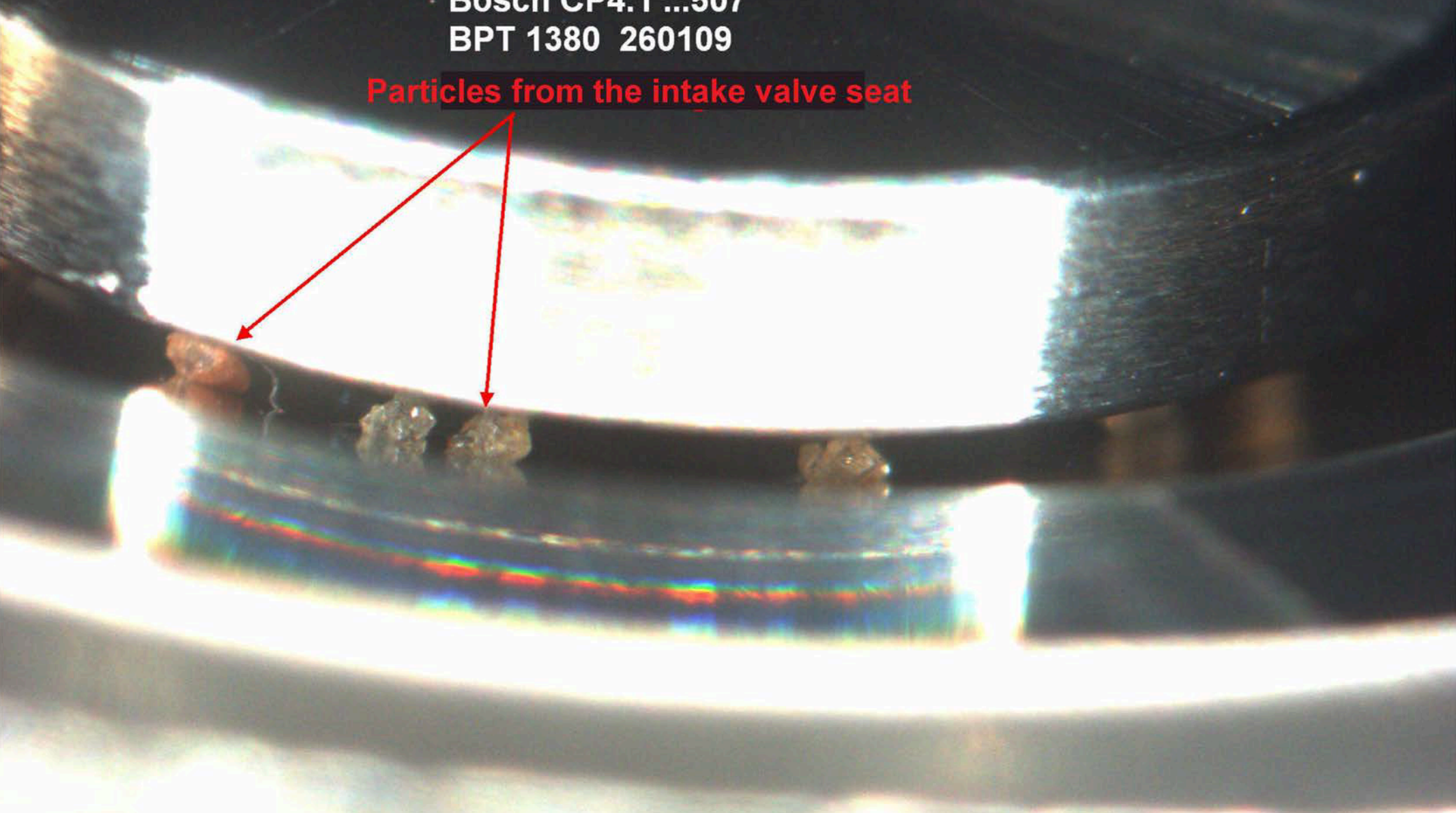
Veh. ER in [REDACTED]

[REDACTED] diesel

Bosch CP4.1 ...507

BPT 1380 260109

Particles from the intake valve seat



CDC14 RPU

VN [REDACTED]

Mileage: 5,645 km

Veh. ER in [REDACTED]

[REDACTED] diesel

Bosch CP4.1 ...507

BPT 1380 260109

Particles from the intake valve seat

EA11003EN-00802[0]



Length: 270.15 μ m



Length: 200.98 μ m

From: Non-responsive content removed

To:

CC:

Date: 4/22/2010 11:49:38 AM

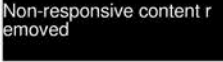
Subject: Re: Photographs of the ER end 059.H W36 509 311h DHT with EU3 fuel

Attachments:  [pumpe_210410.ppt](#)

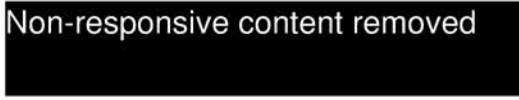
Hi all,

Here is the first analysis of the 1st ER end pump with the EU3  fuel from the engine endurance run 311h DHT (diesel high-speed test).


1st result: Traces of mixed friction in the running surface of the RS

Regards, 

Best regards



AUDI AG



Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Local District Court Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn

Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen, Michael Dick, Frank Dreves, Peter Schwarzenbauer, Axel Strotbek, Werner Widuckel

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From: Non-responsive content removed

Sent: Thursday, April 22, 2010 10:57 AM

To: Non-responsive content removed

Cc:

Subject: RE: Photographs of the ER end 059.H W36 509 311h DHT with EU3 fuel

Hello 

Attached are the photographs of the findings:

Best regards / mit freundlichen Grüßen

Non-responsive content removed

Robert Bosch GmbH

Non-responsive content removed

Registered Office: Stuttgart, Registration Court: Local District Court Stuttgart, Commercial Register No. 14000;
Chairman of the Supervisory Board: Hermann Scholl; Managing Directors: Franz Fehrenbach, Siegfried Dais;
Bernd Bohr, Rudolf Colm, Volkmar Denner, Gerhard Kümmel, Wolfgang Malchow, Peter Marks,
Peter Tyroller; Uwe Raschke

From: Non-responsive content removed

Sent: Thursday, April 22, 2010 10:54 AM

To: Non-responsive content removed

Cc:

Subject: Photographs of the ER end 059.H W36 509 311h DHT with EU3 fuel

Hello ^{Non-responsive content removed}

Could you please send me the photographs of the pump that you showed me yesterday?

Thank you and best wishes,
Best regards

Non-responsive content removed

AUDI AG

Non-responsive content removed

Sitz/Domicile: Ingolstadt
Registergericht/Court of Registry: Local District Court Ingolstadt
HRB Nr./Commercial Register No.: 1
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn
Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen, Michael Dick, Frank Dreves, Peter Schwarzenbauer,
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Status of failure RPU (VN817-8-0164)

Description of problem:

- RPU -test vehicle failure (EVT)
- Engine running on 3 cylinders and then failed. Not possible to start it again.
- The vehicle was OK after replacing the injection system.

Vehicle data:

- Vehicle no.: VN [REDACTED]
- Engine: 2.0l CR, 120 kW
- Mileage: 22,400 km
- Fuel: VW [REDACTED] diesel fuel (HFRR 550 - 650)

Analysis result:

- High-pressure pump wear on the Bosch CP 4.1 (see photographs)
- Wear on the camshaft, roller and roller support due to insufficient lubrication capacity of the fuel
- Traces of corrosion on the camshaft and HP pistons

Determined by validation information, anti-wear packages 0 and 1 must be applied to Bosch CP4.x high-pressure fuel pumps in [REDACTED] including [REDACTED]

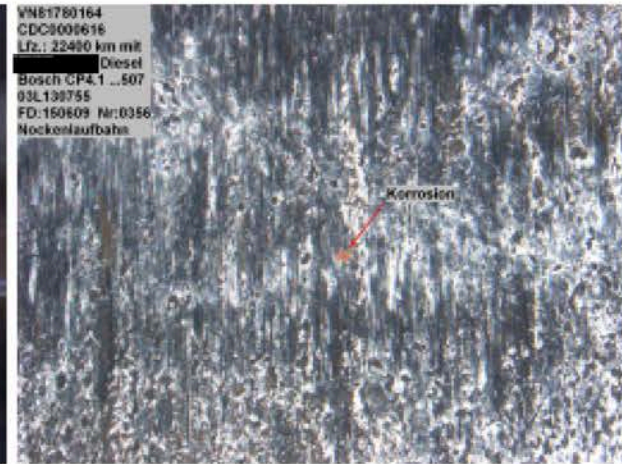
Non-responsive content removed



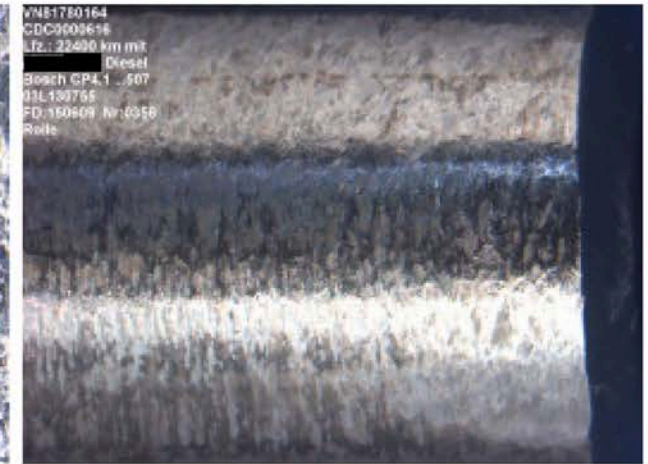
Status of failure RPU (VN817-8-0164)



Camshaft



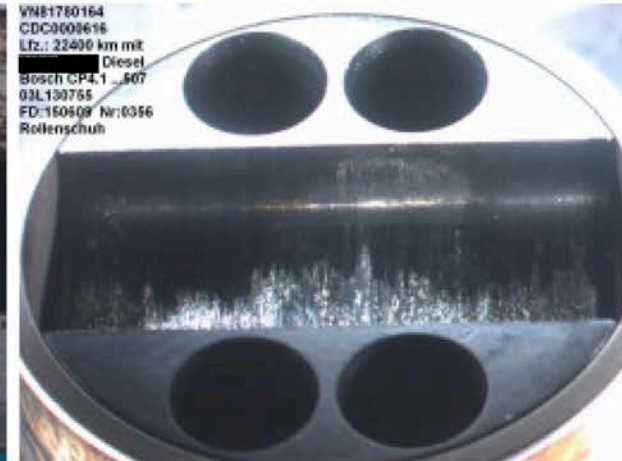
Camshaft



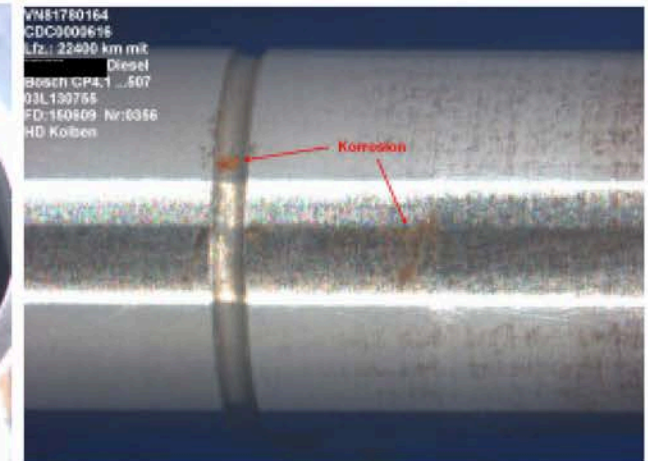
Roller



Roller



Roller support



HP piston

Non-responsive content removed



Status of failure RPU (VN817-8-0164)

Failure hypothesis:

The cause for the high-pressure fuel pump failure is the poor lubrication capability (HFRR = 659 μm) of the validation fuel.

