Supplemental Information for Equipment Report -- 20E-057

1) Additional Information on Brand Name

Customer	Part	Brand	Vehicle Applications
AutoZone	NM4222	Duralast	2005-2008 VOLKSWAGEN: JETTA
Factory Motor Parts	NM4222	FVP	2005-2008 VOLKSWAGEN: JETTA
Any Part-Rama Auto	NM4222	Quality-Built	2005-2008 VOLKSWAGEN: JETTA
MOOG LOUISVILLE WAREHOUSE	NM4222	Quality-Built	2005-2008 VOLKSWAGEN: JETTA
PISTON RING SERVICE SUPPLY	NM4222	Talon	2005-2008 VOLKSWAGEN: JETTA
Customer	**Part**	**Brand**	**Vehicle Applications**
AUTOZONE	NM55381	Duralast	2005-2019 SEAT: ALTEA; LEON / VOLKSWAGEN: BEETLE; BORA; JETTA
PISTON RING SERVICE SUPPLY	NM55381	Talon	2005-2019 SEAT: ALTEA; LEON / VOLKSWAGEN: BEETLE; BORA; JETTA
WM AUTOMOTIVE WAREHOUSE	NM55381	Quality-Built	2005-2019 SEAT: ALTEA; LEON / VOLKSWAGEN: BEETLE; BORA; JETTA

2) Describe the cause (this adds a picture to the description included in the report):

The operator mistakenly reverse crimping fixture during production, so the tool can't limit the fixture's position. The operator didn't increase pressure on crimping fixture for 2 sec. according to SOP so the crimping is not processed correctly.

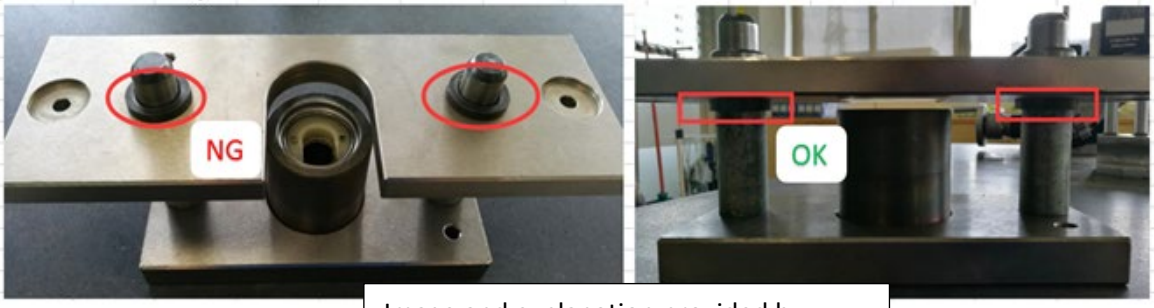


Image and explanation provided by

Based upon the information received from the component part manufacturer Yusin:

WHY1: Crimping machine did not put enough pressure on casting to secure seal properly.

WHY2: Process operator reversed the crimping fixture which caused the tool to limit the crimping angle and pressure.

WHY3: The SOP was not followed correctly and controls were not adjusted to include two seconds of applied pressure.

WHY4: The sum of tolerances between the casting and plastic seal, plus the lack of controls to lock the plastic seal during assembly can lead to improper crimping, allowing the seal to move.

WHY5: The master cylinder design does not consider an error proofing solution to secure the seal regardless of assembly and operator mistakes.

3) Chronology of Defect / Noncompliance Determination

Provide the chronology of events leading up to the defect decision or test data for the noncompliance decision.:

When?	What ?	What do we do about it?
Wednesday, June 17, 2020	Mark Friedberg [mailto:mark@bourneusa.com] sent an email to MPA Quality about nonconforming product shipped to MPA **(no safety issue mentioned).**	MPA Sr. QE, responded by asking for bracket or lot numbers and if this was a **safety concern.** **Containment started:** Request to MPA subsidiaries (MPA, MPM2) & parts in transit to quality control hold (QCH).
Wednesday, June 17, 2020	Mark Friedberg sent an email (below) to MPA Sr. QE Raul Viramontes: Hi Raul, based on what we've seen, if there is a problem it appears to be found during bleeding/initial installation of the assembly. Yusin is investigating and will send a corrective action. What is the warranty rate for MPA?"	MPA Sr. QE Raul Viramontes, responded with warranty charts and requested a conference call June 19.
Thursday, June 18, 2020	Mark Friedberg replied - If you want to have a call we can but not sure what I can add to a conversation tomorrow. We don't have the corrective action form from Yusin.	MPA Sr. QE responded on June 22, fill out the CAR form latest June 26 to set up a meeting and go over the root causes and preventive /corrective actions.
Monday, June 22, 2020	Mark Friedberg replied - We won't have a corrective action completed by Friday June 26. Thursday and Friday this week are a holiday in China. Yusin has identified the issue and is working towards what will be a corrective action. Yusin purchased new equipment to assemble this master that was delivered to the factory last week and is being set up now.	On June 26 MPA Buyer, requested available date to review the corrective action.

