




*The Aviation Suppliers  
Association Presents:*

# ***VISUAL INSPECTION OF AIRCRAFT PARTS***

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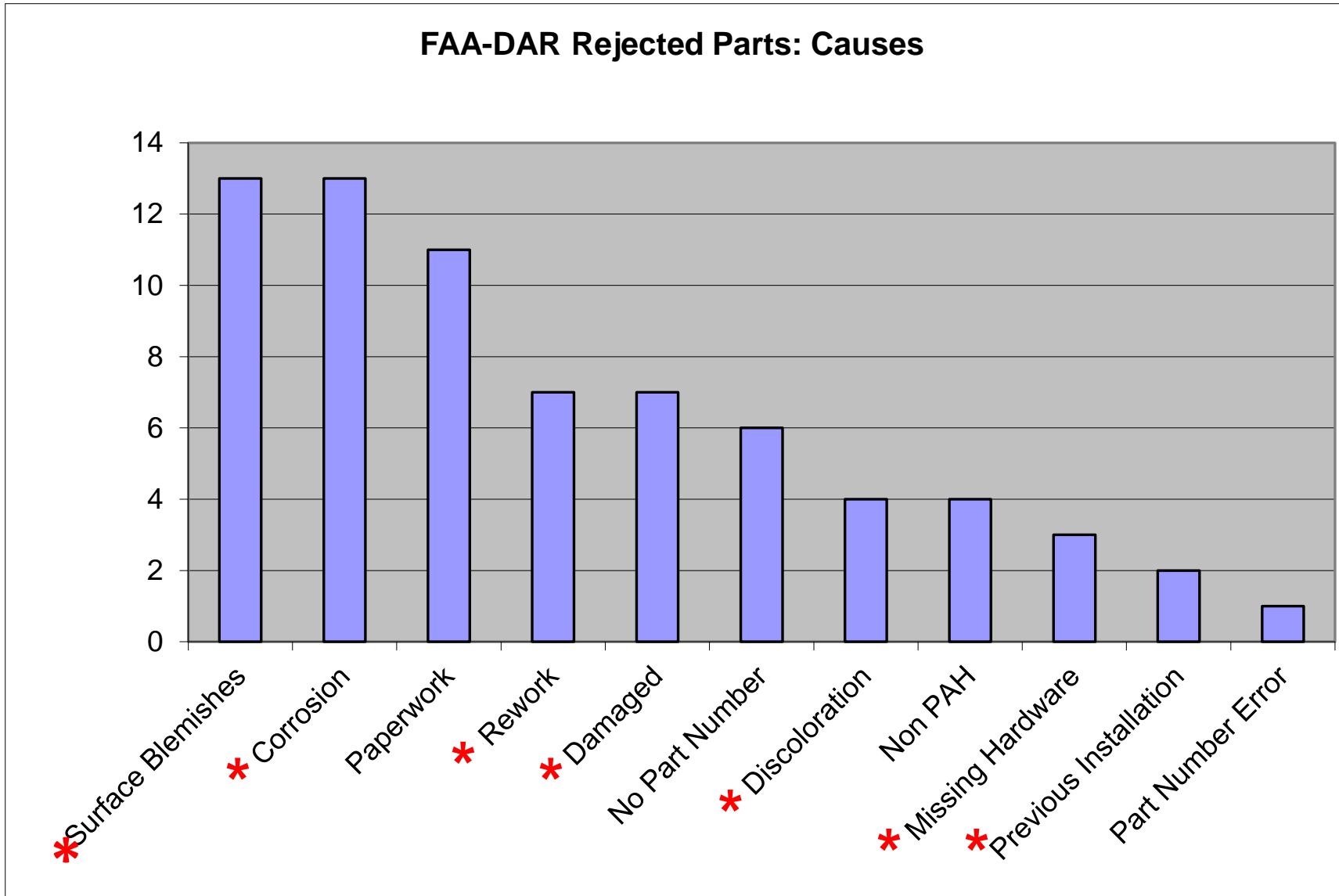
- ***Topics include:***

- Pareto analysis of rejected aftermarket parts
  - Corrosion
  - Previously reworked
  - Previously installed
  - Surface blemishes/differences
  - Missing hardware
  - Beneath the caps
  - ESD caps
  - Shelf Life
  - Calibration Labels
  - Sampling plans
  - Drop Shipping
- 



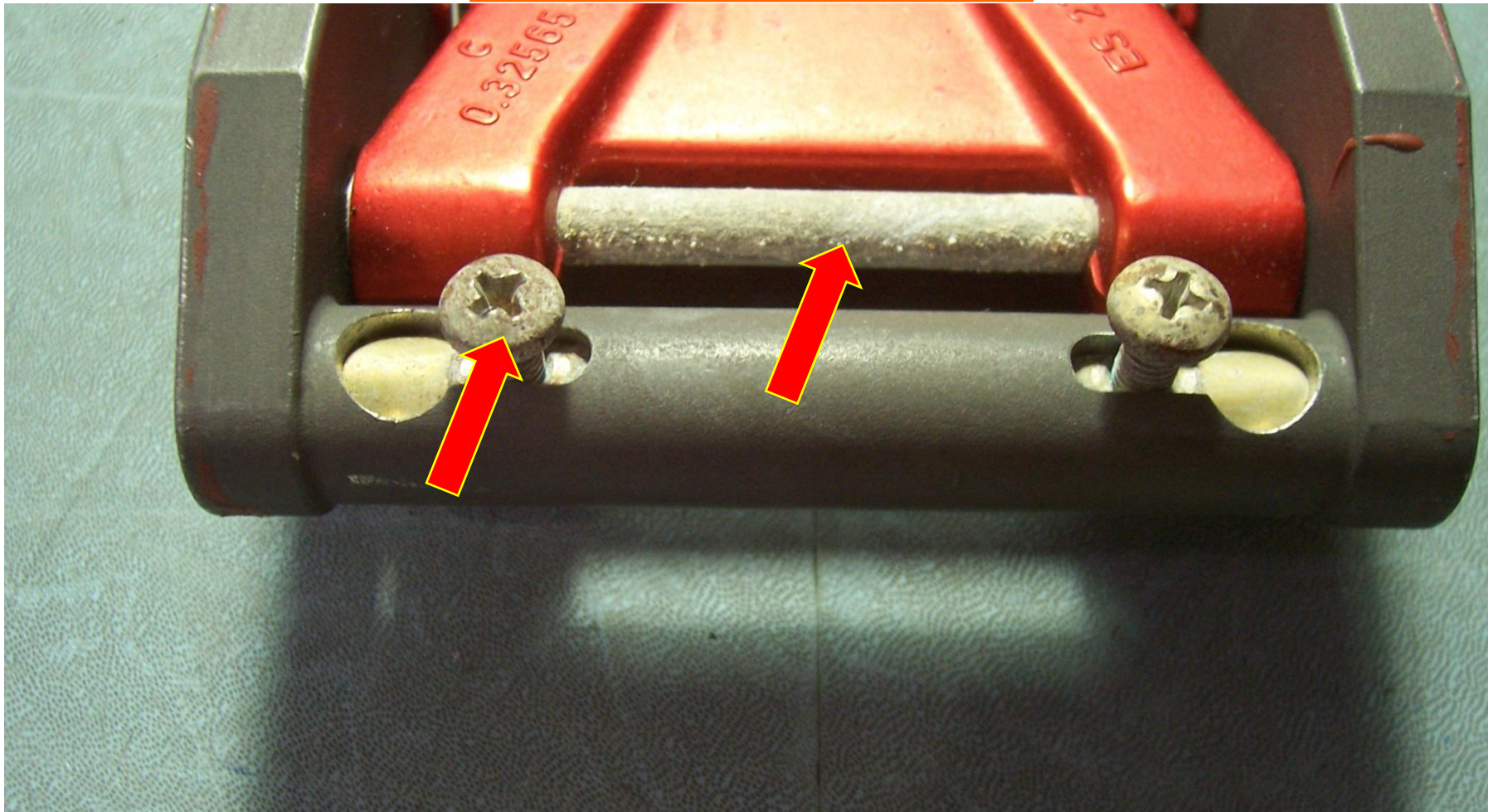
# Pareto Analysis of FAA-DAR Rejected Parts *in the aftermarket:*

\* = Rejects resulting from visual inspection of the parts





# CORROSION:



For detailed information on Corrosion see FAA AC 43.13-1B: ACCEPTABLE METHODS, TECHNIQUES, AND PRACTICES – AIRCRAFT INSPECTION AND REPAIR.