The fact that other verification pumps did not fail is due to fluctuating operating conditions:

These parts were not consistently run using the intended Non-responsive content removed validation fuel, but were run in an earlier verification phase for approx. 15,000 km with DIN EN 590 fuel.

Therefore, due to the well-lubricating fuel, the high-pressure fuel pumps obtained increased robustness on account of a smoothing of the pump drive parts (running-in effect).

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Status of failure RPU (VN817-8-0164)

Status of verification vehicles RUP in Non-responsive content removed

VN Non-responsive content removed (engine no. CDC0000616):
 0 km – 22,400 km VW Non-responsive content removed diesel fuel

VN Non-responsive content removed (engine no. CDC 0000630):
 0 km – 2,400 km VW Non-responsive content removed diesel fuel
 2.400 km – 16,000 km DIN EN 590 (EU5 fuel)
 16,000 km – end of ER VW Non-responsive content removed diesel fuel

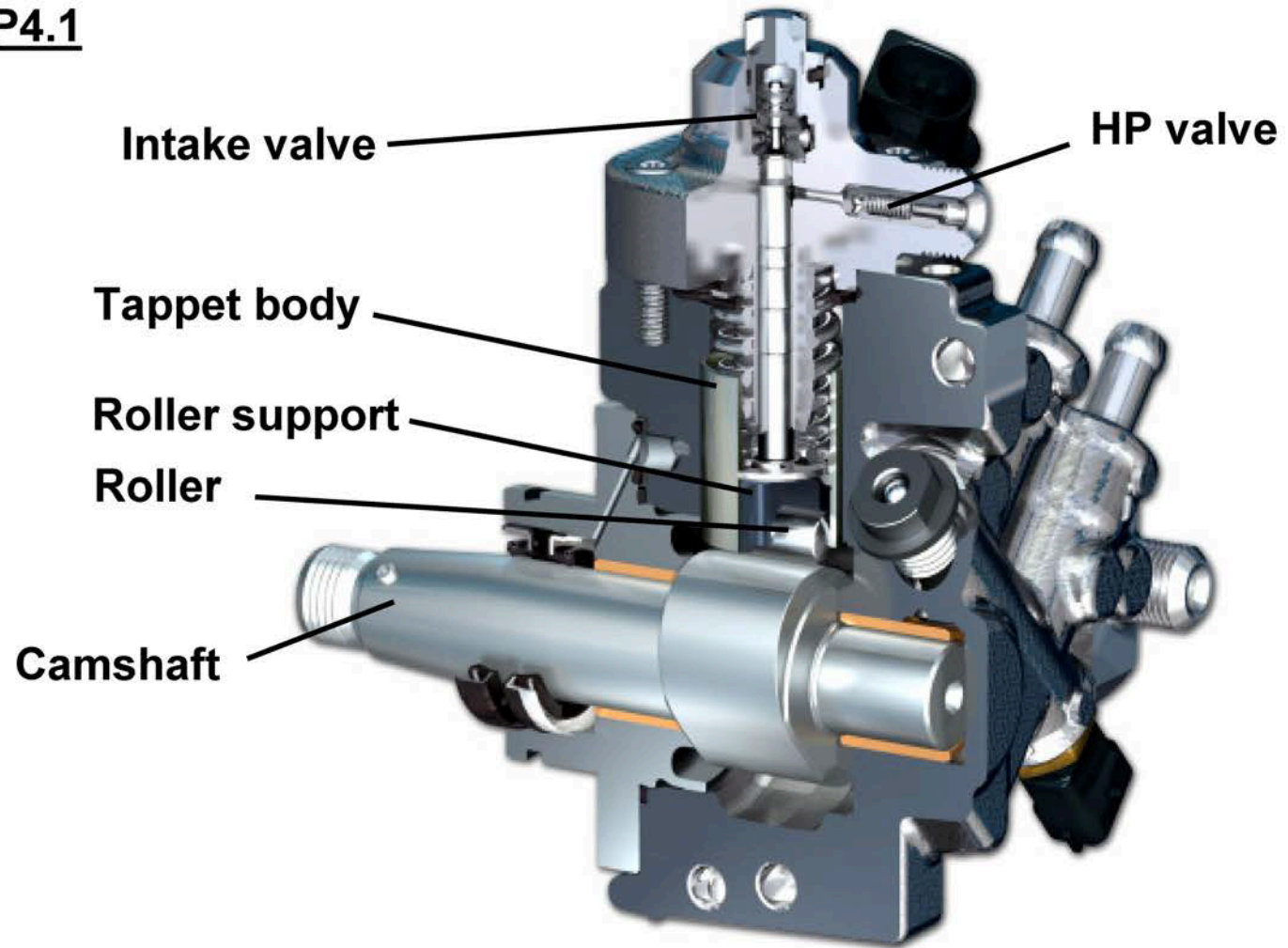
VN Non-responsive content removed (engine no. CDC0000650):
 0 km – 2,000 km VW Non-responsive content removed diesel fuel
 2,000 km -19,500 km DIN EN 590 (EU5 fuel)
 19,500 km – 100,000 km VW Non-responsive content removed diesel fuel

Non-responsive content removed



Status of failure RPU (VN [REDACTED])

Bosch CP4.1



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EA11003EN-00806[0]

From: Non-responsive content removed**To:****CC:****Date:** 9/1/2010 1:05:14 PM**Subject:** CP4.1 findings from RPU VN [REDACTED]**Attachments:** [Status_RPU_VN81780164.pdf](#)

Hello gentlemen,

Attached is the diagnostic report for the vehicle failure RPU VN 817-8-0164 in [REDACTED].
The cause for the damage is the poor lubrication capabilities of the fuel.
We have presented this report today in the "key points discussion Testing" NE.
On account of the requirement to use CP4.1 with RP0 and RP1, this topic will be added to the agenda for the NE damage meeting tomorrow.

Best regards,

Non-responsive content removed

Volkswagen AG

Non-responsive content removed

VOLKSWAGEN AG

Sitz/Domicile: Wolfsburg

Registergericht/Court of Registry: Local District Court Braunschweig

HRB Nr./ Commercial Register No.: 100484

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Ferdinand Piëch

Vorstand/Board of Management: Martin Winterkorn (Chairman/CEO), Francisco J. Garcia Sanz, Jochem Heizmann, Horst Neumann, Hans Dieter Pötsch

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Status of failure RPU (VN817-8-0164)

Description of problem:

- RPU -test vehicle failure (EVT)
- Engine running on 3 cylinders and then failed. Not possible to start it again.
- The vehicle was OK after replacing the injection system.

Vehicle data:

- Vehicle no.: VN [REDACTED]
- Engine: 2.0l CR, 120 kW
- Mileage: 22,400 km
- Fuel: VW EU2 validation diesel fuel (HFRR 550 - 650)

Analysis result:

- High-pressure pump wear on the Bosch CP 4.1 (see photographs)
- Wear on the camshaft, roller and roller support due to insufficient lubrication capacity of the fuel
- Traces of corrosion on the camshaft and HP pistons

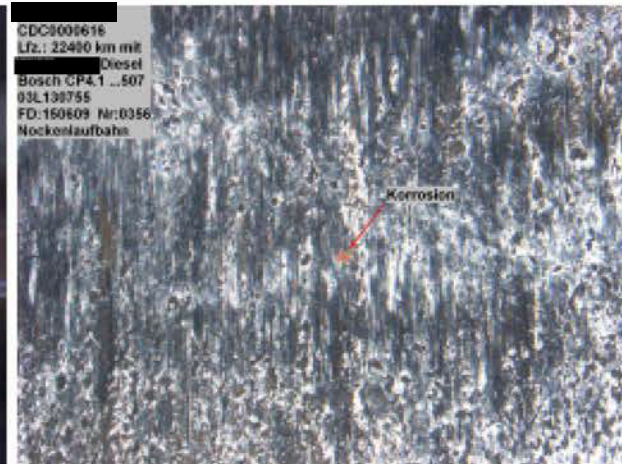
Determined by validation information, anti-wear packages 0 and 1 must be applied to Bosch CP4.x high-pressure fuel pumps in all EU4 markets, including [REDACTED]



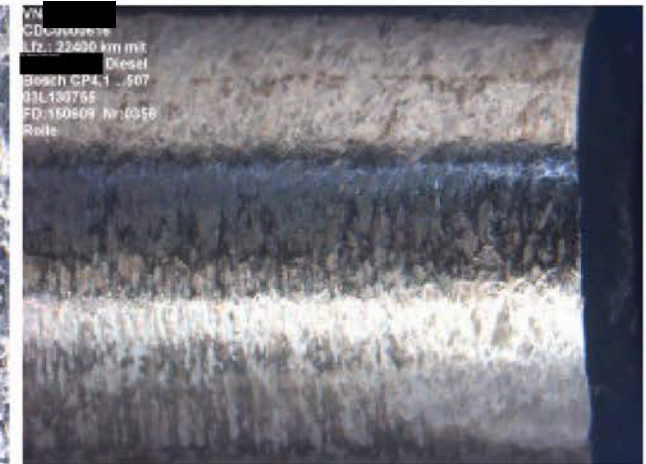
Status of failure RPU (VN [REDACTED])



Camshaft



Camshaft



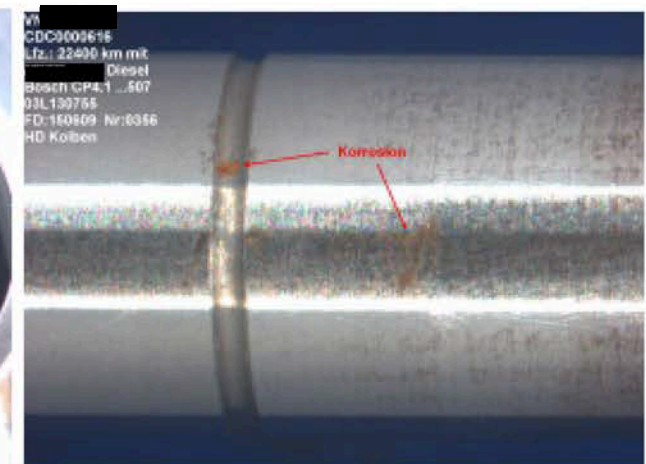
Roller



Roller



Roller support



HP piston

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Analysis of CP 4.1 from RPU VN [REDACTED]

Vehicle data:

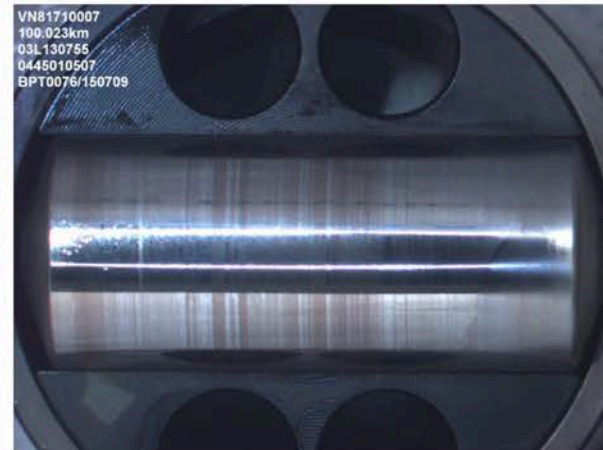
- Vehicle no.: VN [REDACTED]
- Engine: 2.0l CR, 120 kW
- Mileage: 100,023 km EVT
- Fuel: 0 km – 2,000 km VW [REDACTED] diesel fuel
2,000 km -19,500 km DIN EN 590 (EU5 fuel)
19,500 km – ER end VW [REDACTED] diesel fuel

Analysis result:

- one-sided smoothing on the camshaft running surface
- Traces of corrosion and deposits on the roller and HP pistons



