



Merlyn Products, Inc. Findings Report

MPi 18-1 N2890T SN: 28-7921088
Kit SN: 1893090533
Unit SN: 1893090533 A0849
TT: Total time not given
NTSB Accident #: CEN19LA317
FSDO Tear down and Inspection at MPi facility

Date: January 16, 2020
Inspection Date: January 16, 2020
Preliminary Report
Ref: SO8417/—/JI4069
Inspected by: Philip Griffis, ASI
with H. Evans Jonathan
Nordhagen, Tanya Livers, S.
Evans
Report by: S. Evans

Complaint: Aircraft accident, NTSB requested inspection of components

Total Time on unit: Total time on unit since overhaul not evident, available. Last entry engine log Tach 4058 hours, Engine SMOH 927.2 hrs Owner Registration Card indicates Tach was 1715.13 hrs on October 15, 1993. Last service record for this upper deck pressure controller occurred September 29, 2006. Service history attached.

Inspection: Box opened on site by Philip Griffis, FAA Aviation Inspector.
External: Received assembled, on exhaust bypass elbow (EBE). The heat shield was in place, but bent slightly. Safety wire had been cut, or broken. The orientation of the heat shield to the AN822-4 fittings on the cap and housing was incorrect. The AN822-4 fittings were also not oriented correctly with respect to each other. Overall appearance dirty, dirt/soot/rust on cap outside, guide rusted, fresh tool marks on the guide indicate that it had been opened or attempted to be opened. Note: the guide was not loose but required about 100 in/lb effort to remove it from the exhaust bypass elbow (EBE) which would normally be 280 in/lb, this also suggests that the control had been removed from the EBE. The housing was in good condition. The color of the housing and cap is black. No evidence of extreme heat (high temperature lightens the color). Evidence on the data tag that the stability clamp had been in place at least part of the time. The Exhaust bypass elbow shows extreme signs of heat creep. Observations and inspection notes during tear down:

- Receiving function test indicated it did not hold a vacuum. The valve didn't pull down. Bleed off rate on upper deck fitting was less than 1 second. Bench test attempted, failed.
- Exhaust bypass elbow: Serious heat creep and deformation of the elbow at the cuff end and tube bend. Some rust as well. The exhaust nipple for the straight tube was broken and attached to the EBE.
- Heat shield: Earlier style, clamp tab in place, spot weld broken one place, very small crack a outside edge.
- Housing: The color black. (Black is the original color) The stability clamp appears to have been in use at least some of the time since the last service in 2006. The exterior is fairly clean. No obvious "tag" marks. Residue on the outside is probably from chemicals used to extinguish the fire. The inside shows signs of spring wear, some rust on one side at base of spring well, light soot. One notable mark (soot blow trough) appears to be where hole in diaphragm was located.
- Cap: color is black. Most of it is covered in dried oil and chemicals from fire extinguisher. The cap had a severely rusted e-clip and dark residue inside of the cap around the e-clip The AN822-4 fitting was seated taller than normal. It did not appear to have been loosened. While unusual, it would not have impacted operation of the UDPC.
- The e-clip was intact. It was very rusted. It was not removed.



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- Cap retaining ring: Stainless Steel. OK.
- Guide: The exterior of the guide is rusted lightly over most of the surface. The chamfered (threaded end) has some accumulated material one side of the chamfer and some rust indicated in the upper part of the hole. Hole oversized.
- Valve: Light coating of baked soot. No indications of wear, stem concentric, no indication of sticking in radius.
- Spring: nothing noted.
- Diaphragm Assembly: The diaphragm fabric has a small hole in the viton fabric at the bottom of the diaphragm just above the piston/backplate. The cut communicates through the fabric to the other side. The diaphragm would not have been working. The valve would have been in the closed position.

NOTES:

The control was manufactured in September 1991, and was sold to this aircraft in September 3, 1991.

It's service history is as follows:

- 03/20/1995: Provided hardware for the heat shield
- 06/13/2000: RTS service: guide, valve, diaphragm, spring, heat shield, boss for exhaust bypass elbow (EBE)
- 09/29/2006: Received with guide broken at the boss of EBE, housing cracked, large nick on MP end, cap evidence of extreme heat. Replaced housing, guide and heat shield.

- In all operations, whether with the factory "ground adjustable wastegate" or the Merlyn upper deck pressure control, the pilot manages the throttles to prevent overboost.
- The factory fuel flow setting is not affected by the installation of the Merlyn upper deck pressure control. The exception would be where the bolt was intentionally screwed in farther than normal. This is done to achieve a higher critical altitude with the factory ground adjustable, fixed bolt wastegate. This also exacerbates the backpressure in the turbine housing and engine resulting higher oil temps and CHT. In this case the fuel flow will need to be corrected to the factory settings prior to installing the Merlyn UDPC kit. The Merlyn UDPC is variable and does not require this artificial setting for higher critical altitude which increases to 18,000 ft.