[https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_43.13-1B\\_w-chg1.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_43.13-1B_w-chg1.pdf)



# CORROSION:





# CORROSION:



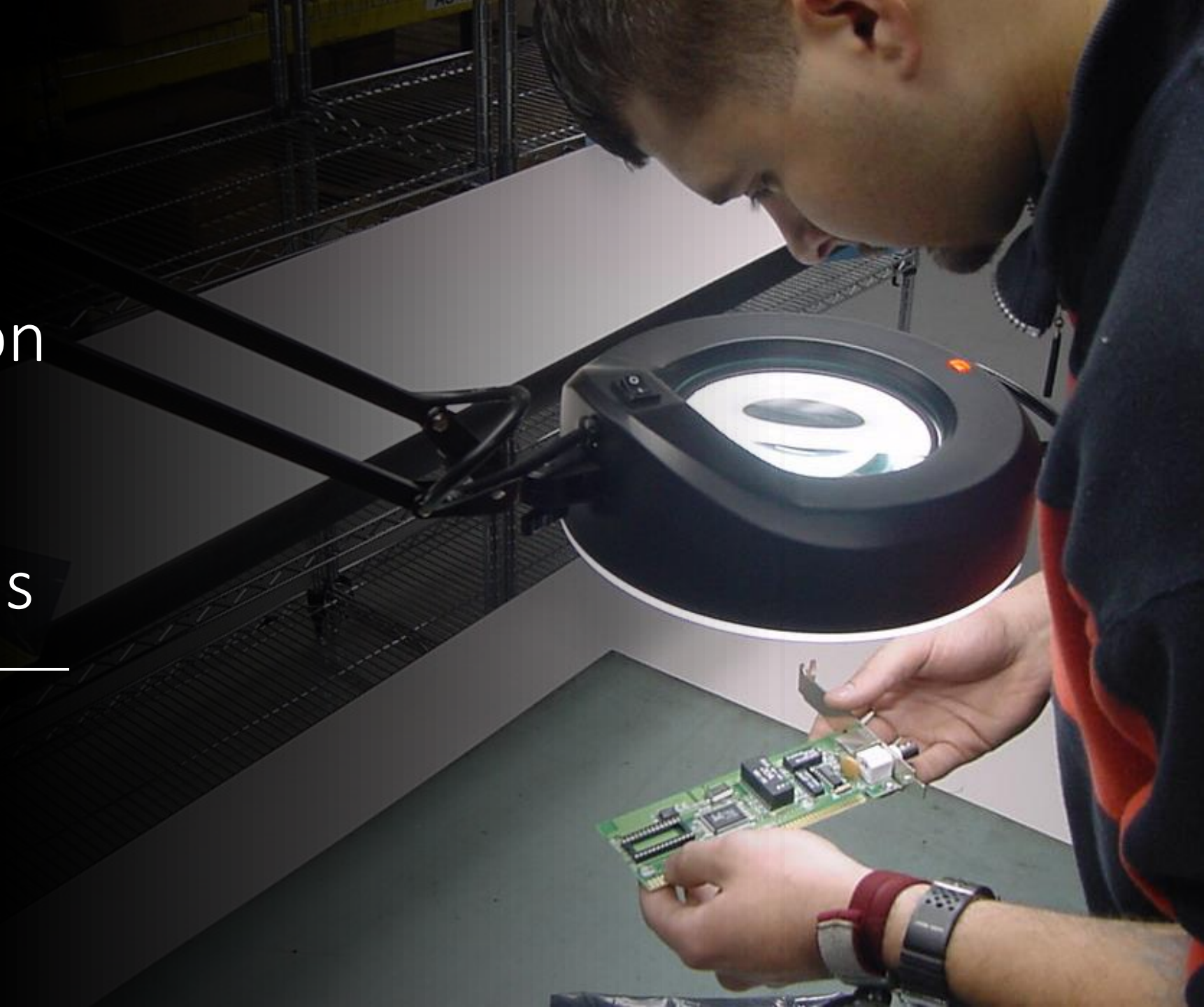


# CORROSION:



By the way, light and magnification go a long way to aiding in proper visual inspections

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Dogs don't get the virus so are free to travel



***SHOW-OFFS!***



# PREVIOUSLY REWORKED:



*Have you ever seen an overhauled part and commented that it looked like new? All three were presented as New parts. Note the manufacturer's markings and inspection stamps on the real new part.*



# PREVIOUSLY REWORKED:



*Have you ever seen an overhauled part and commented that it looked like new? All four were presented as New parts. Note the manufacturer's markings and inspection stamps on the real new part.*



# EVIDENCE OF PREVIOUS INSTALLATION:

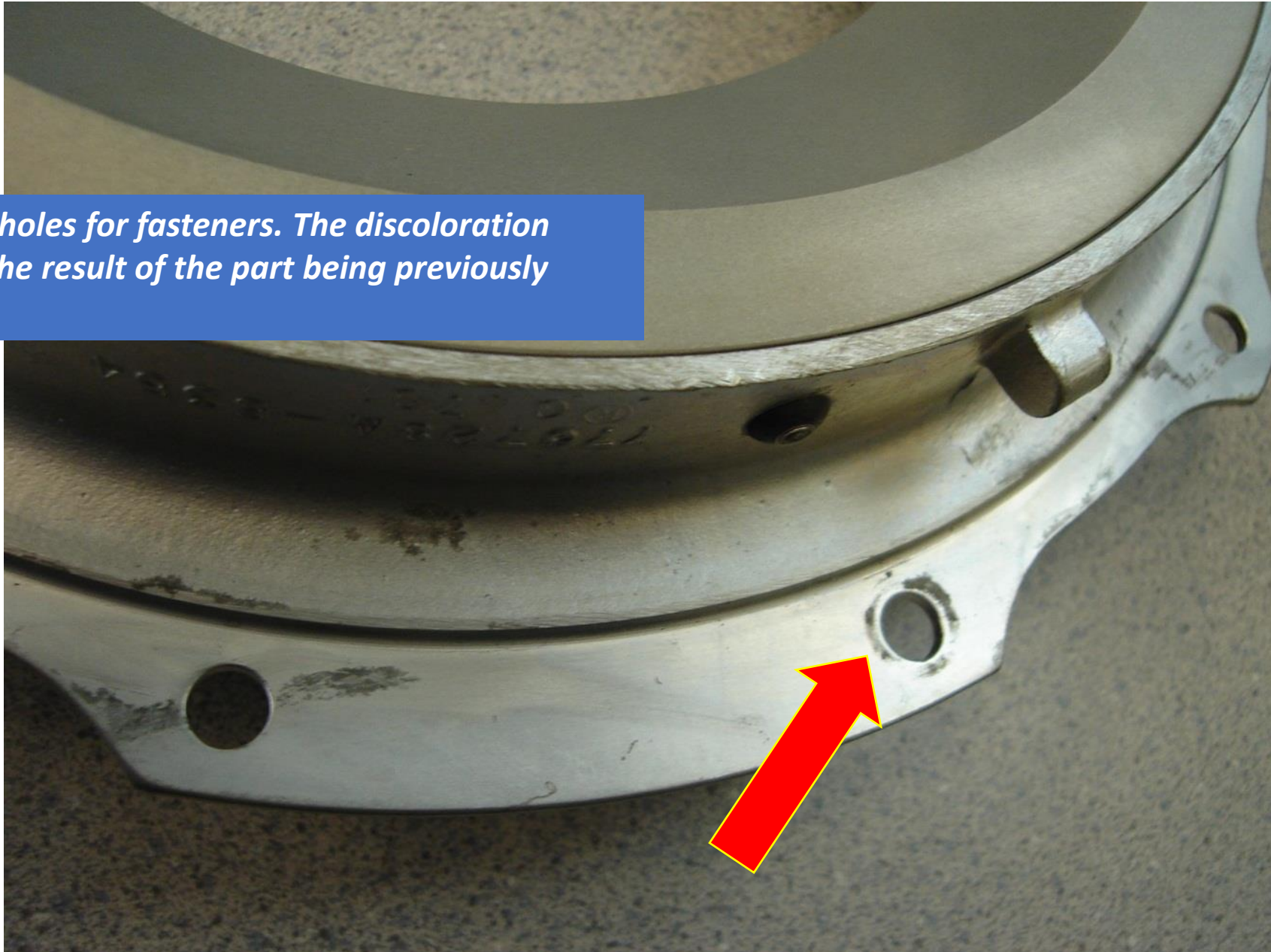
*Note the threads on the left are sharp, reflective of a new part. The threads on the right are rounded, reflective of previous installations*





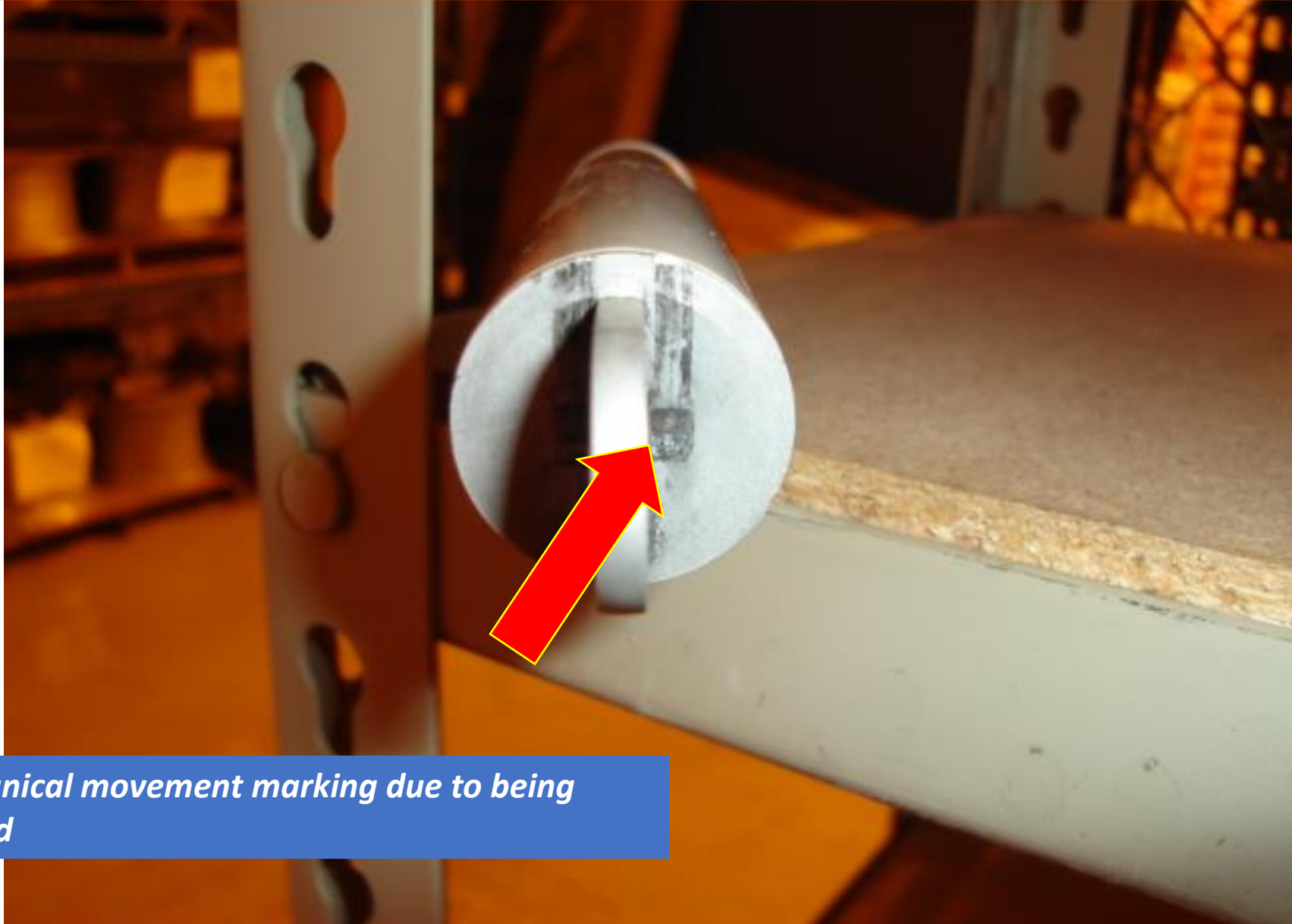
# EVIDENCE OF PREVIOUS INSTALLATION:

*Note the mounting holes for fasteners. The discoloration around the hole is the result of the part being previously installed*





# EVIDENCE OF PREVIOUS INSTALLATION:

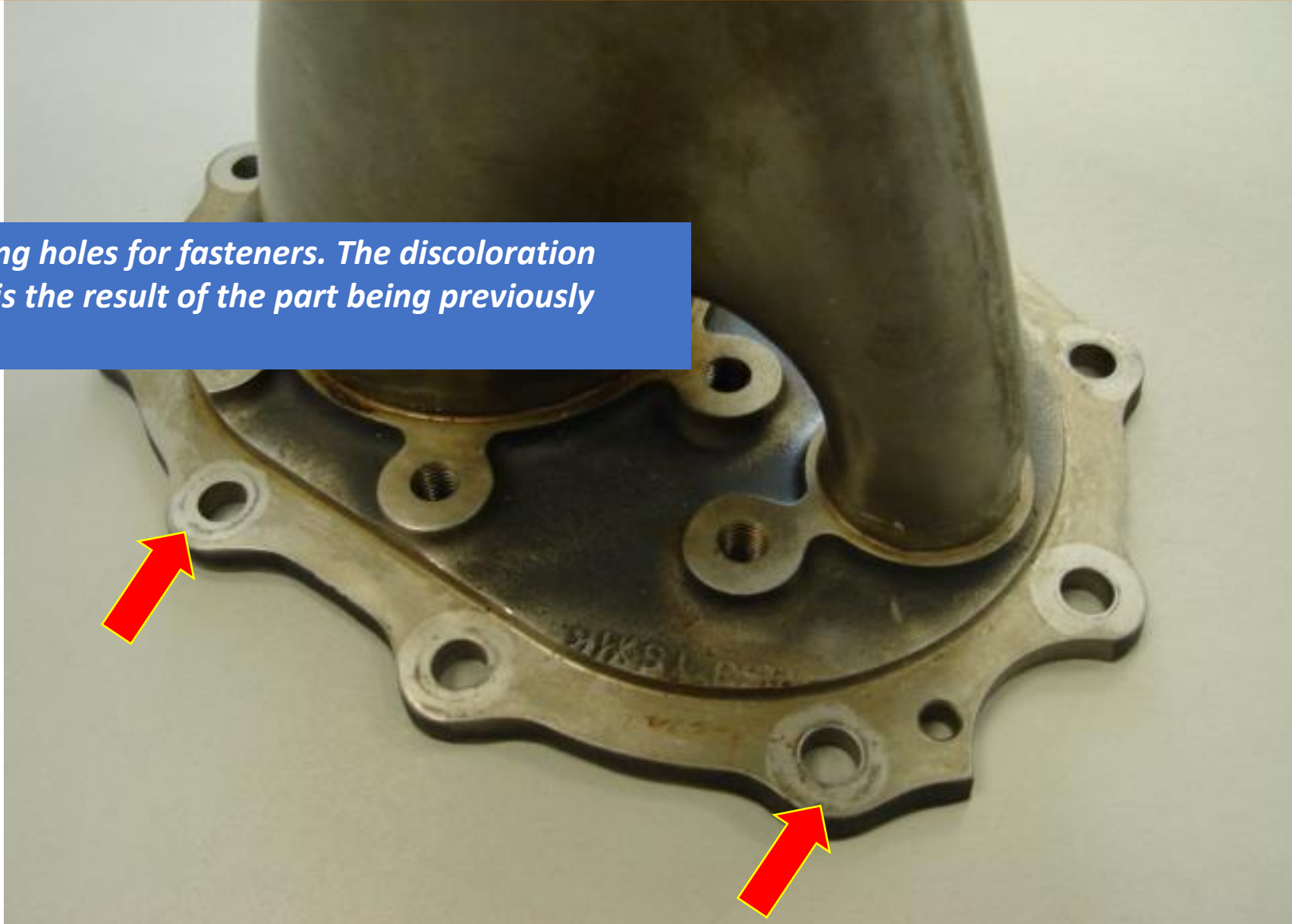


*Evidence of mechanical movement marking due to being previously installed*



# EVIDENCE OF PREVIOUS INSTALLATION:

*Note the mounting holes for fasteners. The discoloration around the hole is the result of the part being previously installed*





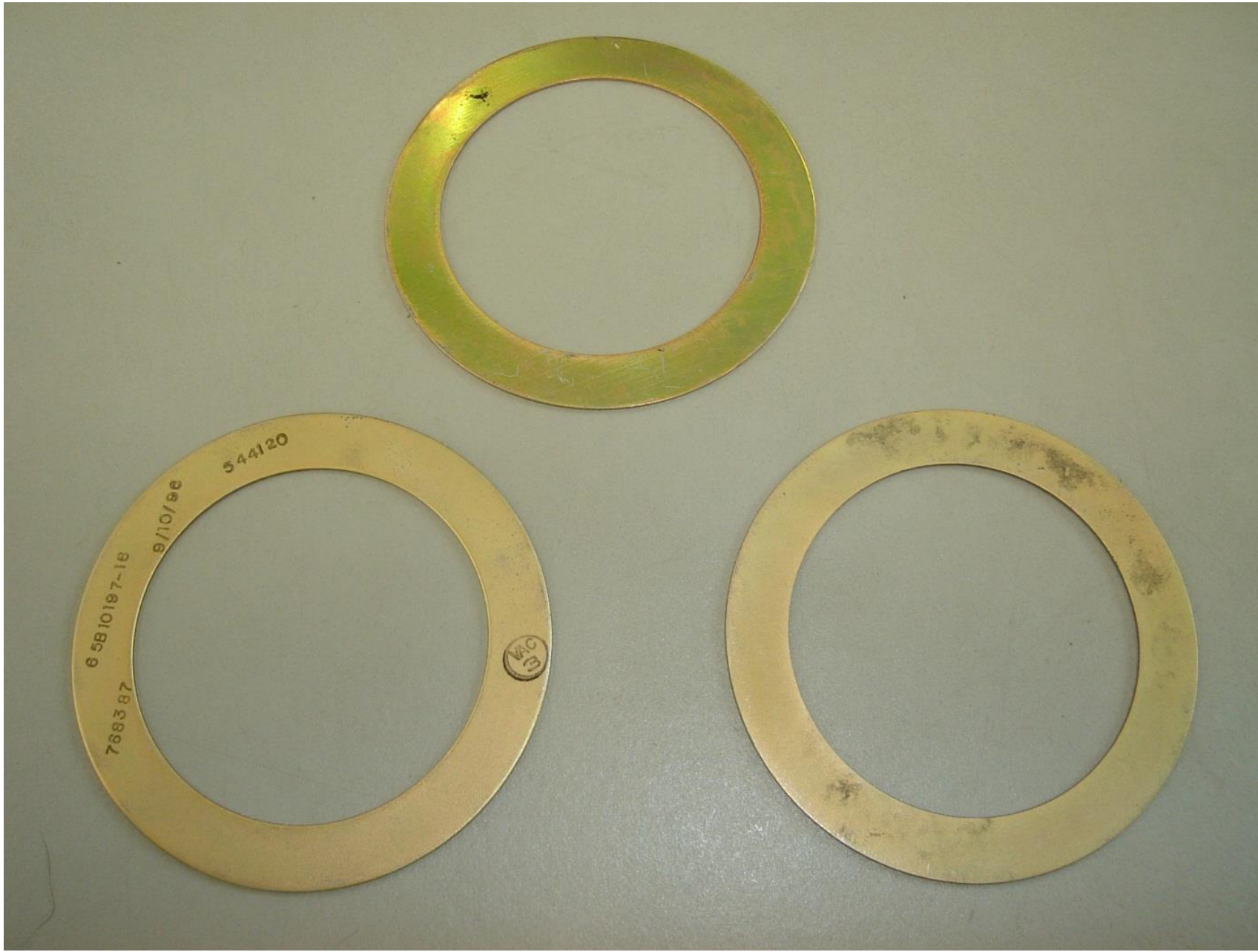
# EVIDENCE OF PREVIOUS INSTALLATION:







# SURFACE BLEMISHES/DIFFERENCES:





# SURFACE BLEMISHES/DIFFERENCES:





# SURFACE BLEMISHES/DIFFERENCES:





# SURFACE BLEMISHES/DIFFERENCES:





# **SURFACE BLEMISHES/DIFFERENCES:**



*All three of this same part number appear different, but the Manufacturer provided proof of acceptance of this.*



# SURFACE BLEMISHES/DIFFERENCES:



*Although rejected by a distributor for discoloration, a picture was sent to the customer who accepted this as normal following a heat-treat operation during overhaul*



# SURFACE BLEMISHES/DIFFERENCES:





# SURFACE BLEMISHES/DIFFERENCES:





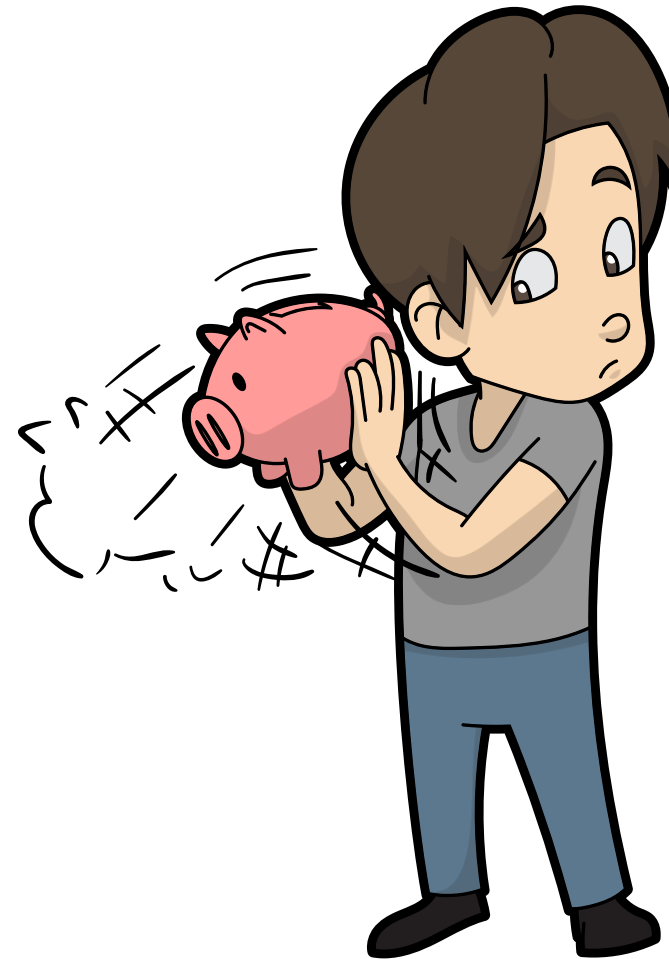


**Missing hardware**



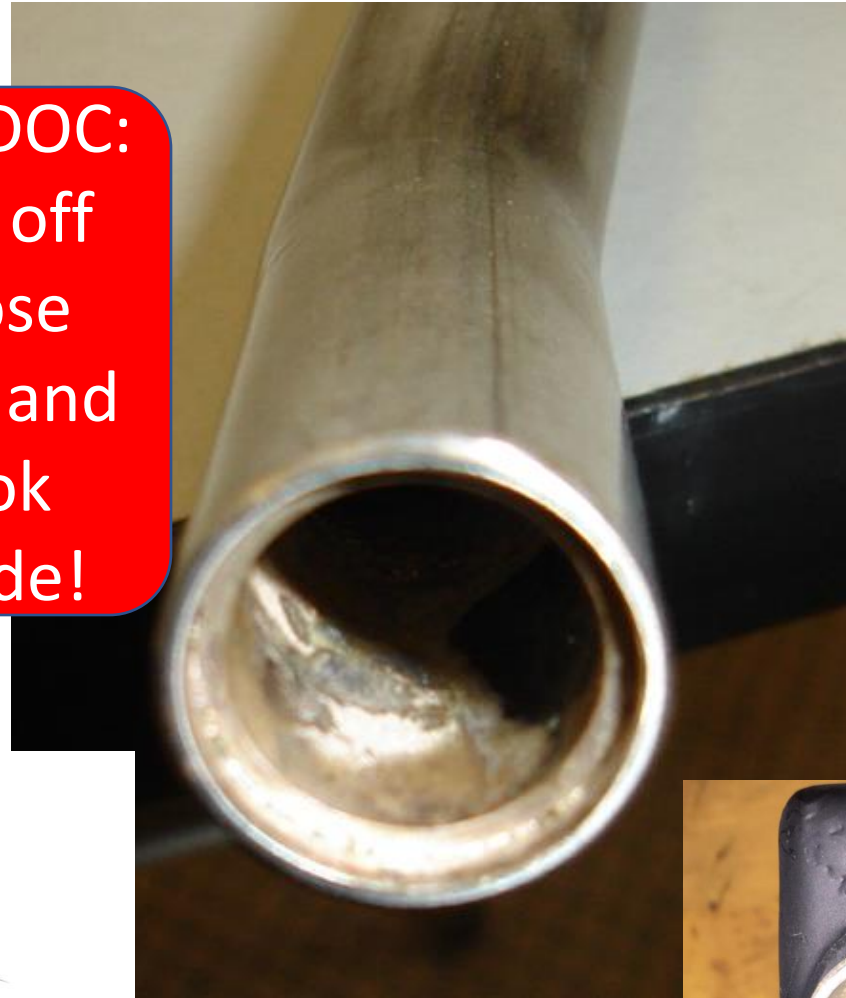
By the Way:

Don't be afraid to  
shake parts to  
check for internal  
loose hardware





HEY DOC:  
Pull off  
those  
caps and  
look  
inside!



No.. no.. don't smell it... 😂





# This part has a label that says it's ESD, but these are *not* ESD Caps



These two Caps are typical, correct ESD Caps.

For more ESD information, see Butterfly's training offering on the topic





## ***SHELF LIFE:***

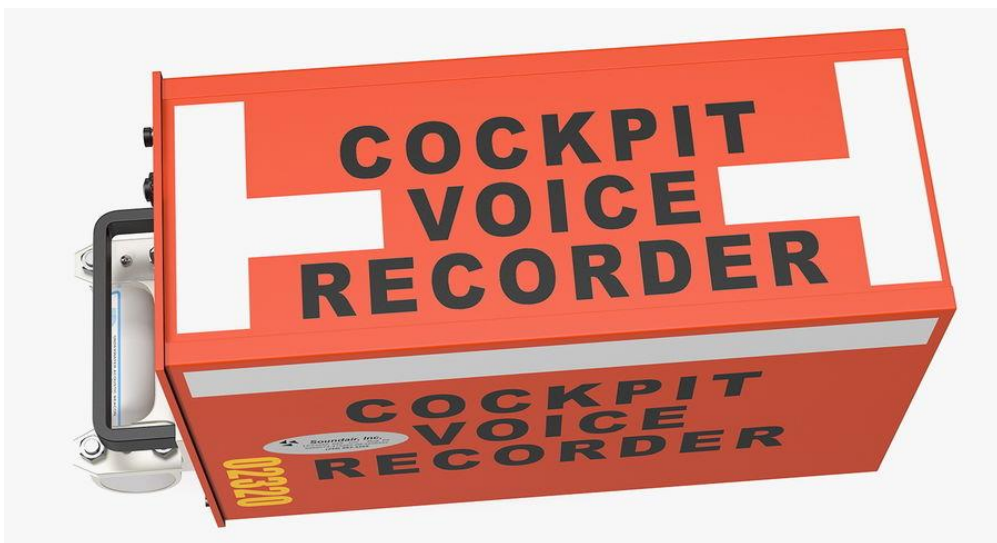
- For various reasons, some parts have been designated to have a limited shelf life, that is, after ***sitting on the shelf*** unused for a period of time, the parts are considered unusable. The shelf life period is established by the manufacturer. *NOT to be confused with Life Limited Parts.*
- **Typical parts with shelf life limitations include some parts with o-rings in them, batteries, or parts required by FARs to be tested periodically such as ATC Transponders.**
- **Some consumables like alcohol, paint, sealants, and grease also have shelf life limitations.**



Parts with Batteries:

Cockpit Voice Recorders (CVR)

Flight Data Recorders (FDRs)