Camshaft



Roller



HP Piston

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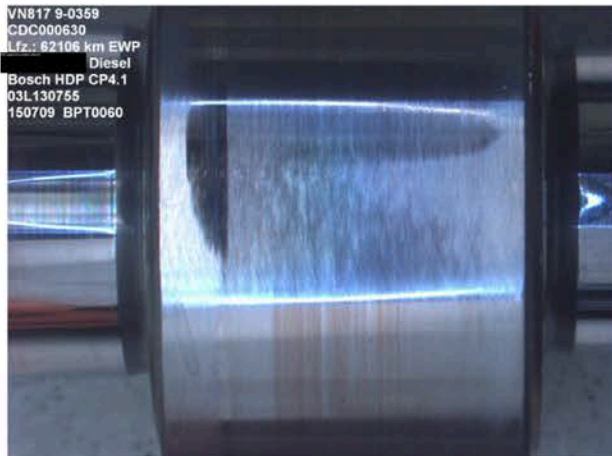
Analysis of CP 4.1 from RPU VN [REDACTED]

Vehicle data:

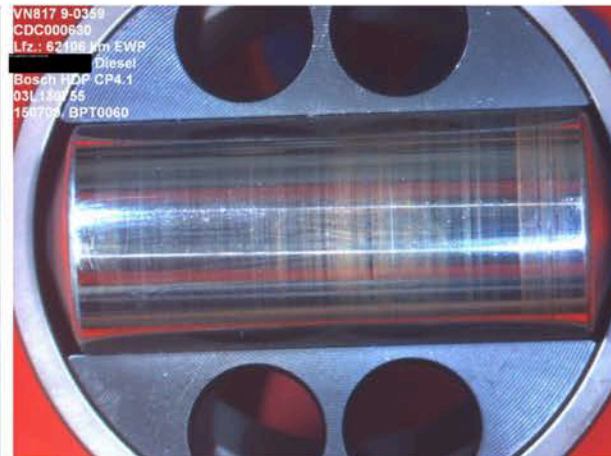
- Vehicle no.: VN [REDACTED]
- Engine: 2.0l CR, 120 kW
- Mileage: 62,106 km EVT
- Fuel: 0 km – 2,400 km VW [REDACTED] diesel fuel
 2,400 km -16,000 km DIN EN 590 (EU5 fuel)
 16,000 km – ER end VW [REDACTED] diesel fuel

Analysis result:

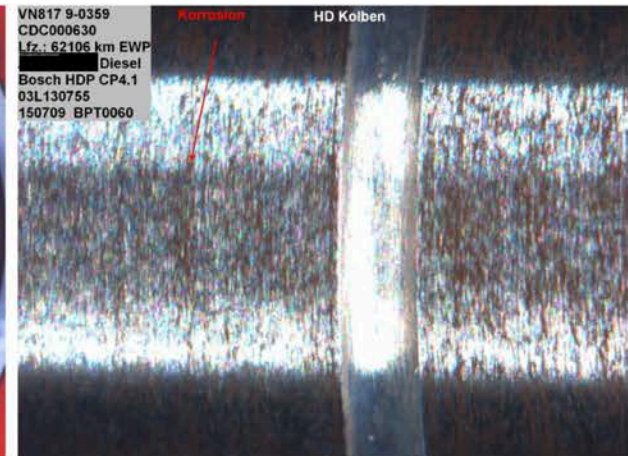
- one-sided smoothing on the camshaft running surface
- Traces of corrosion and deposits on the roller and HP pistons



Camshaft



Roller



HP piston

Non-responsive content removed



From: Non-responsive content removed
To: Non-responsive content removed
Cc:
Subject: Re: Request for results slide IAV
Date: Wednesday, October 20, 2010 8:35:51 AM
Attachments: [Überlasttests@Audi_150910.ppt](#)

Hello [redacted] here are the IAV results: File from 9/15/2010

Rega [redacted]

Best regards

Non-responsive content removed

AUDI AG

[redacted]
74148 Neckarsulm

Non-responsive content removed

<http://www.audi.com>

Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Local District Court Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn

Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen, Michael Dick, Frank Dreves, Peter Schwarzenbauer, Thomas Sigi, Axel Strotbek

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From: Non-responsive content removed
Sent: Wednesday, October 20, 2010 8:25 AM

To: Non-responsive content removed
Subject: RE: Request for results slide IAV

Hello [redacted]

Here is the requested presentation. The difference with reduced inlet pressure was not as clear, but the statistics will show us more.

Mit freundlichen Grüßen / Best regards

Non-responsive content removed

Robert Bosch GmbH

Non-responsive content removed

70442 Stuttgart

[GERMANY](#)

www.bosch.com

Non-responsive content removed

Registered Office: Stuttgart, Registration Court: Local District Court Stuttgart, Commercial Register No. 14000;
Chairman of the Supervisory Board: Hermann Scholl; Managing Directors: Franz Fehrenbach, Siegfried Dais;
Bernd Bohr, Rudolf Colm, Volkmar Denner, Wolfgang Malchow, Peter Marks,
Peter Tyroller; Stefan Asenkerschbaumer, Uwe Raschke, Wolf-Henning Scheider

From: Non-responsive content removed
Sent: Tuesday, October 19, 2010 4:24 PM

To: Non-responsive content removed
Subject: RE: Request for results slide IAV

Hello
Do you have images of the RP2?

We ran the pump with reduced inlet pressure and wanted to see if it had an impact on the deposits:

Here is the pump that ran with 5bar inlet pressure:

CP42S-4,85-REC-MT20

Draft 301 181 KH

BPT 4325

Thanks and regards,

Non-responsive content removed

Best regards

Non-responsive content removed

AUDI AG

74148 Neckarsulm

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<http://www.audi.com>

Sitz/Domicile: Ingolstadt
Registergericht/Court of Registry: Local District Court Ingolstadt
HRB Nr./Commercial Register No.: 1
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn
Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen, Michael Dick, Frank Dreves, Peter Schwarzenbauer, Thomas Sigi, Axel Strotbek

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From: Non-responsive content removed
Sent: Thursday, August 05, 2010 4:11 PM
To: Non-responsive content removed
Cc: removed
Subject: RE: Request for results slide IAV

Hello Non-responsive content removed

Here are slides that were shown yesterday.

Best regards / mit freundlichen Grüßen

BeQIK

Non-responsive content removed

From: Non-responsive content removed

Sent: Thursday, August 05, 2010 11:05 AM

To: Non-responsive content removed

Cc: ed

Subject: Request for results slide IAV

Hello Non-responsive content removed

Before the minutes, do you think you could send me and Non-responsive content removed the shown slides of the analysis for the Non-responsive content removed

Thanks and regards Non-responsive content removed

Best regards

Non-responsive content removed

AUDI AG

74148 Neckarsulm

Non-responsive content removed

<http://www.audi.com>

Sitz/Domicile: Ingolstadt

Registergericht/Court of Registry: Local District Court Ingolstadt

HRB Nr./Commercial Register No.: 1

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Martin Winterkorn




Vorstand/Board of Management: Rupert Stadler (Vorsitzender/Chairman), Ulf Berkenhagen, Michael Dick, Frank Dreves, Peter Schwarzen-bauer, Axel Strotbek, Werner Widuckel

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TP Audio overload test

Status of check on CP4.2 with series / RP1 / RP2




WK36

Pump test bench testing CP4.2

Pump type	Test type	ER start SET	Fuel type	Actual running time	Target running time	
Serie (C3)	QHALT	15/10	EU3	150	150	2200bar ██████████ *
Serie (C3)	QHALT	15/10	EU3	68	150	2200bar ██████████ * Failure due to drivetrain damage
Serie (C3)	QHALT	16/10	EU3	150	150	2200bar ██████████ * * Parts to BOSCH on 07/28/2010
Serie (C3)	QHALT	18/10	EU3	150	150	2200bar ██████████ **
RP1 (C2)	QHALT	19/10	EU3	150	150	2300bar ██████████ **
RP1 (C2)	QHALT	20/10	EU3	150	150	2300bar ██████████ ** ** Parts to BOSCH on 07/28/2010
RP2 (C2)	QHALT	29/10	EU3	150	150	2300bar BPT4325 finished on 07/23/2010 ***
RP2 (C2)	QHALT	30/10	EU3	150	150	2300bar BPT4324 finished on 08/08/2010 *** Reduced inlet pressure from 6 bar to 4.5 bar
RP2 (C2)	QHALT	31/10	EU3	150	150	2300bar BPT4323 finished on 08/22/2010 *** Reduced inlet pressure from 6 bar to 4.5 bar
RP2 (C2)	QHALT	??/10	EU3	150	150	2300bar BPT4388 finished on 09/02/2010 *** ** Parts to BOSCH on 9/8/2010

Comments:

Supply pressure (rel.)	3,5 bar	4,0 bar	4,5 bar	5,0 bar
ml/15s	600	940	1280	1550
l/h	144	225,6	307,2	372

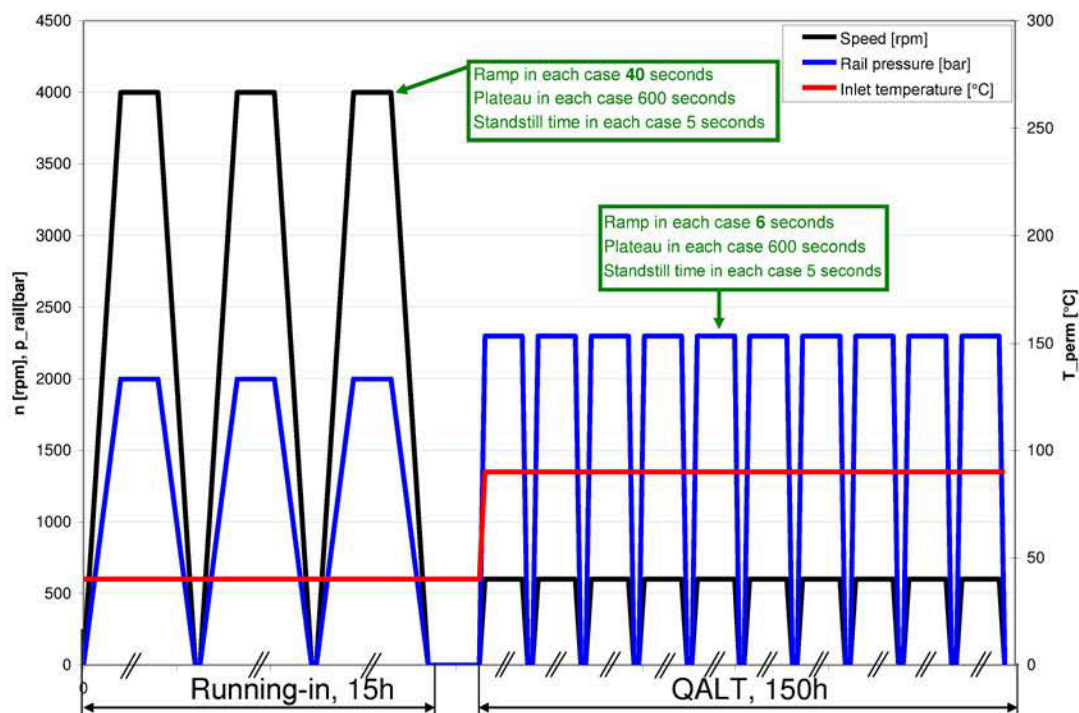
TP Audi overload test

Test conditions

Overload test on drivetrain CP4 LR/RS-QALT

→ Variant 1: Mixed friction at low speeds

- Running-in program (15 h, 4000 rpm, 2000 bar, 40°C, [REDACTED] diesel Cl. 4.)
- Endurance run program (150 h, 600 rpm, 2300 bar, 90°C, [REDACTED] diesel Cl. 4.)



