Applicable To Hydrant Couplers Manufactured (3-20-2013 to 1-8-2016)
64800/64810 Series
64900/64910 Series
61525/64525 Series

Black Oxide Coated Stud Corrosion and Hydrogen Embrittlement (HE)

Functional Operation:
Flange studs are utilized as the primary fastening hardware to connect the upper and lower assemblies of the Hydrant Coupler. A total of 6 studs can be located along the center flange which effectively secures the upper pressure elbow to the lower coupler assembly.

During 2013 an attempt to improve field serviceability and repair lead to the decision to change the previously selected stainless steel stud to a black oxide coated high strength steel stud with a hex slot at one end. This hex slot improved ease of replacement and installation. The black oxide coating provides a degree of corrosion protection to steel which was taken into consideration during the selection process. The black oxide coated studs were replaced once again by stainless steel studs in 2016 due to a small number of failure reports.

Related Issue Black Oxide Coated Stud Corrosion and Hydrogen Embrittlement (HE) (P/N 221321):
We are aware of a small number of reports of corrosion related hydrogen embrittlement which may have, or have already resulted in stud material failure. A sample from a failed unit was analyzed by a metallurgy lab which found corrosion related hydrogen embrittlement to be the main factor for failure. There are a number of environmental and manufacturing factors which may induce hydrogen into steel such as temperature, electroplating, chemicals, cathodic and/or corrosion reactions. It is believed that active corrosion due to the operating environment created pitting within the steel stud leading to hydrogen stress corrosion cracking which in turn weakened the stud material allowing it to shear while under stress.

The majority of reports have originated from locations with a greater degree of corrosive factors such as locations near oceans, locations where salts are used, and locations where cathodic protection is used.

Internal Corrective Actions:
As of 01-08-2016 all black oxide coated steel studs (P/N 221321) were purged from inventory and disposed of. All assemblies in process were issued new stainless steel studs replacing the black oxide coated studs.

External Corrective Actions:
Locations which exhibited this issue were provided with replacement studs. Replacement stainless steel studs (P/N 221321) will be offered at no cost for 1 year from the date of this bulletin. Requests beyond 1 year will be reviewed on a case by case basis.
Figure 1 Black Oxide Stud with Surface Corrosion

Figure 2 Severe Corrosion and Buildup
Recommended Inspection:

Due to the type of failure reported, and a potential for fuel spillage, we recommend inspecting hydrant couplers currently in use. It is important to ensure the studs supplied with the hydrant coupler do not exhibit severe corrosion and are stainless steel. Check to ensure all studs, washers, and nuts are properly secured. If the coupler is equipped with black oxide coated studs it is recommended to contact your local distributor for replacement stainless steel studs (P/N 221321).

The image below is a visual aid which may help with identifying black oxide coated vs. stainless steel studs. Stainless steel studs may have debris or foreign material coating the surface due to environmental factors. For additional information please refer to related service manuals.

![Figure 4 Black Oxide Coated vs. Stainless Steel Stud](image)

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**Model and Serial Numbers affected:**

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<tr>
<th>Part Number</th>
<th>SN's from 3/20/13 to 1/8/16</th>
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<tbody>
<tr>
<td>61525 (All Options)</td>
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<td>64910 (All Options)</td>
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Technical Information and Repair:

Service manuals are available if repair is required.

- SM64800 – For all 64800 couplers
- SM64802 – For all 64802 couplers
- SM61525 – For all 61525 and 64525 series couplers
- SM64803 – For all 64803 couplers
- SM64804 – For all 64804 couplers
- SM64900 – For all 64900 couplers
- SM64902 – For all 64902 couplers
- SM64910 – For all 64810 and 64910 series couplers

Service manuals can be found at the link below:
http://www.eaton.com/Eaton/ProductsServices/ProductsByName/Cartari/CarterGroundFuelingMaintenanceManuals/index.htm

Distribution Network:
http://www.eaton.com/Eaton/ProductsServices/Aerospace/WorldwideLocations/IrvineFED/index.htm

General Technical Support Email:
GroundFueling@Eaton.com