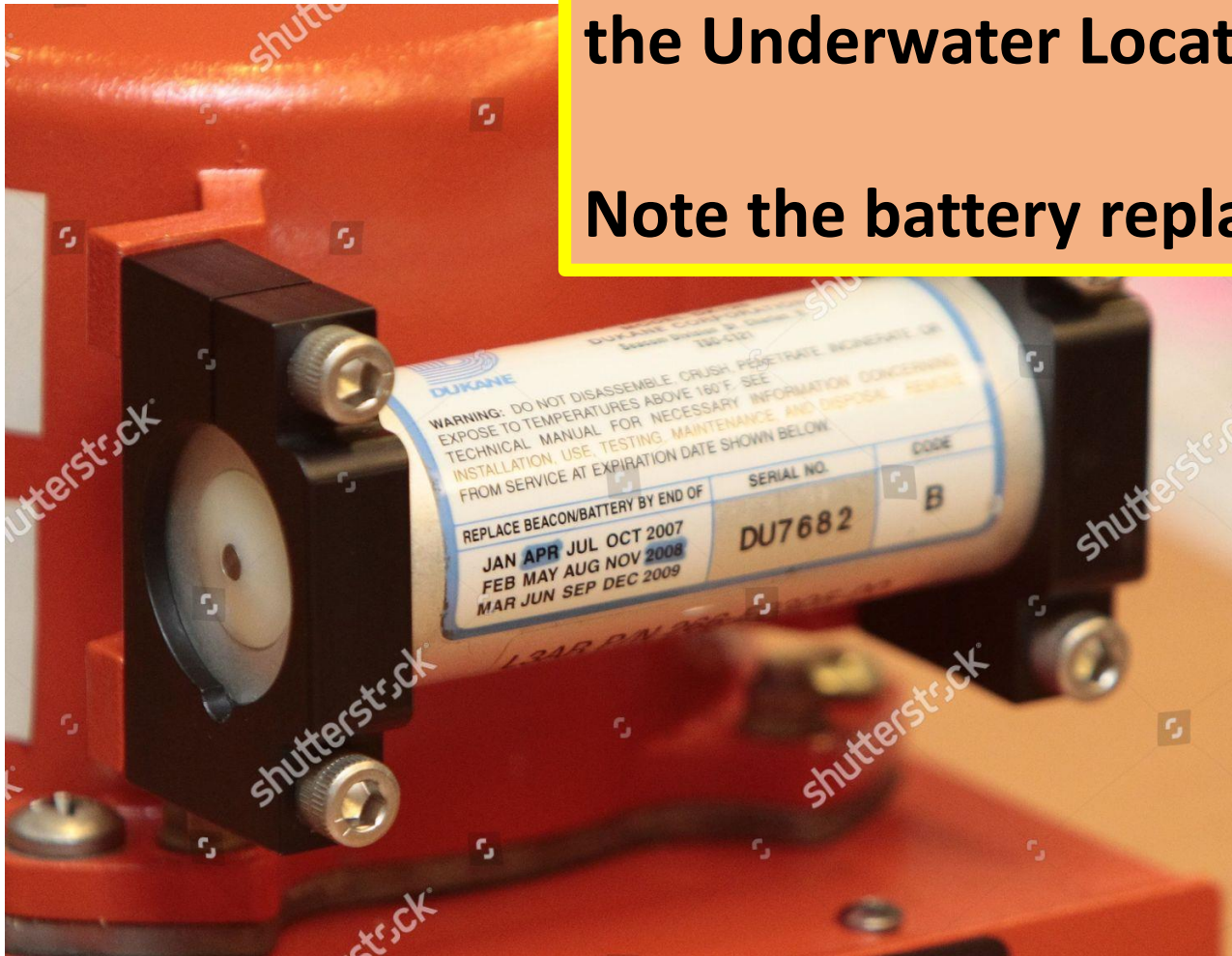




## Parts with Batteries

For FDRs and CVRs, this is the part with the batteries;  
the Underwater Locator Beacon (ULB)

Note the battery replacement information on the decal







# Parts with Batteries

**Emergency  
Path  
Lighting**



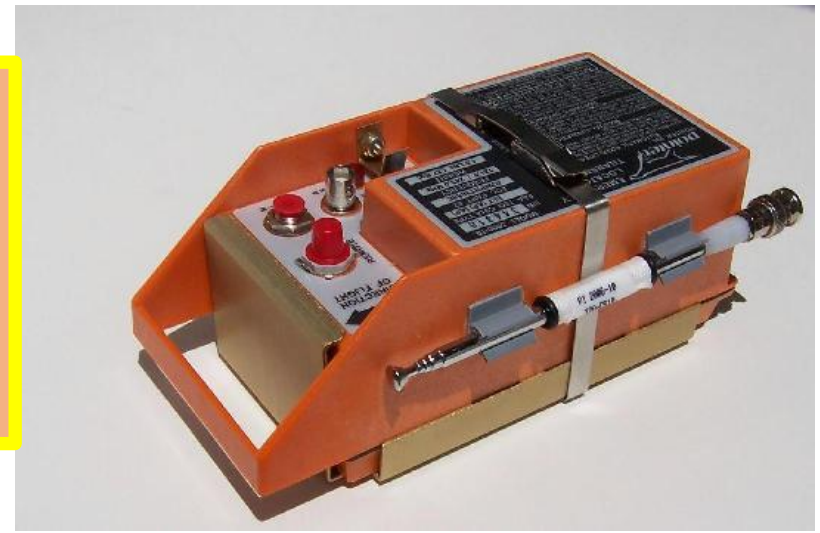
**Typical  
Battery Packs  
for the  
Emergency  
Path Lighting**





# Parts with Batteries

## Emergency Locator Transmitters (ELTs)



FCCID label location on ELT model ADT 406 AF-AP



# Typical Main and APU Batteries



NCSP B 53060 RM



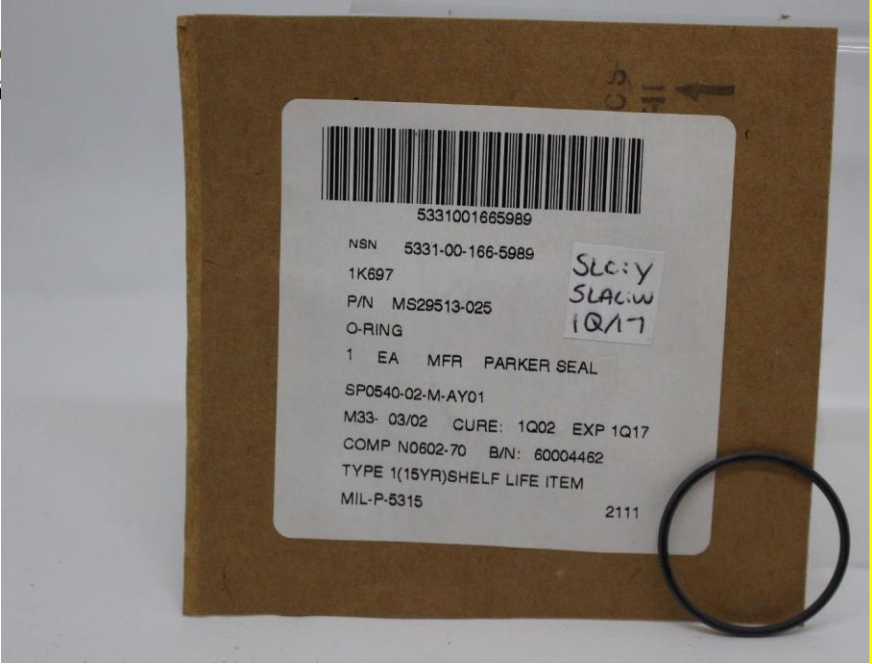
For anything that is a battery or may contain batteries, the following should be considered

- That it's HAZMAT
- Storage of the part on a trickle charge extends its shelf life. A trickle charge is an application of a small amount of electrical energy to keep it charged.