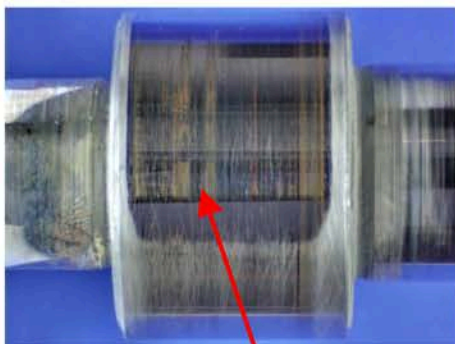
BOSCH

TTC Audio overload test

2010-CP4_0576; series; 0445010611; 05 100205 BPT 0604
AH; RT: 150h

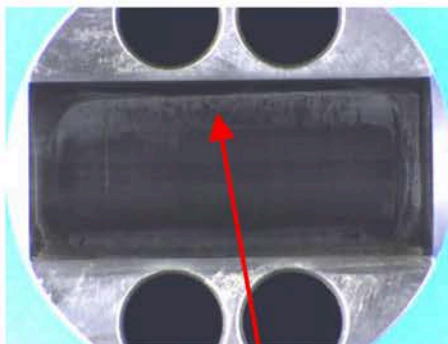
Series (C3)

TDC



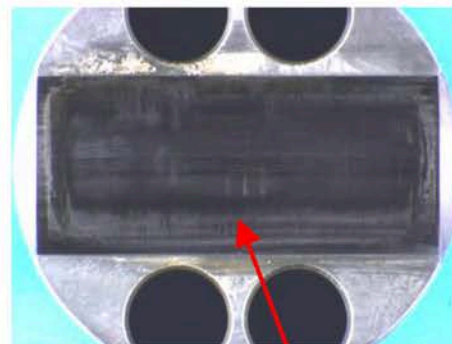
Chatter marks

Cyl.1



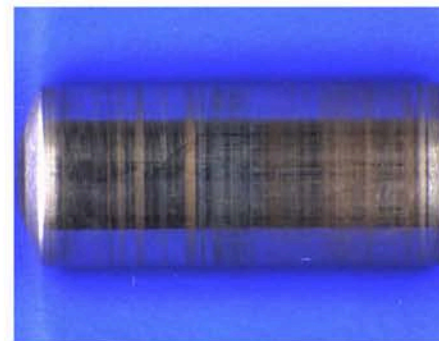
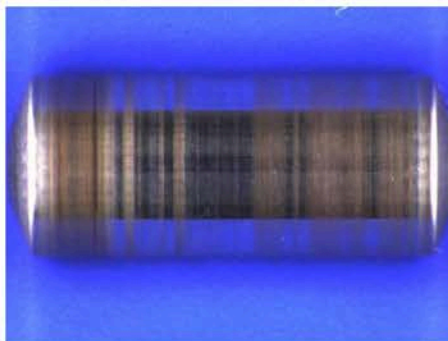
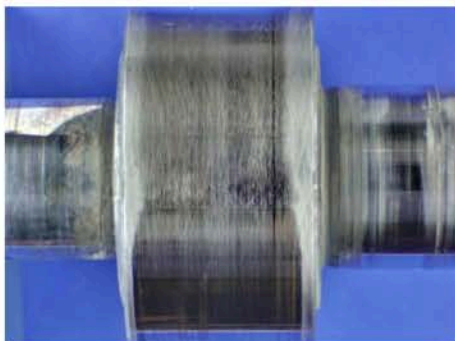
Considerable deposits

Cyl.2



Considerable deposits

BDC

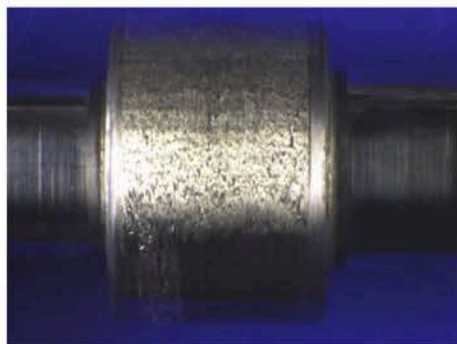


TFT: Audio overload test

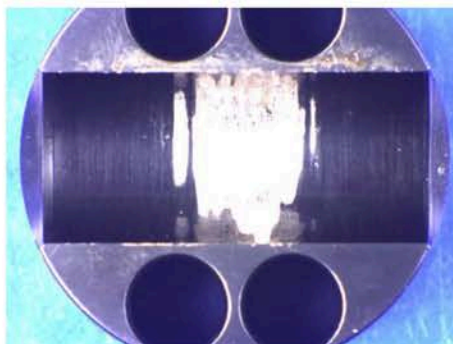
2010-CP4_0577; series; 0445010611; 05 100205 BPT 0607
AH; RT: 68h

Series (C3)

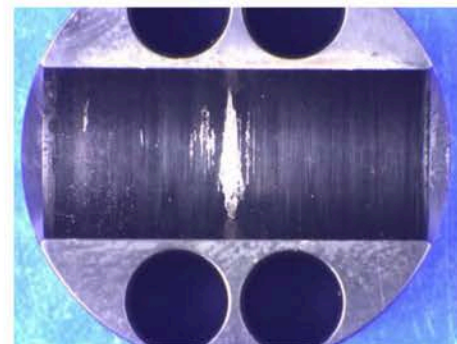
TDC



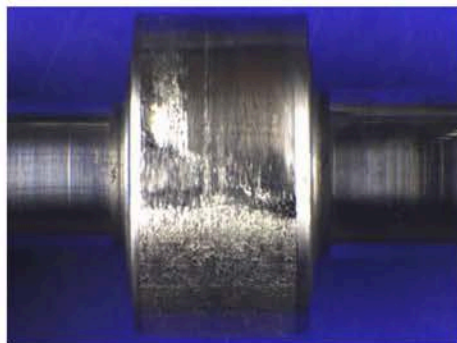
Cyl.1



Cyl.2



BDC



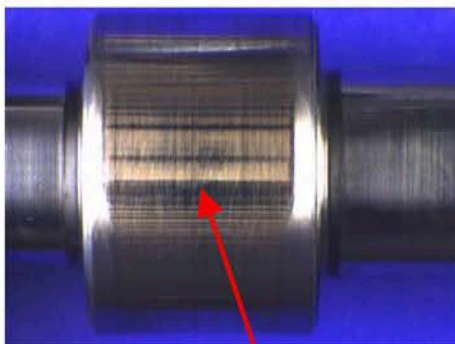
BOSCH

TTC: Audio overload test

2010-CP4_0575; series; 0445010611; 05 100205 BPT 0608
AH; RT: 150h

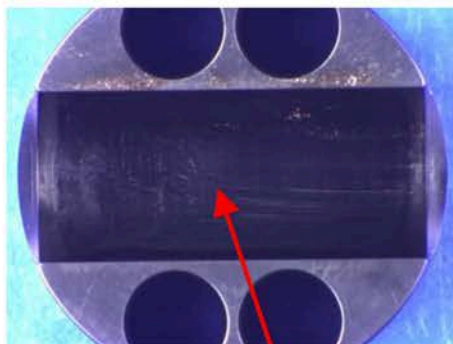
Series (C3)

TDC



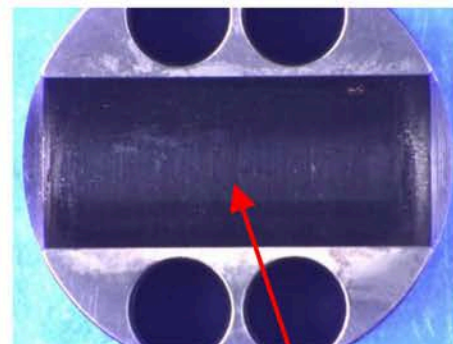
Chatter marks

Cyl.1



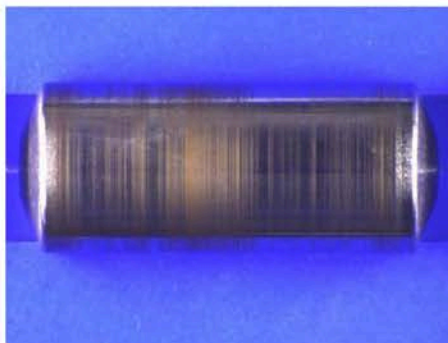
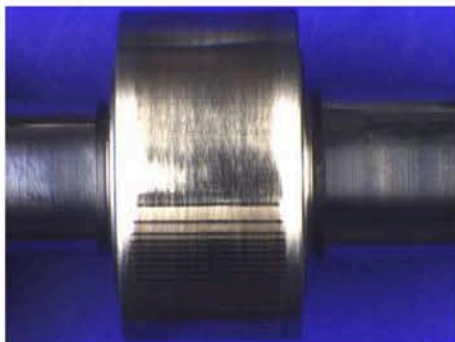
slight deposits

Cyl.2



slight deposits

BDC

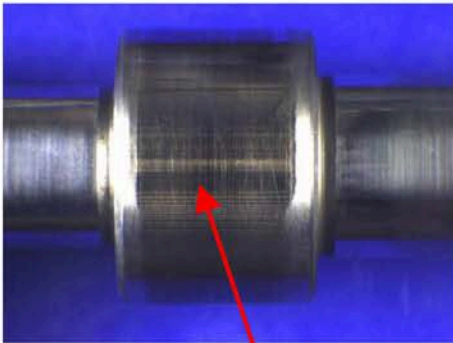


TTC: Audio overload test

2010-CP4_0579; series; 0445010611; 05 100205 BPT 0603
AH; RT: 150h

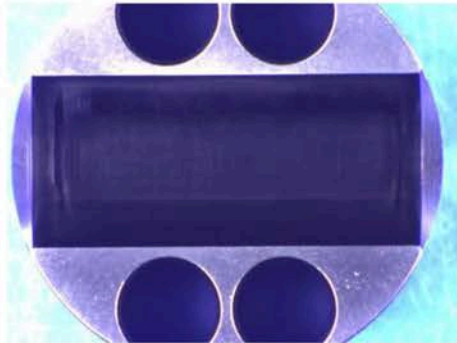
Series (C3)

TDC

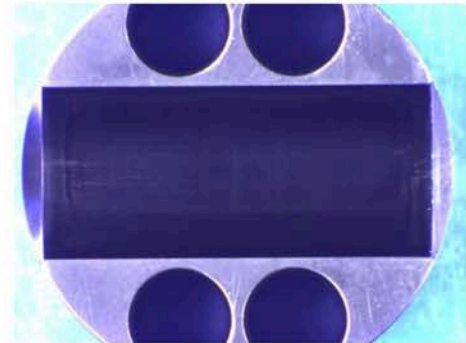


Chatter marks

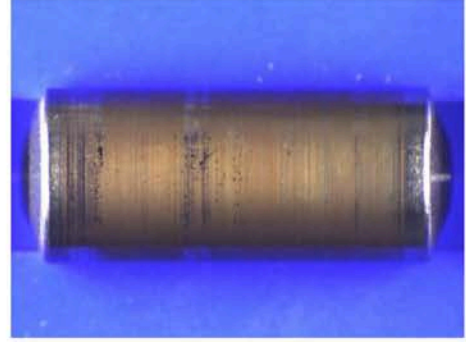
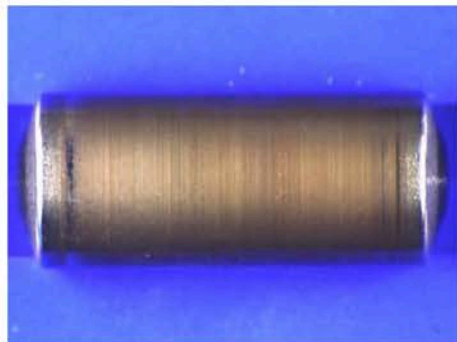
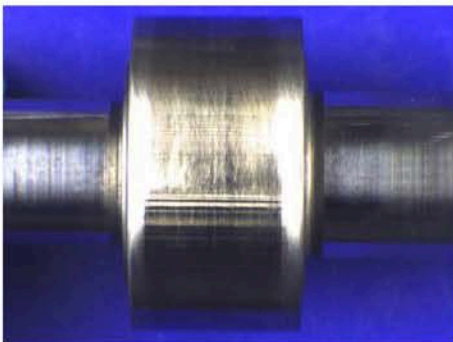
Cyl.1