	Complete testing results and a final corrective action could be available later next week.	
Monday, June 29, 2020	Mark Friedberg sent supplier corrective action form to MPA.	MPA involved Executive VPA Supply Chain to set up a conference call with Yusin. Elevated to VP Engineering. Requested confirmation and root cause; scheduled emergency conference call with Yusin.
Wednesday, July 1, 2020	Conference call with Yusin. Supplier explained issue, root cause and his point of view of the failure mode as well as provided suspect defective date code. Supplier disagreed with this being a safety issue.	MPA Investigation started: July 1, requested samples from MPM2 for corporate testing. July 6, samples arrived to Torrance from MPM2. July 7, pull test started.
Wednesday, July 8, 2020	Reviewed pull test results on meeting.	MPA Sr. QE Raul Viramontes, sent out results and our engineering department recommended a Durability Test.
Thursday, July 9, 2020	Durability test started.	Monitored part.
Friday July 10, 2020	Communication with supplier about date code relation with MPA date code.	Review if MPA had any in house, we did not.
Monday , July 13, 2020	Durability test completed.	Durability Report sent out, July 14.
Wednesday, July 15, 2020	Meeting to review durability report.	Technical meeting to review results took place and decided to elevate the issue to Executive Management. Scheduled executive meeting on July 16.
Thursday, July 16, 2020	Elevation of the issue to Executive Management.	Decision to report to NHTSA.
Friday, July 17, 2020	Report sent to NHTSA	

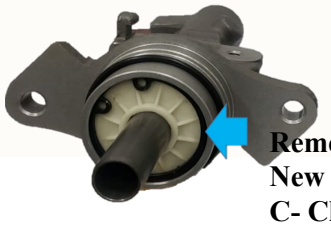
4) Describe what distinguishes the remedy component from the recalled component. (adds chart and picture to description)

Master cylinder was re-designed by manufacturer Yusin to include a C-clip which will secure the seal. MPA has validated C-clip redesign made by manufacturer Yusin's with push (destructive) and durability test.

	Recalled part number (Superseded by C-clip)	**Remedy** part number with C-clip design
Yusin	V0300-1(AH)	V0820(AH)
Equivalent to MPA	NM4222	NM4333
	NM55381	NM55677

MPA Durability test simulates the vehicle braking system. The tester consists of 4 wheel cylinders and an electric actuator that cycles the master cylinder. The unit was bench bled and filled with dot 3 brake fluid and cycled every 3-5 seconds to reach a pressure of 600-1500 psi. Every hour a pressure hold test was performed to ensure there was no pressure loss. The unit ran for 70 hours (49,426 cycles) with no signs of pressure loss or visible leaks. The test was resumed for further testing and stopped at 424 Hours (299,503 cycles) with no signs of pressure loss or leaks. Once removed from the tester the unit showed no signs of fluid leaks or movement of the seal retainer and C-clip. To measure the strength of the C-clip retention destructive testing was also performed. The unit was cut at the neck of the mounting flange and a force was applied to the primary piston in the direction of the retainer. This simulates the force direction the internal springs would apply on the C-clip when the unit is fully assembled. A force of 2023 lbs. was applied causing the piston to break through the plastic seal retainer. The aluminum casting did not fracture and the c clip showed no signs of movement from its initial positon. This was well above the OEM unit tested, which had the casting fracture at 1600 lbs. From this, we can conclude that the improved design with the addition of the C-clip retainer will not have any of the seal retention failures the previous design had and that the design meets and exceeds OEM seal retainer retention specifications.

Recall unit: crimping process



Remedy unit: New design with C- Clip retainer