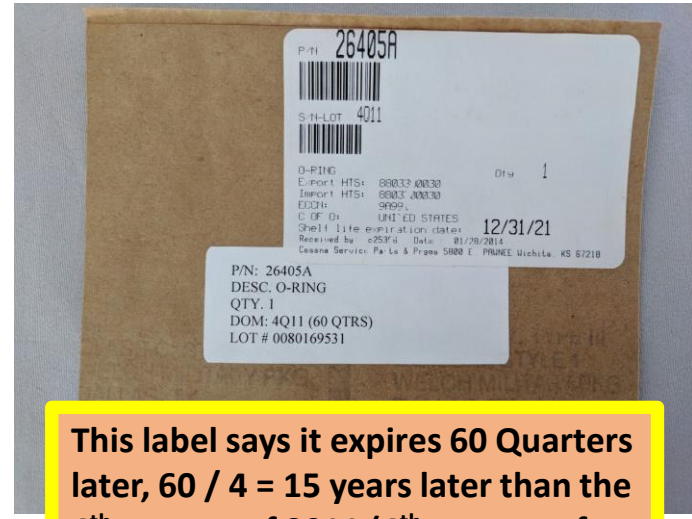


**OH  
NO!**

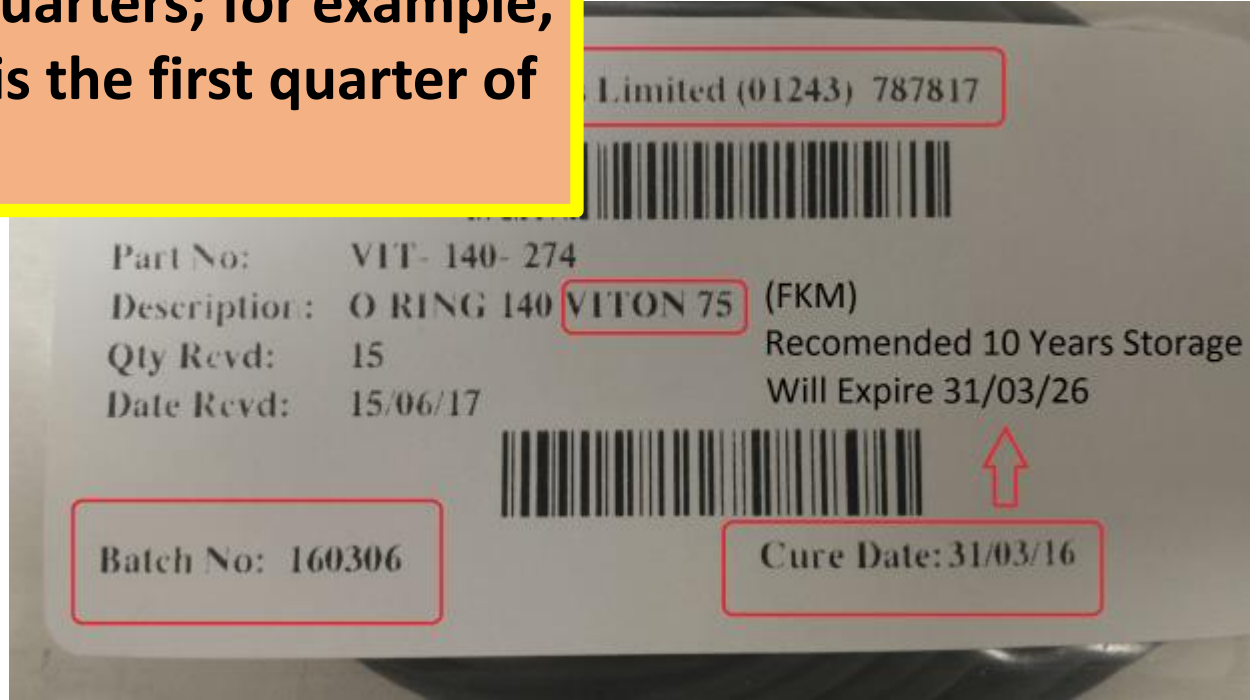
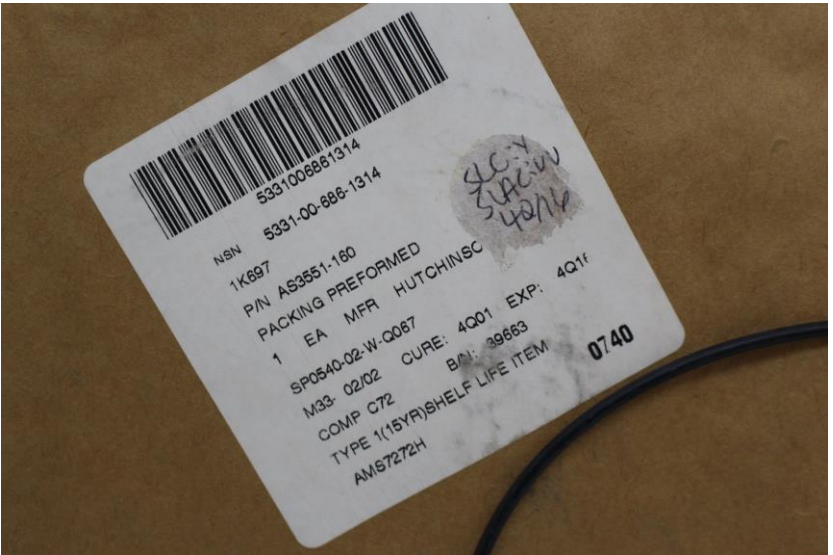


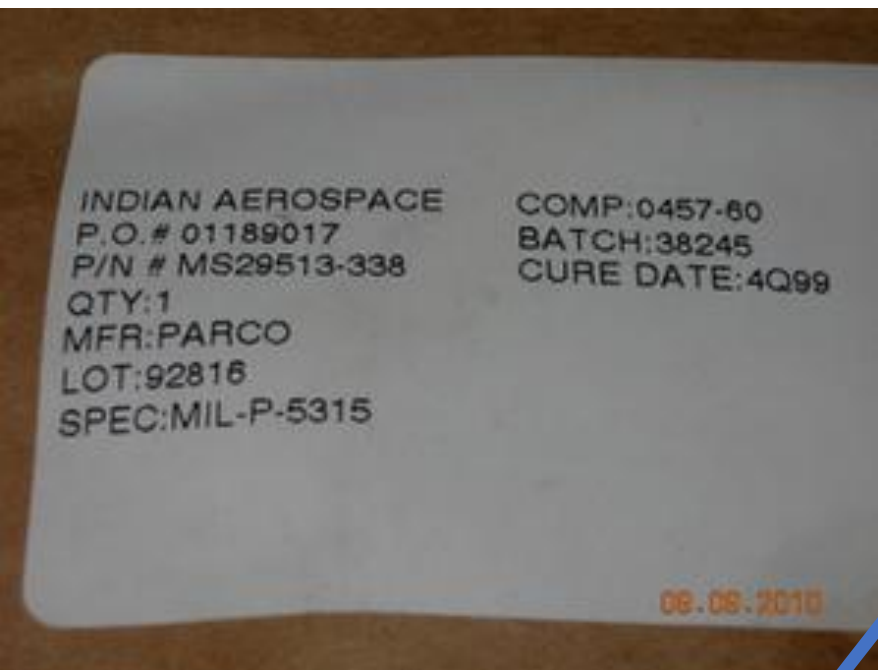
## O-Rings, Packings

- Cure Dates are the equivalent of manufacturing dates
- Cure Dates and expiration dates are often expressed in yearly Quarters; for example, "1Q17" is the first quarter of 2017



This label says it expires 60 Quarters later,  $60 / 4 = 15$  years later than the 4<sup>th</sup> quarter of 2011 (4<sup>th</sup> quarter of 2026)





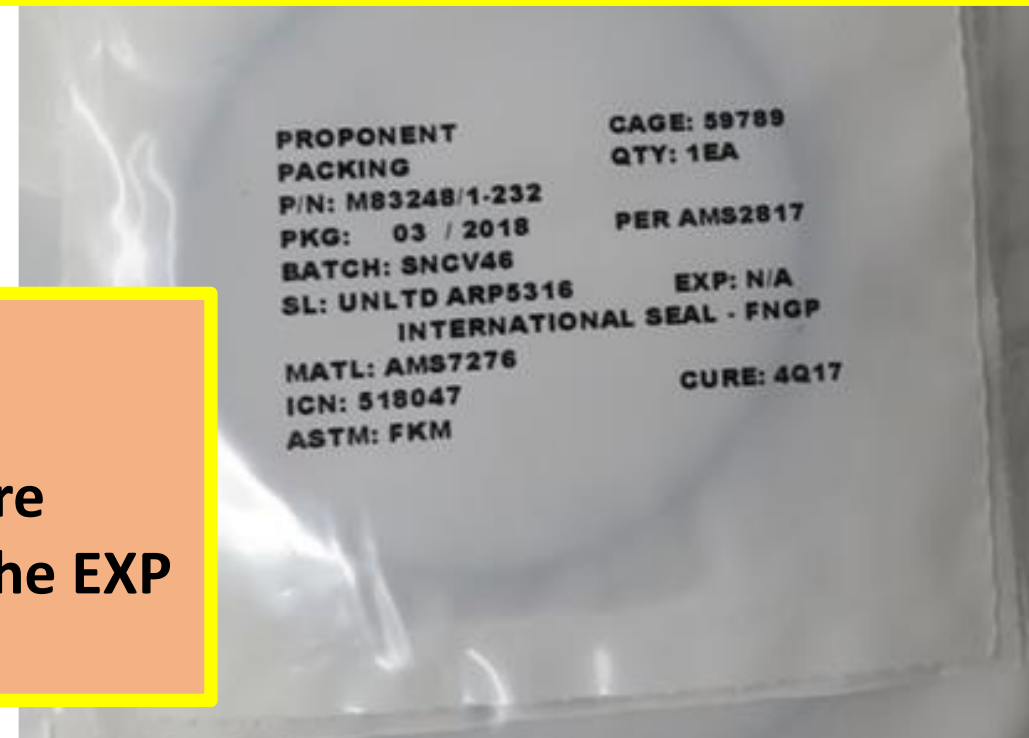
A continuous source of frustration are labels that show a cure date but no stated expiration date. For more information, read this informative article titled "SHELF LIFE CHALLENGES"

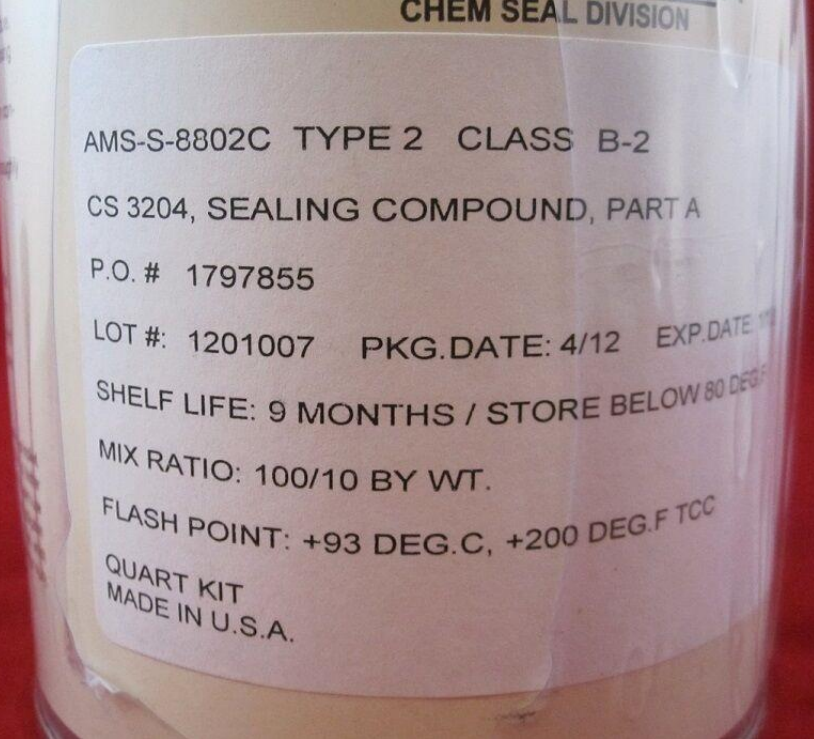
<https://www.aviationsuppliers.org/SHELF-LIFE-CHALLENGES>