Cyl.2



BDC



BOSCH

T1: Audio overload test

2010-CP4_0576; series; 0445010611; 05 100205 BPT 0604
AH; RT: 150h

Series (C3)

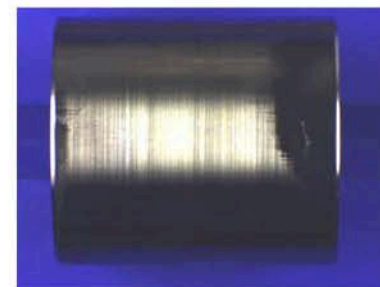
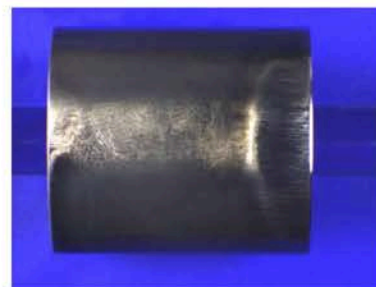
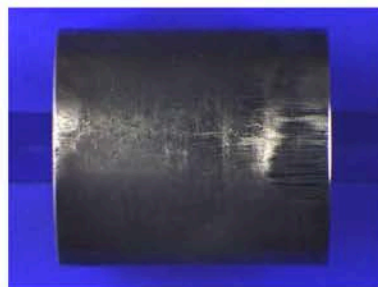
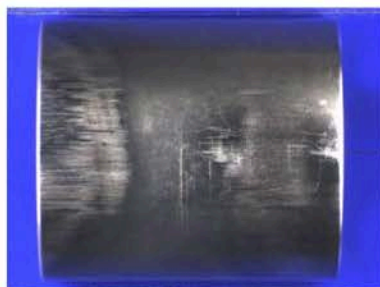
_0576 (150 h)

_0577 (68 h)

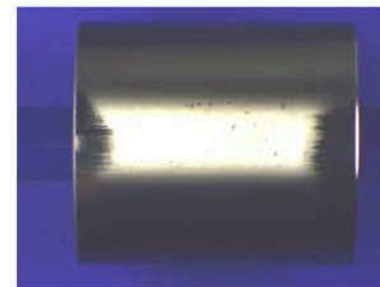
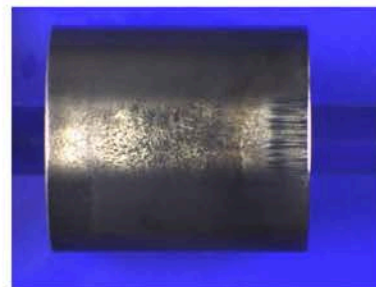
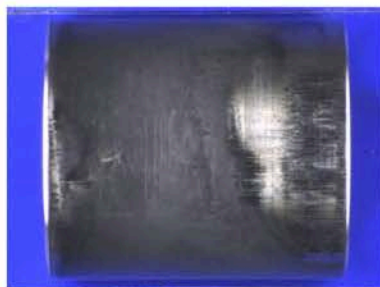
_0575 (150 h)

_0579 (150 h)

Cyl.1



Cyl.2



Considerable aluminum oxide build-up (black) as an indication of high temperatures



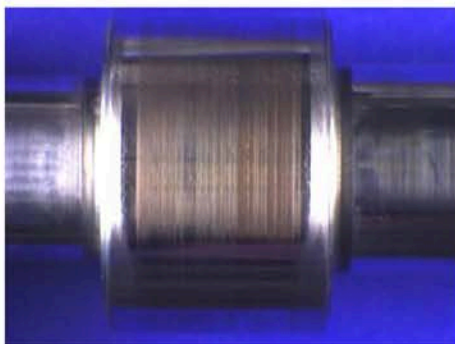
BOSCH

TP: Audio overload test

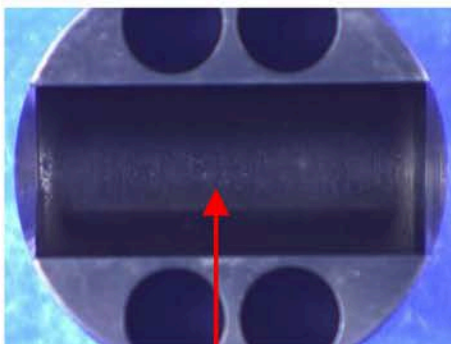
2010-CP4_0578; series; 0445010611; 05 100402 BPT 1142
BB; RT: 150h

RP1

TDC

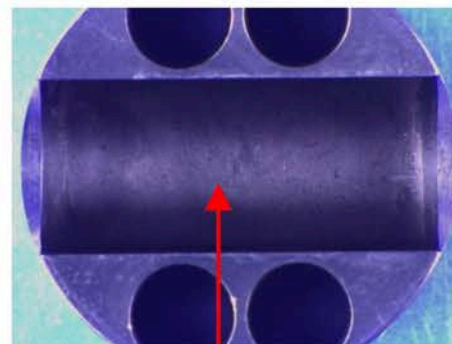


Cyl.1



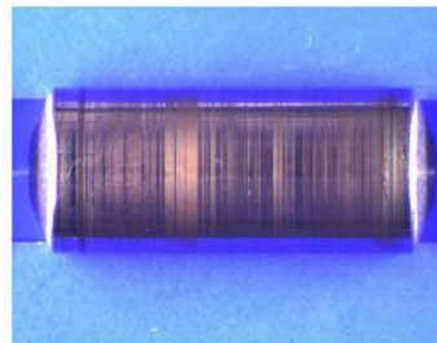
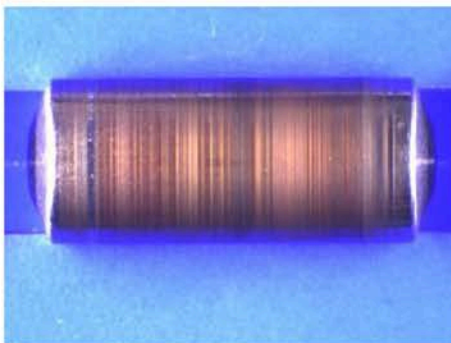
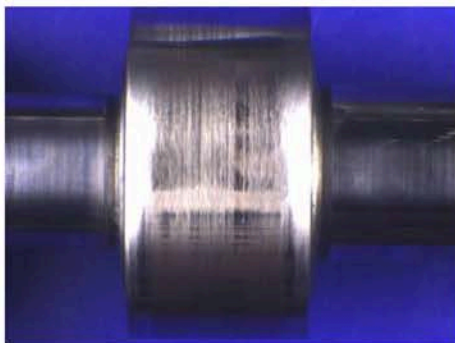
No deposits

Cyl.2



No deposits

BDC

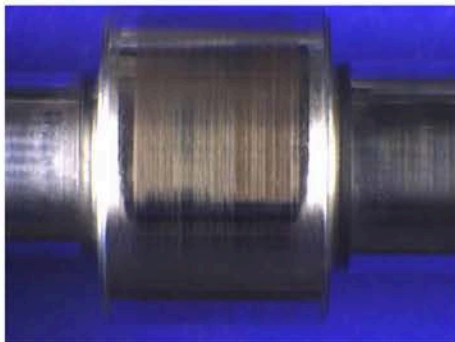


TFT: Audioverload test

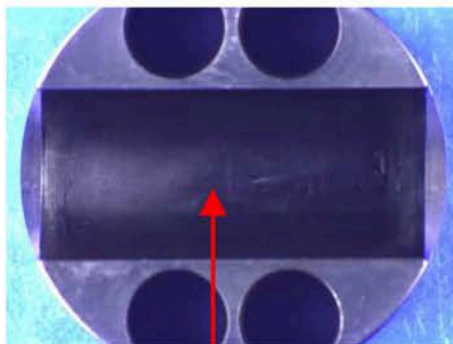
2010-CP4_0580; series; 0445010611; 05 100402 BPT 1138
BB; RT: 150h

RP1

TDC

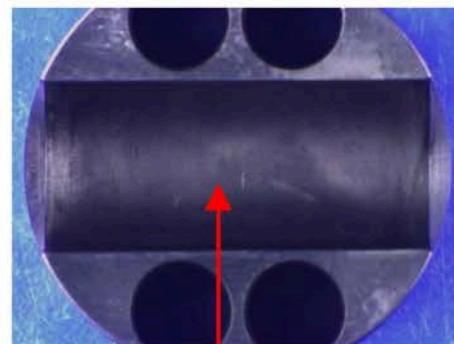


Cyl.1



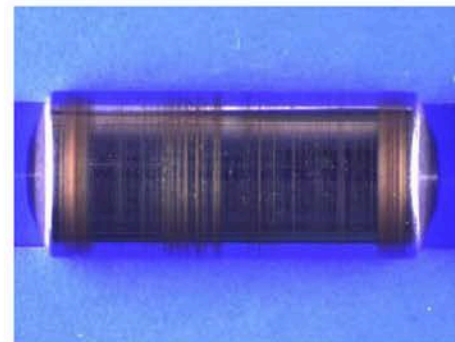
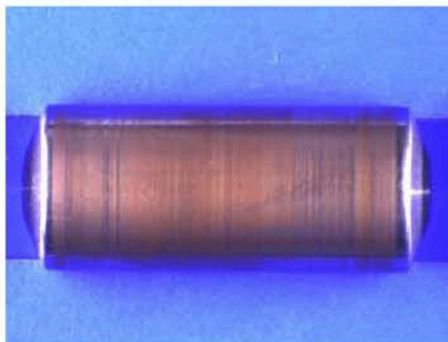
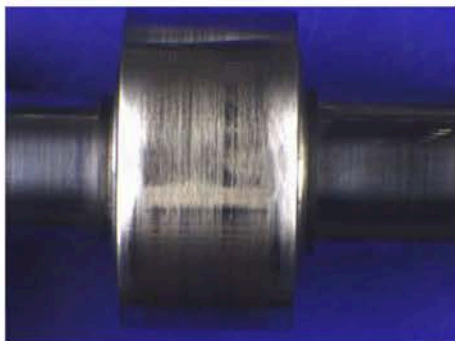
Negligible deposits