Suzanne Evans
Merlyn Products, Inc.

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DENVER CO 80209

3 LBS

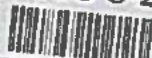
1 OF 1

DWT: 11.10.10

SHIP TO:
COLBY BARRON
(509) 332-2352
PAA SPOKANE FSDO
SUITE 2400
15201 E. INDIANA AVE.
SPOKANE VALLEY WA 99216-2830



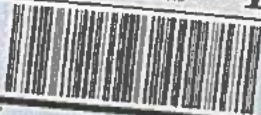
ID 838 8-22



UPS NEXT DAY AIR

TRACKING #: 1Z A39 876 01 9659 5403

1



BILLING: Pym

Reference # 1: CENPLA317
Reference # 2: 123897

As of 11/10/10

Reference #3: 123897



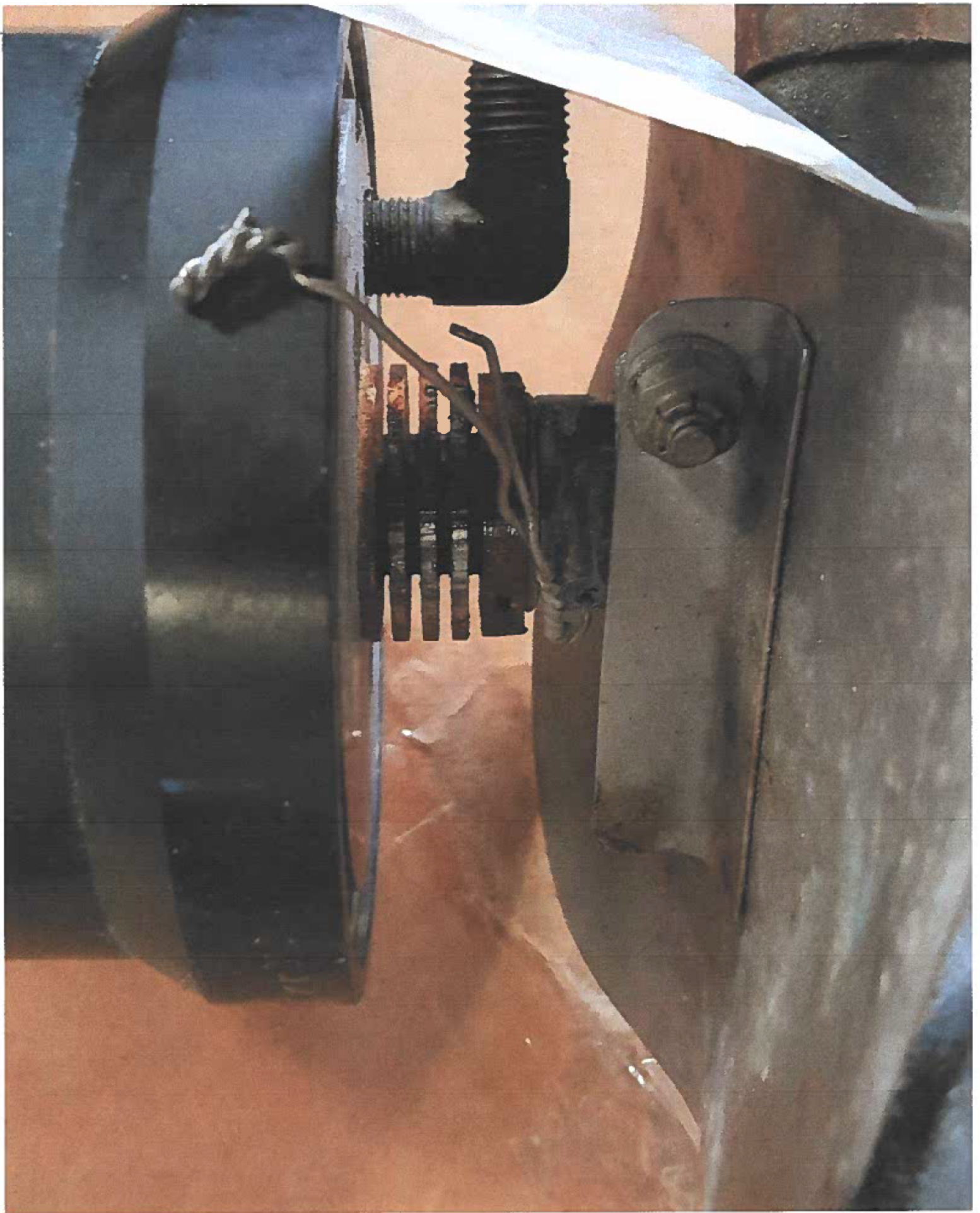
UPS CampaignShip - United States

PAA - SPOKANE FSDO
SUITE 2400
15201 E. INDIANA AVE
SPOKANE VALLEY WA 99216
P. BOTTOM L. WEST
408-1003 X
11/10/10 11:10 AM PST
11/10/10 11:10 AM PST