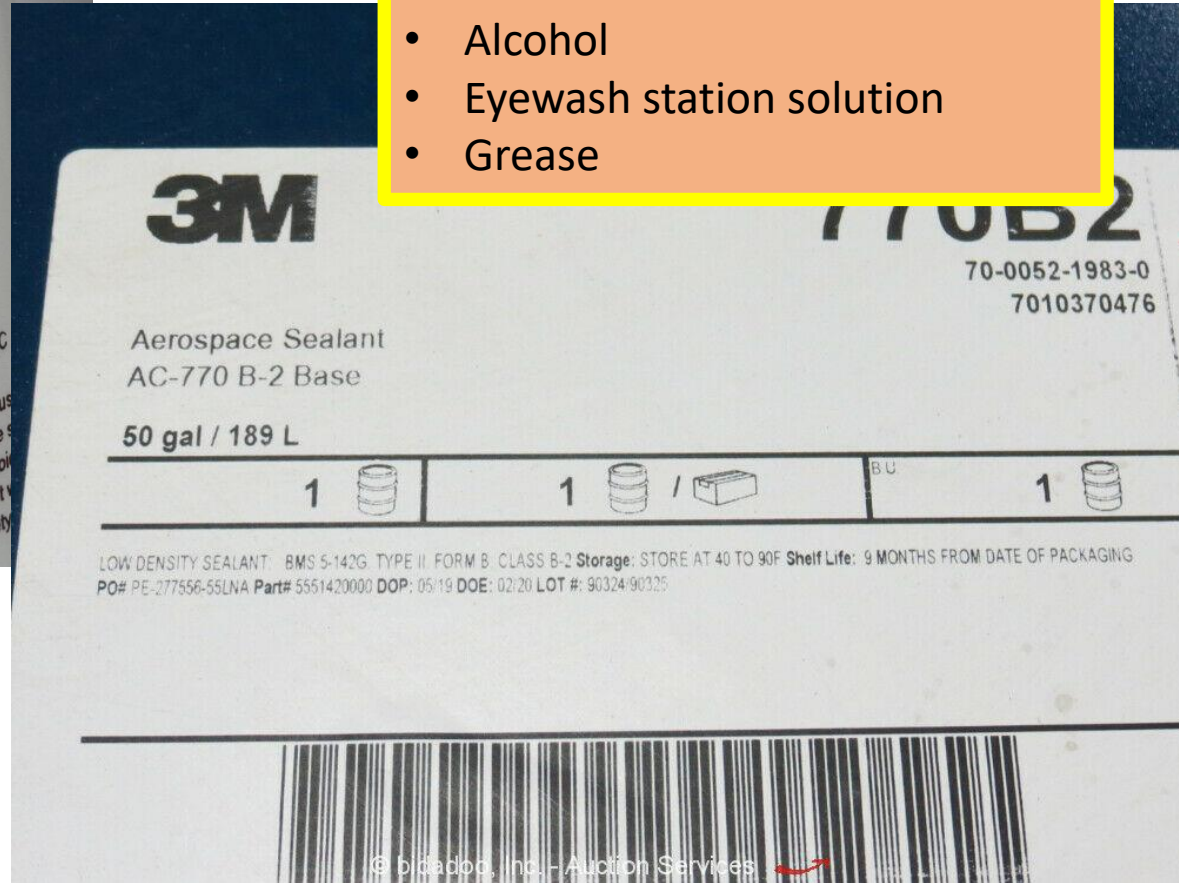
**Bravo:**

**This one has a cure date, but states the EXP is 'N/A'.**





- Additional consumables with known shelf life may include:
- Sealants
  - Epoxy
  - Paints
  - Primers
  - Loctite and its equivalents
  - Solvents
  - Alcohol
  - Eyewash station solution
  - Grease

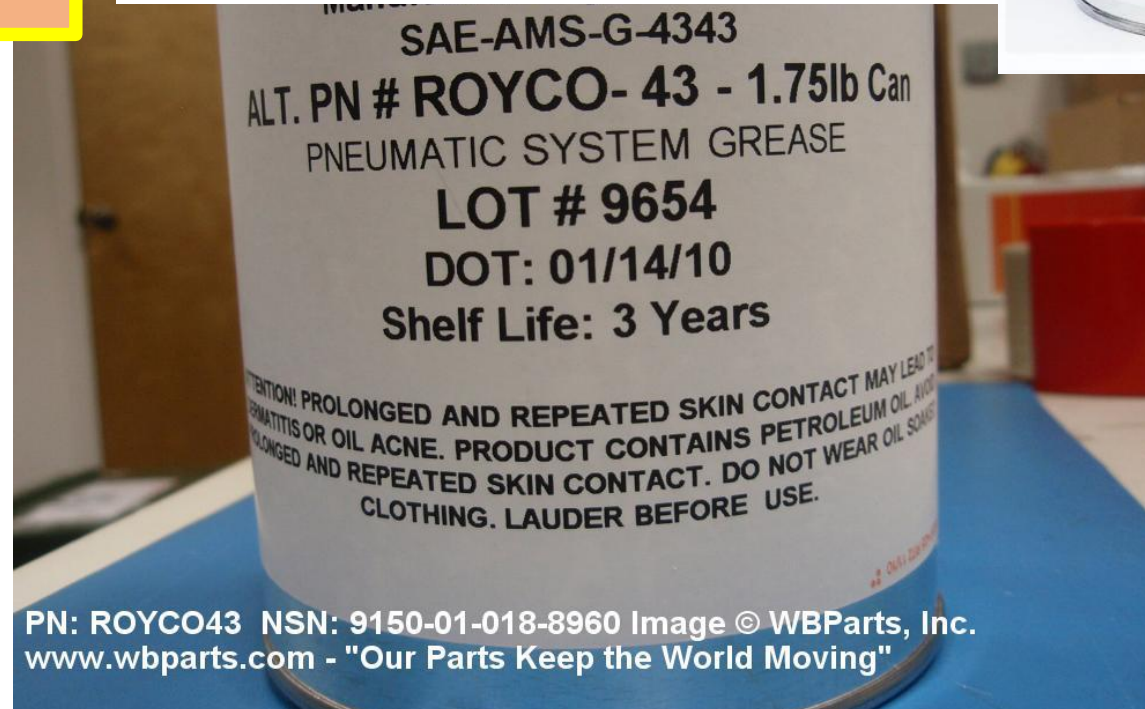
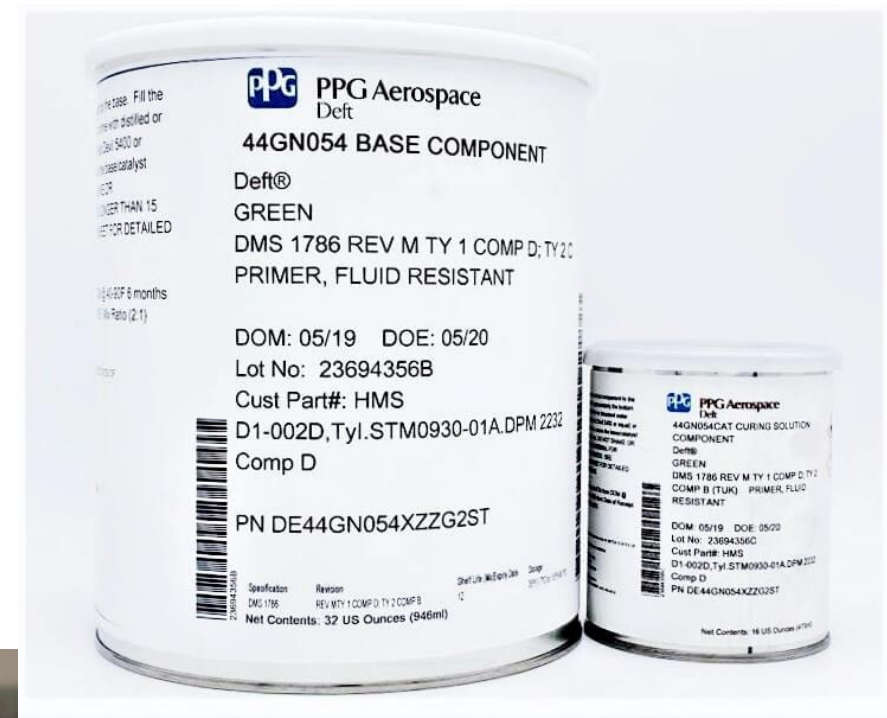


© Premier Farnell  
Copying of image is prohibited



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- Eyewash station solution
- Grease



PN: ROYCO43 NSN: 9150-01-018-8960 Image © WBPARTS, Inc.  
www.wbparts.com - "Our Parts Keep the World Moving"



## Life Vests



## Rafts and slides



Shelf Life,  
Also:

## Medical Kits



# Shelf Life, Also:

In some cases there are bearings that have shelf life. In most cases this is due to the shelf life of the preservative lubricant/grease, not the part itself.

Some companies may have their own procedures to clean and then reapply the preservative lubricant/grease and then re-establish a new shelf life date.