Cyl.2



Negligible deposits

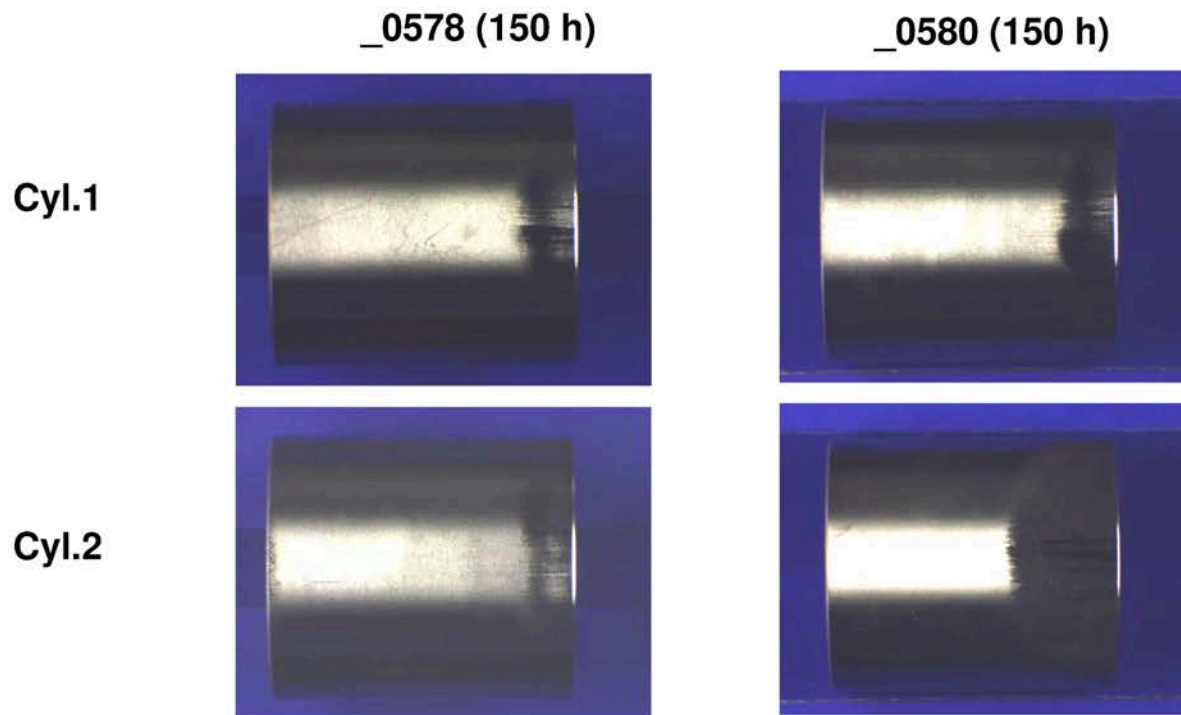
BDC



T1: Audio overload test

2010-CP4_0576; series; 0445010611; 05 100205 BPT 0604
AH; running time: 150h

RP1



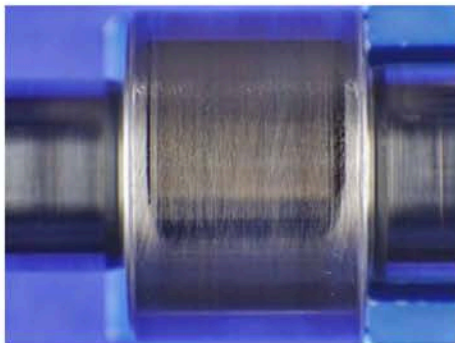
Aluminum oxide build-up (black) as an indication of increased temperatures

T7: Add overload test

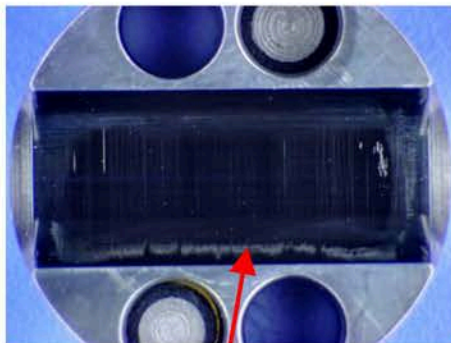
2010-CP4_0633; series; 0445B20318; 007-4325 (W19 EU5)
 running time: 150h

RP2

TDC

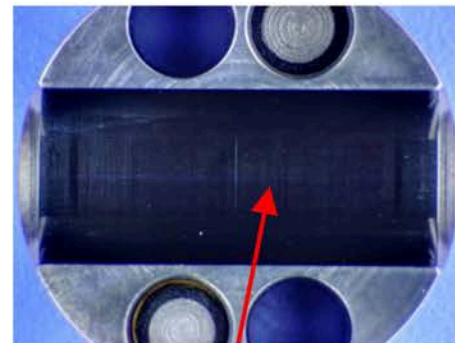


Left



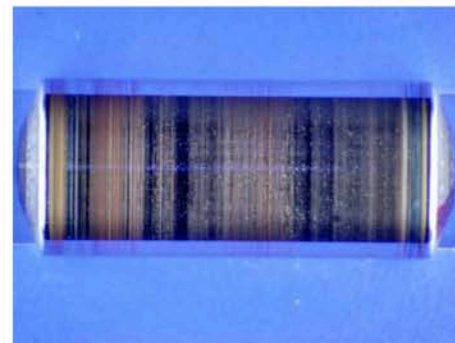
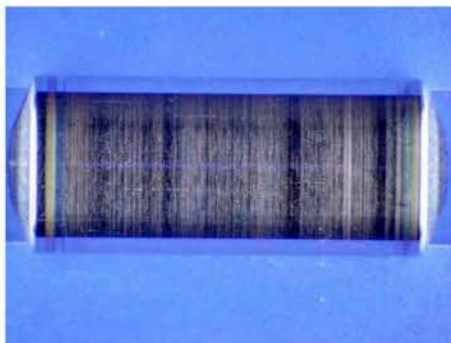
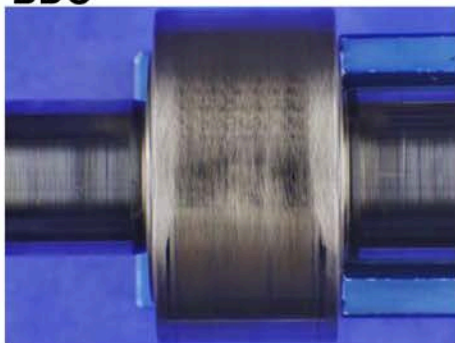
Negligible deposits

Right



No deposits

BDC

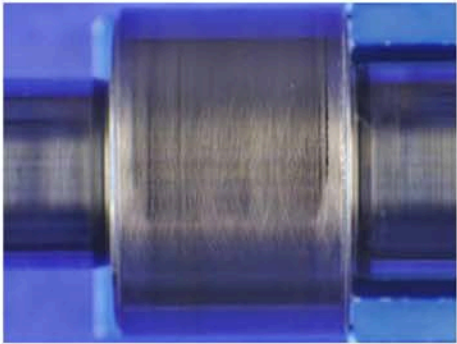


TT: Addi overload test

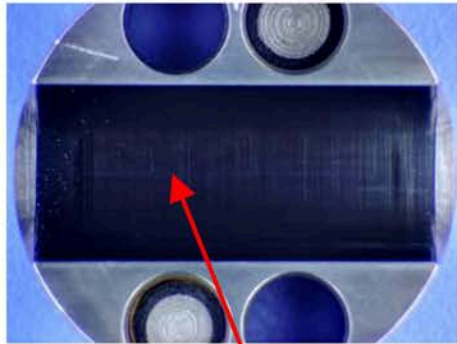
2010-CP4_0631; series; 0445B20318; 007-4324 (W19 EU5)
RT: 150h

RP2

TDC

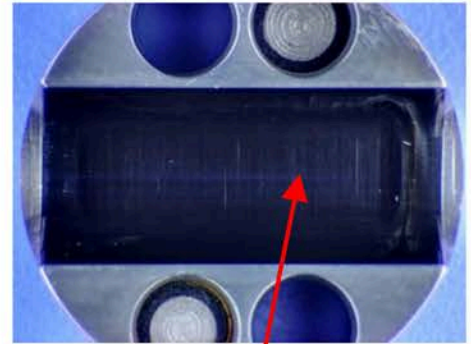


Left



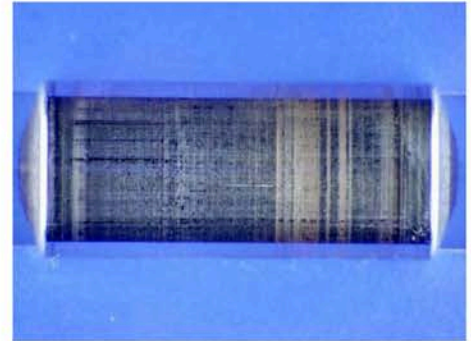
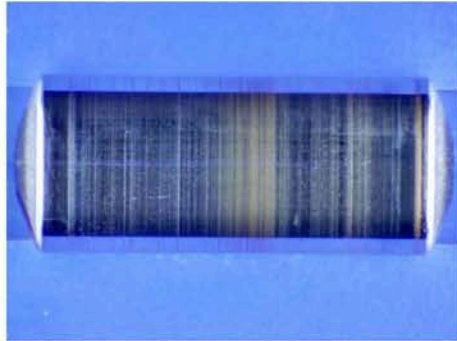
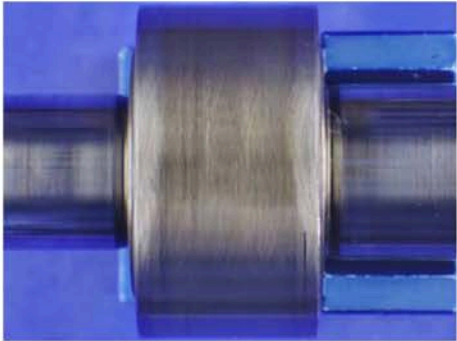
No deposits

Right



No deposits

BDC

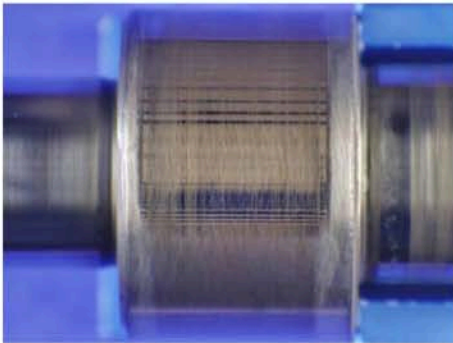


T7: Addi overload test

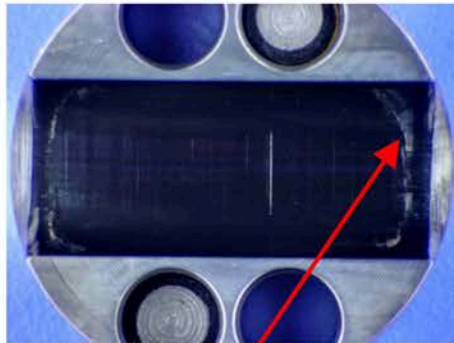
2010-CP4_0632; series; 0445B20318; 007-4322 (W19 EU5)
running time: 150h

RP2

TDC

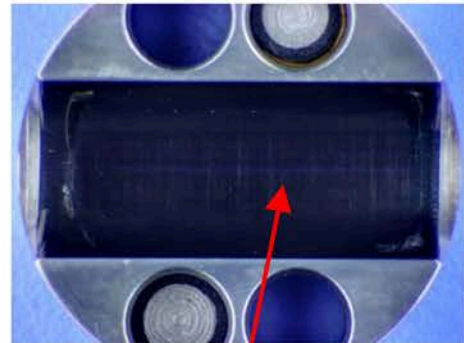


Cyl.1



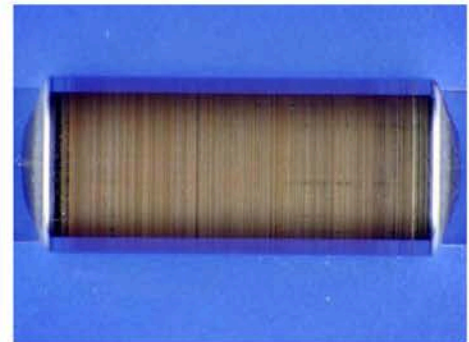
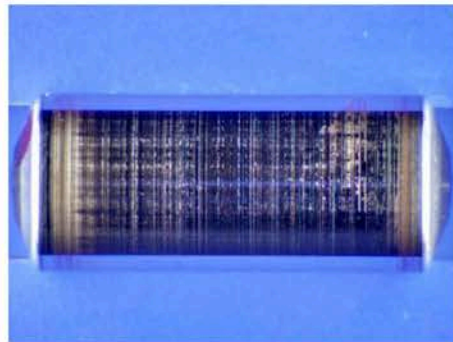
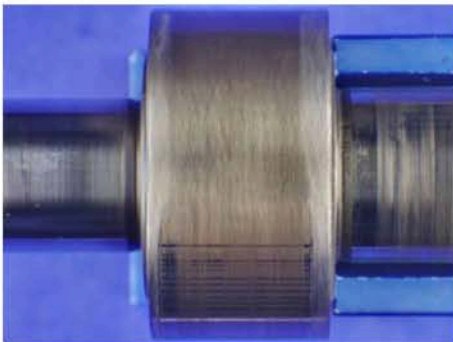
Sparse deposits