of used UDP
g FB

Kit SN: 1893090533

Rev. E

Evidence disassembly

Defect wire cut inside

visual damage

Feed Rate: *1/000*

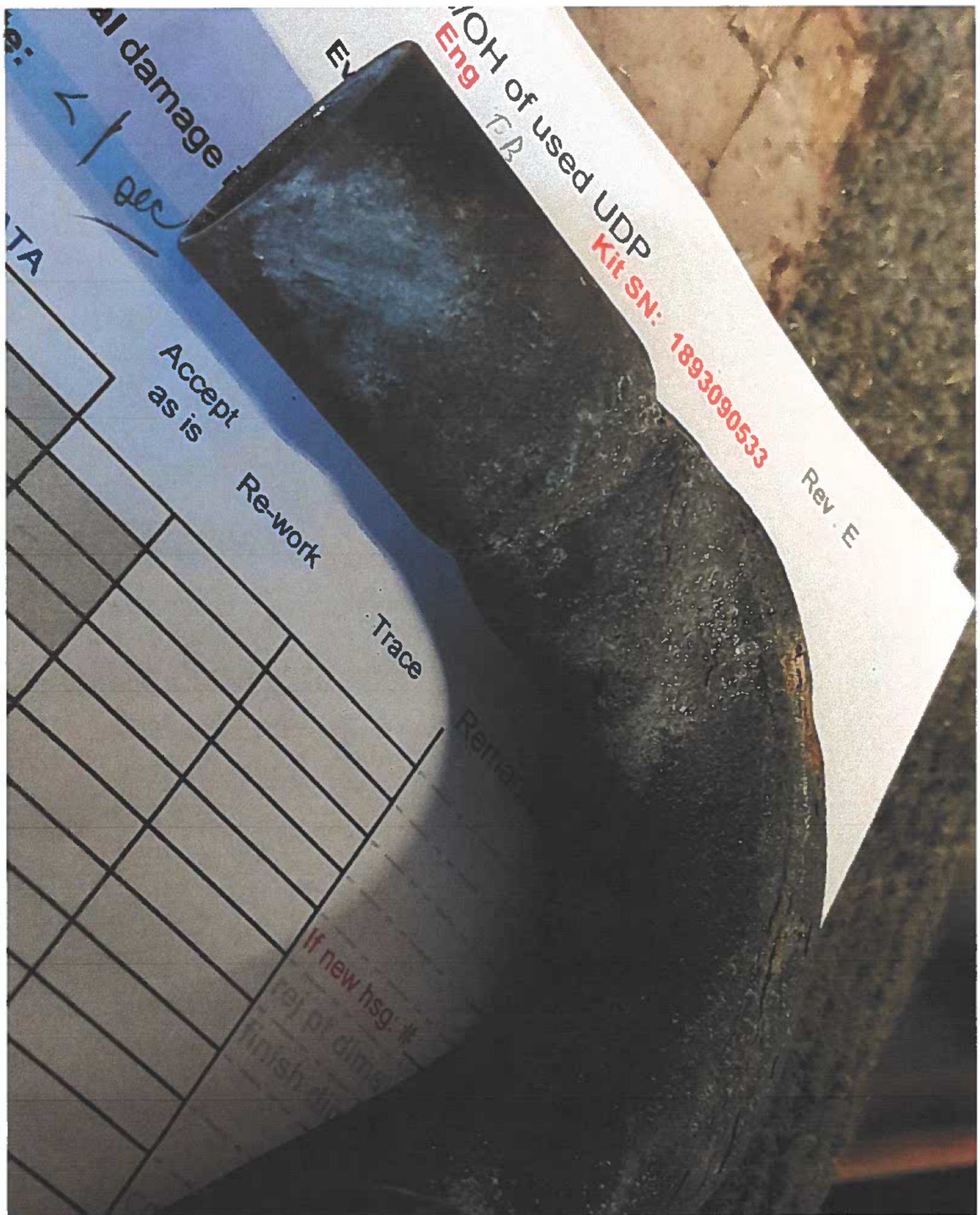
Measured DATA

Accept as is

Re-work

Trace

ETCH-07
P0377
LZ1000-01



MOH of used UDP
Eng

Kit SN: 1893090533

Rev. E

Accept
as is

Re-work

Trace

Remarks

If new hsg: #

rej pt dms

finish dms







Return factory new & 1 removed

Trace Re-work

heat creep, box
rp, etc.

list issues

concentricity

finish on