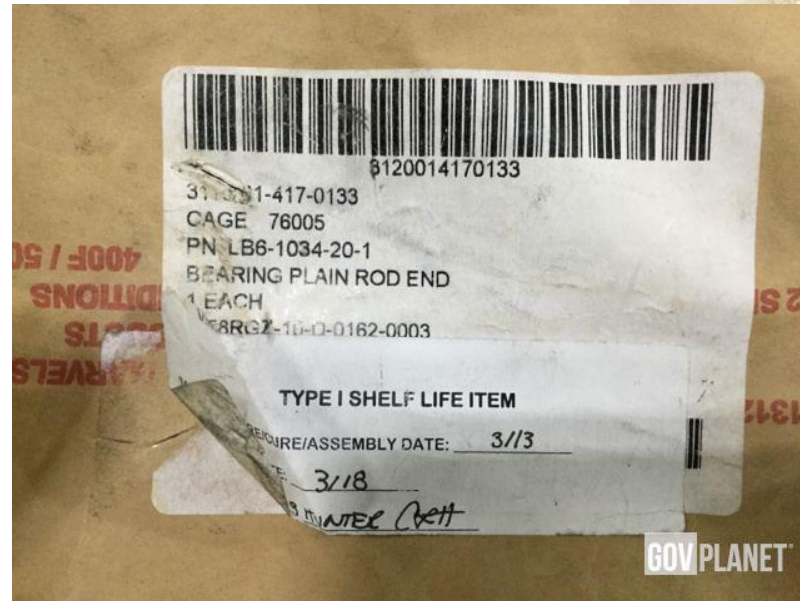
Sometimes the shelf life is tied to the manufacturer's codes which are not clearly evident without consulting the OEM specifications data



3110-01-226-8783  
CAGE 1XLG2  
PN: 04008  
BEARING,BALL,ANNULAR  
1 EA  
SPE4A6-17-V-8914  
ZZ-03/17  
SHELF LIFE



GOV PLANET



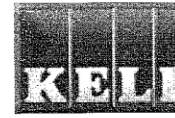


# Calibration Labels

Here's a typical Certificate of Calibration, the part, and the calibration label affixed to the part.

Inspect and compare the cert to the label to assure that:

- The due dates match
- The part serial number or unique ID match
- That the calibration results state the part passed



## Certificate of Calibration

# KELC-616351

Kimball Electronic Laboratory, Inc.



Purchase Order # S/T#JR07242019

**Calibration Performed By:**

**For:** UNIT0001

KIMBALL ELECTRONIC LABORATORY, INC.  
8081 W 21 LANE  
HIALEAH, FL. 33016

**Equipment Information** KELI I.D.: KEL-112923

Description: WRIST STRAP TESTER  
Manufacturer: POMONA  
Model Number: 6086  
Part Number: 341  
Range: VARIOUS  
Serial Number: 0603063  
Customer I.D.: N/A  
Cust. Barcode: N/A  
Cust. Dept.: N/A  
Specifications: MANUFACTURER

Cal Date: 01-Aug-19  
Cal. Due Date: 01-Aug-20  
Cal. Interval: 12 MONTHS  
Received: IN TOLERANCE  
Calibration Result: PASS  
Environmental Conditions: 74 DEG F / 44 % RH  
Performed By: GILBERT  
BORNO  
Procedure: SYN2097  
Cal Location: IN-HOUSE

This is to certify that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure at the points tested (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration is in accordance with Kimball Electronic Laboratory, Inc Quality Assurance Manual. KELI's Quality system is A2LA-Accredited to ISO/IEC:17025:2005 and compliant with MIL-STD-45662A and ANSI/NCSS Z540-1-1994. TURS when applicable are greater than or equal to 4:1; with expanded uncertainty used to calculate the Test Uncertainty Ratio, with a coverage factor of K=2 at a confidence level of approximately 95%, unless otherwise noted. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired. KELI will not take into account measurement uncertainty on conditional statements such as in tolerance, out of tolerance, pass and fail. Kel's conditional statements will only take into account the nominal value at a specific test point +/- the tolerance. Measurement uncertainty will be stated on the certificate and where applicable at each measured test point. KELI shall allow the customer to assess and conclude if the results meet their specific needs.

**Calibration Remarks**

THIS UNIT WAS FOUND TO BE IN TOLERANCE AT THE TIME OF CALIBRATION.  
PERFORMED ROUTINE CAL. NO ADJUSTMENTS REQUIRED

**Standards Used To Calibrate Equipment**

Company	I.D.	Manufacturer	Model/PN	Description	Serial Number	Last Cal.	Cal. Due Date
KIM001	341	BIDDLE	72-6346-1	DECADE RESISTOR	95892	07-Dec-17	31-Dec-19

**Signatures:**

Technician:  
GILBERT  
BORNO

*Gilbert*  
01-Aug-19 2:14:18 PM

Quality Assurance:  
JAVIER  
BALCEIRO

*Javier*  
01-Aug-19 2:15:42 PM

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Kimball Electronic Laboratory, Inc. - 8081 W. 21st Lane - Hialeah, FL. 33016  
Tel: 305-822-5792 - Toll Free: 800-393-1094 - Fax: 305-352-3125 - Web: www.kellilabs.com



## Receiving Inspection Sampling Plans

Some of you may be required by contract or Quality Standard to have a Sampling Plan for the parts you inspect. For Example:

Quality Management Systems – Requirements for Aviation, Space, and Defense Distributors, AS/EN 9120:

***“2. ensuring that when sampling is used as a means of product acceptance, the sampling plan is justified on the basis of recognized statistical principles and appropriate for use.”***

Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations, AS/EN 9100:

***“2. ensuring that when sampling is used as a means of product acceptance, the sampling plan is justified on the basis of recognized statistical principles and appropriate for use (i.e., matching the sampling plan to the criticality of the product and to the process capability). “***

Contract Clause:

***“Supplier shall implement a sampling plan in accordance with ANSI ASQC Z1.4 or ISO 2859.”***

**A sampling plan** is a detailed outline of which measurements will be taken at what times, on which material, in what manner, and by whom. Sampling plans should be designed in such a way that the resulting data will contain a representative sample



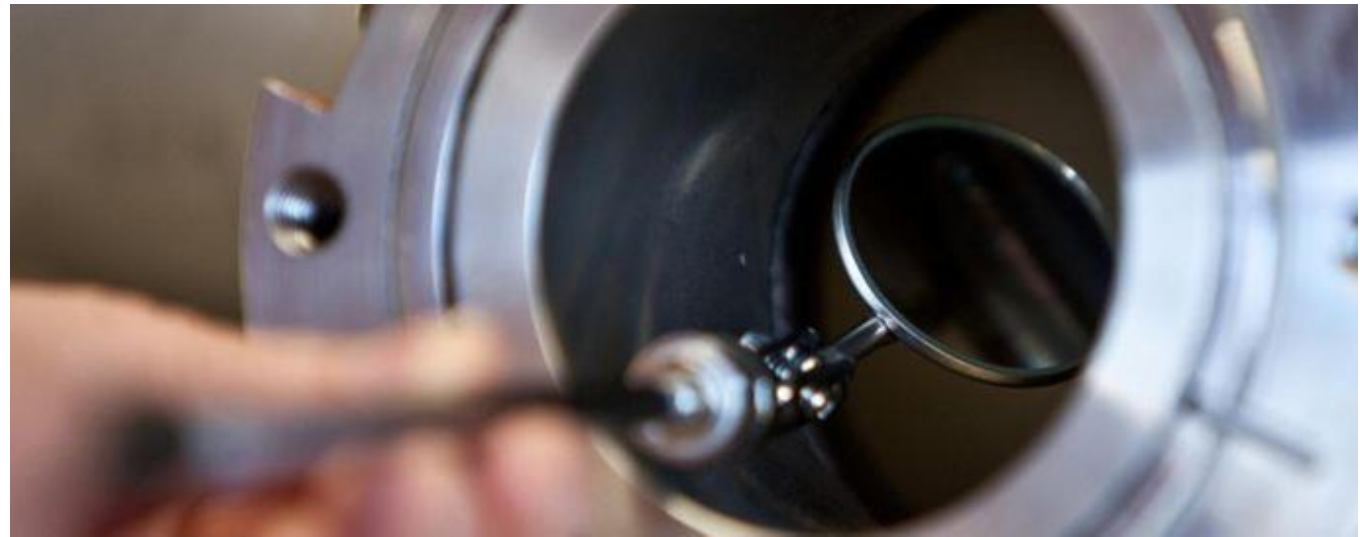
## Here's a simple Sampling Plan

Table 1 Sampling Plan – General Inspection Level II/Normal per ANSI/ASQ Z1.4  
(Accept on zero fails, Reject on one fail)

Lot Size	Sample Size
2 – 8	2
9 – 15	3
16 – 25	5
26 – 50	8
51 – 90	13
91 – 150	20
151 – 280	32
281 – 500	50
501 – 1200	80
1201 or Over	125



- 15.3.4 A random sample is selected from the lot per Table 1 and a 100% inspection of the sample is performed. One failure from the sample results in a rejection of the entire lot received.





## ASA-100 Paragraph 6.B:

**“Receiving inspection for aircraft fasteners shall include a sample visual inspection for general workmanship...”**

***What are you looking for?***

***General Workmanship could include:***

**Consistent head markings,  
if any**



**No cross threads**



**No machining burrs**



**Consistent finish**

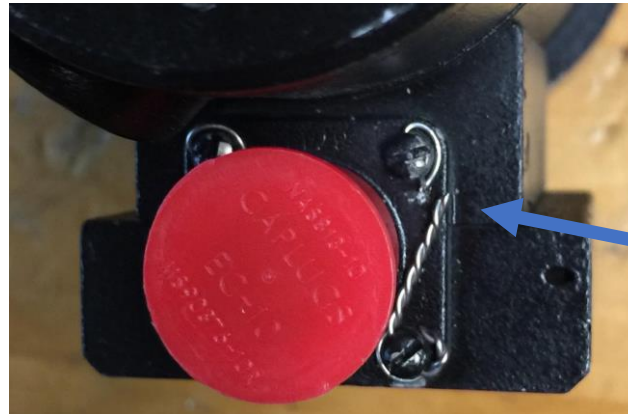
**Consistent length or  
height, and diameter**





## Drop Shipping:

- **When available, *look* at the pictures!**
- **Zoom in and look at other views in addition to the data plate.**



The safety wire is broken





That's all folks!