Cyl.2



No deposits

BDC

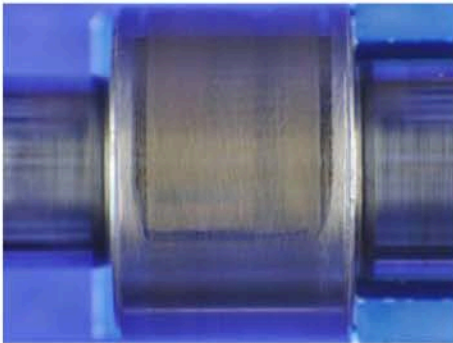


TT: Add overload test

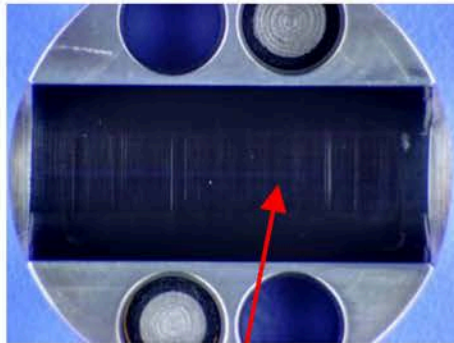
2010-CP4_0630; series; 0445B20318; 007-4388 (W19 EU5)
RT: 150h

RP2

TDC

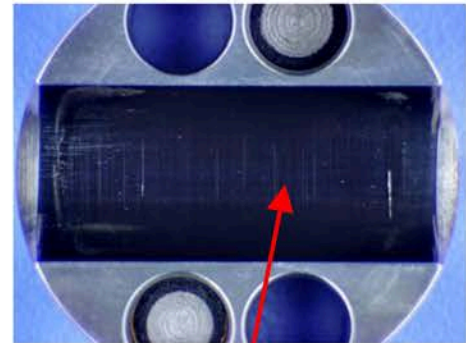


Cyl.1



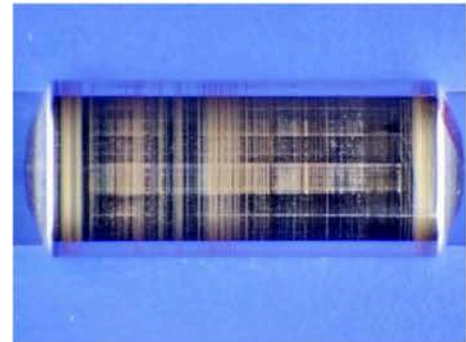
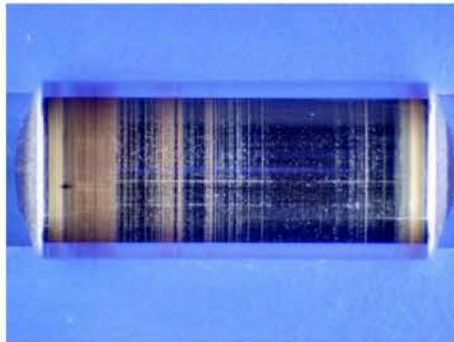
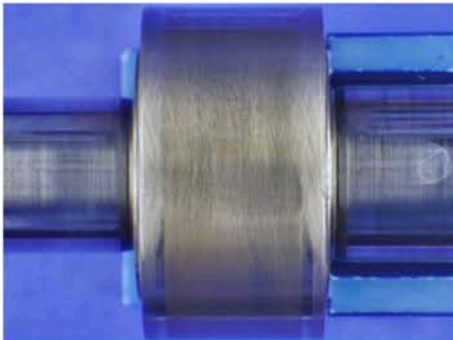
No deposits

Cyl.2



No deposits

BDC



BOSCH

TT: Add overload test

2010-CP4_0576; series; 0445010611; 05 100205 BPT 0604
AH; RT: 150h

RP2

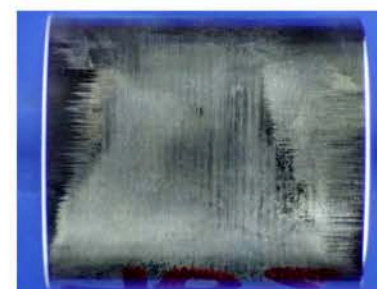
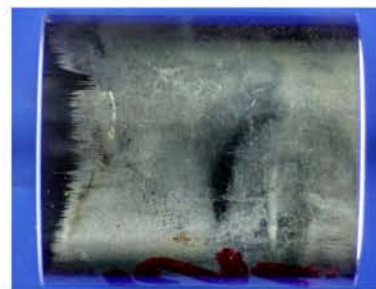
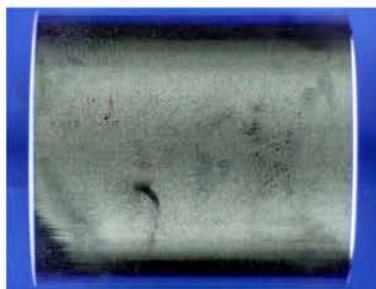
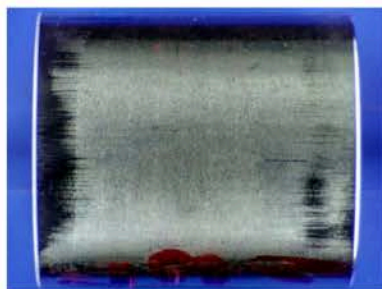
_0633 (150 h)

_0631 (150 h)

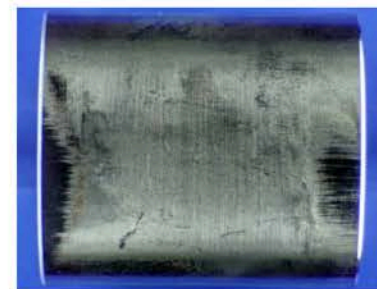
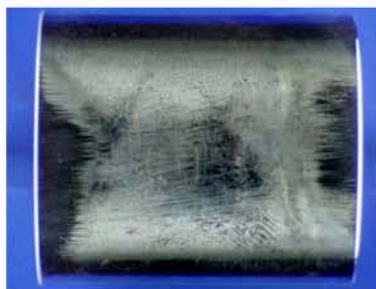
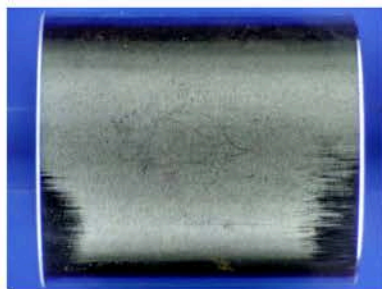
_0632 (150 h)

_0630 (150 h)

Cyl.1



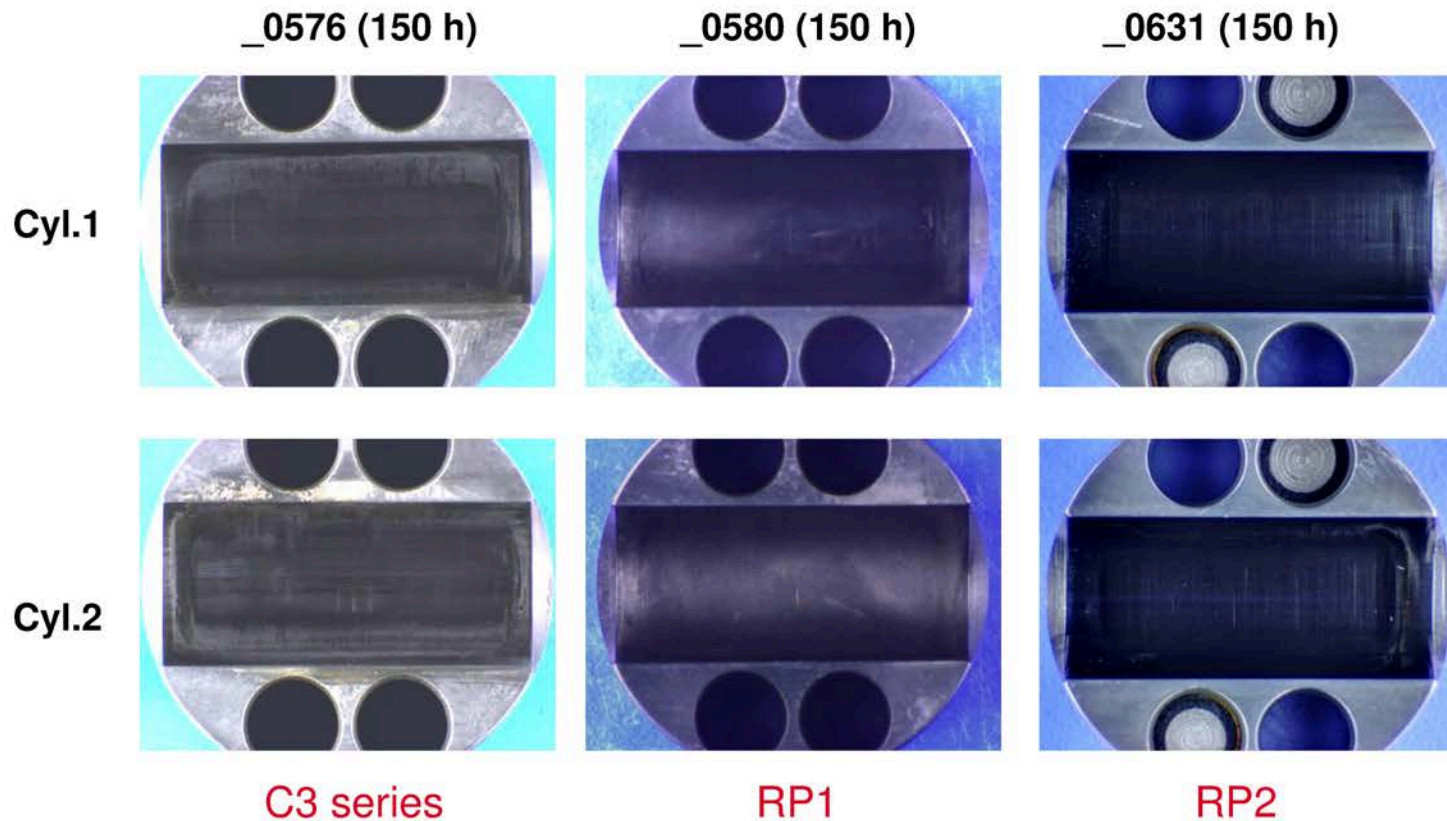
Cyl.2



Low aluminum oxide build-up (black) as an indication of low temperatures

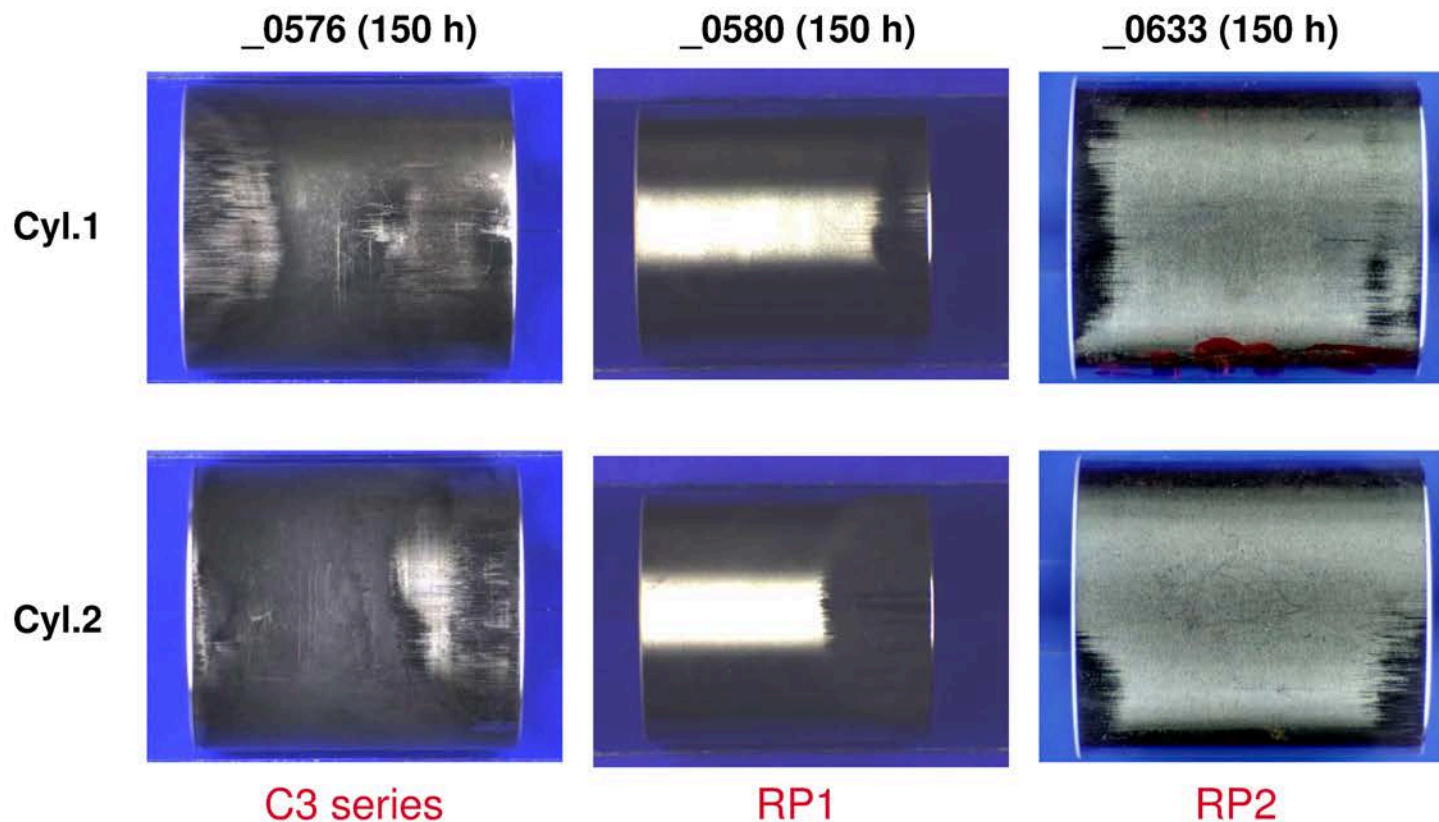
7. Add overload test

Summary of visual findings



TF: Addi overload test

Summary of visual findings



EA11003EN-02270[0]

From: Non-responsive content removed
To: [Redacted]

CC:

Date: 4/15/2008 12:41:00 PM

Subject: Current status - verification of PRV1 [Redacted]

20,680

18,359

2,895

25,819

67,753

5 vehicles --> Total in bold.

Best regards

Non-responsive content removed

Non-responsive content removed

From: [Redacted]
Sent: Thursday, April 03, 2008 12:22 PM

To: Non-responsive content removed

Reference: Re: Building of PRV1 assembly capacity at [Redacted]

New status!

Best regards

From: Non-responsive content removed

Sent: Tuesday, April 01, 2008 10:44 AM

To: Non-responsive content removed

Cc: [Redacted]
Subject: ANS: Building of PRV1 assembly capacity at Bosch [Redacted]

Hello [Redacted]

EA11003EN-02270[1]

Your leakage oil rails are in the following vehicles and have a total 38 Tkm mileage:

- AU416 98000
- AU416 98001
- AU484 88132
- AU482 98044

Kind regards

Non-responsive content removed

From: Non-responsive content removed

Sent: Monday, March 31, 2008 4:45 PM

Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Attention: km file not updated; you will receive new mileage values on Friday.

Best regards

Non-responsive content removed

From: Non-responsive content removed

Sent: Friday, March 28, 2008 12:06 PM

Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Dear Non-responsive content removed

Unfortunately I have rather bad news:

Have redesigned only 2 vehicles. Both vehicles are still affected by a further retrofit campaign, so they are currently at a standstill.

Mileage: 1 x 0 km - 1 x 3,600 km ;-)

How's it looking at VW?

I would rely on the results from there; to wait for our results wouldn't be practical with the time constraints that you apparently have.

Hello Non-responsive content removed

Please install further parts in the ongoing cars as quickly as possible.

Best regards

Non-responsive content removed

EA11003EN-02270[2]

Non-responsive content removed

AUDI AG

Non-responsive content removed

From: Non-responsive content removed

Sent: Friday, March 28, 2008 10:58 AM

To: Non-responsive content removed

Subject: Re: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

From: Non-responsive content removed

Sent: Thursday, March 27, 2008 5:56 PM

To: Non-responsive content removed

Cc: d

Subject: Re: Structure of assembly capacity in Bosch Non-responsive content removed

Hello Non-responsive content removed

I wrote to you last week r.e. the current status of the vehicle testing with PRV from the booster unit in Non-responsive content removed

Could you please notify me of the current status, as Non-responsive content removed is on holiday this week.

Best regards / mit freundlichen Grüßen

Non-responsive content removed

From: Non-responsive content removed

Sent: Thursday, March 20, 2008 2:49 PM

Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch

Hello Non-responsive content removed

EA11003EN-02270[3]

Please refer to me, as [Non-responsive content removed] is not available at present.

We have agreed with [Non-responsive content removed] to release the PRV booster unit in [redacted] next week. The prerequisite is however that we obtain a positive result from the vehicle testing.

Could you please notify me of the current status.

Many thanks in advance

Best regards / mit freundlichen Grüßen

[Non-responsive content removed]

Robert Bosch GmbH

[Non-responsive content removed]

Robert Bosch GmbH, Domicile: Stuttgart, Court of Registry: Local District Court
Stuttgart Commercial Register No. 14000 Hermann Scholl;
Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Wolfgang Chur, Rudolf Colm,
Gerhard Kümmel, Wolfgang Malchow, Peter Marks; Volkmar Denner, Peter Tyroller.

From: [Non-responsive content removed]

Sent: Tuesday, February 26, 2008 3:59 PM

[Non-responsive content removed]

Subject: ANS: Building of PRV1 assembly capacity at Bosch [Non-responsive content removed]

Hi [Non-responsive content removed]

The parts have now been built into the cars and are running; this will take weeks! When is Mr. [redacted] going to [Non-responsive content removed]

Best regards

[Non-responsive content removed]

EA11003EN-02270[4]

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AUDI AG

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From:

Sent: Tuesday, February 26, 2008 2:59 PM

To: Non-responsive content removed

Cc:

Subject: ANS: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Hello gentlemen,

Do you now have an interim result from the planned testing?

Please keep me informed so that we can respond quickly.

Many thanks in advance

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From: Non-responsive content removed

Sent: Tuesday, February 12, 2008 5:17 PM

To: Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Address:

Non-responsive content removed

D - 85045 Ingolstadt

Best regards

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-----Original message-----

From: Non-responsive content removed

Sent: Tuesday, February 12, 2008 4:11 PM

To: Non-responsive content removed

Cc:

EA11003EN-02270[5]

Subject: ANS: Building of PRV1 assembly capacity at Bosch [Non-responsive content removed]

Hello [Non-responsive content removed] hello [Non-responsive content removed]

I have the parts ready to send to you.

Could you please e-mail me your dispatch address so that the parts do not get lost.

Thank you.

>Mit freundlichen Grüßen / Best regards

>
[Non-responsive content removed]

>Robert Bosch GmbH

[Non-responsive content removed]

>Robert Bosch GmbH, Domicile: Stuttgart, Court of Registry: Local District Court Stuttgart, Commercial Register No. 14000; Hermann Scholl;
>Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Wolfgang Chur, Rudolf Colm, Gerhard Kümmel, Wolfgang Malchow, Peter Marks; Volkmar Denner, Peter Tyroller.

>

-----Original message-----

From: [Non-responsive content removed]

Sent: Friday, January 25, 2008 5:25 PM

[Non-responsive content removed]

Subject: ANS: Building of PRV1 assembly capacity at Bosch [Non-responsive content removed]

Hello,

After my telephone conversation with [Non-responsive content removed] allow me to summarize the procedure for the topic:

10 parts will be sent to [Non-responsive content removed] After receipt of the parts, these will go to the component test bench, then they will be measured and built into the engine (parallel testing and

EA11003EN-02270[6]

assessment for the release date).

5 further parts will be delivered to [redacted] also for parallel testing.

I wish you all a great weekend and remain yours

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Robert Bosch GmbH

Non-responsive content removed

>Robert Bosch GmbH, Domicile: Stuttgart, Court of Registry: Local District Court Stuttgart, Commercial Register No. 14000; Hermann Scholl;
>Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Wolfgang Chur, Rudolf Colm, Gerhard Kümmel, Wolfgang Malchow, Peter Marks; Volkmar Denner, Peter Tyroller.

-----Original message-----

From: Non-responsive content removed

Sent: Tuesday, November 20, 2007 9:12 PM

Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Hello,

We should integrate the PRV at the release of a new site in our release ER. I would like a delivery of 10 parts to Non-responsive content removed

Regards

Volkswagen AG

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EA11003EN-02270[7]

VOLKSWAGEN AG

Sitz/Domicile: Wolfsburg

Registergericht/Court of Registry: Local District Court Braunschweig

HRB Nr./ Commercial Register No.: 100484

Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Ferdinand Piëch Vorstand/
Board of Management: Martin Winterkorn (Vorsitzender/Chairman), Francisco J. Garcia Sanz,
Jochem Heizmann, Horst Neumann, Hans Dieter Pötsch

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From: Non-responsive content removed

Sent: Monday, November 19, 2007 10:53 AM

Non-responsive content removed

Subject: ANS: Building of PRV1 assembly capacity at Bosch Budweis/Czech Republic

Hello Non-responsive content removed

We should also decide together with my superior, Non-responsive content removed
whether we have to / want to conduct a vehicle verification for a new delivery plant - like, for example, with CP4.1 Non-responsive content removed

If I understand the correspondence from Bosch correctly, only the PRV1 and not the complete FRL and in turn only R4-CR (not V6/V8-TDI) are affected.

Furthermore, I would be interested to know from the long-term planning at RB whether also the FRL and V6-TDI are to go to Non-responsive content removed

Best regards

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EA11003EN-02270[8]

Non-responsive content removed

From: Non-responsive content removed

Sent: Monday, November 19, 2007 9:55 AM

Non-responsive content removed

Subject: RE: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

Hello Non-responsive content removed

Conditions for customer release (chronological order):

- Go from AUDI/VW Non-responsive content removed
- Go from the AUDI/VW Non-responsive content removed
- Sampling with measures report (if not material change) at least 4 weeks before introduction date
- Additional successful inspection of the customer quality assurance (2 weeks before introduction at the latest)
- Ensure the delivery release up until a successful inspection

Please always inform all affected customer parties (Non-responsive content removed)

With best wishes

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Sent: Friday, November 16, 2011 12:58 PM

Non-responsive content removed

Subject: Building of PRV1 assembly capacity at Bosch Non-responsive content removed

EA11003EN-02270[9]

Hi [Non-responsive content removed]

We are also planning to produce pressure retaining valves of 1st generation (PRV1) in future in our production plant in [redacted] in order to serve the increasing demand. Please find attached a presentation with information.

<>

Please let us know your requirements for release from your side in project R4 2.01 low.

Please feel free to contact me with further questions.

Mit freundlichen Grüßen / Best regards

[Non-responsive content removed]

Robert Bosch GmbH

[Non-responsive content removed]

Robert Bosch GmbH, Domicile: Stuttgart, Court of Registry: Local district Court Stuttgart
Commercial Register No. 14000 Hermann Scholl;
Management: Franz Fehrenbach, Siegfried Dais; Bernd Bohr, Wolfgang Chur, Rudolf Colm,
Gerhard Kümmel, Wolfgang Malchow, Peter Marks; Volkmar Denner, Peter Tyroller.