

**APPLICABLE TO ALL CARTER API STYLE
HYDRANT COUPLERS***

PN700092705
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EXCESSIVE WEAR CAN CAUSE COUPLER EJECTION

BACKGROUND - A Carter Hydrant Coupler is designed to mate to an API/IP 1584 Hydrant Valve interface and provide a safe, dry-break connection that also has a breakaway feature, should a drive-away or knock-off force be applied to the Coupler. API/IP 1584 includes complete interface dimensional requirements but does not specify wear limits for either of the mating parts (the API Hydrant ring or the internal mating surfaces of the Couplers). The API/IP 1584 dimensional information was established as an industry standard so that all manufacturers' components will be interchangeable and mate with other manufactured products.

Recently, Carter has received several individual reports of its Couplers separating from the Hydrant Valve to which it was connected during normal fueling operations. Although this is more common than one would think, up to the present time this has always been caused by external forces (a strike from another piece of ground equipment or a pull-off force from a drive-away), which break some of the latching lugs. However, these recent reported separations occurred without breaking any of the latching lugs. These couplers and the top half of the Hydrant Valves were returned to Carter for investigation. In all cases, the age of the couplers ranged between 10 and 13 years old and had been in use in major international airports.

Carter has previously released Product News Bulletins covering the proper inspection gauges available for both the Coupler and the Hydrant Valve interfaces. Carter's Engineering Department conducted a very thorough investigation of the material returned to us and concluded that additional inspection procedures need to be added to our applicable Service Manuals, which will hopefully prevent future ejections of the Coupler from the Hydrant Valve.

INVESTIGATION RESULTS - summary of our findings:

- All couplers revealed substantial wear, but based on their age (10 to 13 years old), this wear is not unexpected for components used in difficult service.
- The internal wear mainly between the collar and the lower housing was found to be extreme. A closer investigation into this situation was conducted to determine the results of the wear on these internal surfaces and also to aid in the development of additional inspection tests that can be recommended to determine the end of the useful life of the coupler components. The latching lug wear was less severe, indicating that the lugs may have been replaced (possibly several times) during earlier overhauls.
- In one case, the upper hydrant housing was found to have been "resurfaced" to remove dings, dents, and/or other wear marks on the API interface ring, effectively removing important required material necessary to ensure the interface is capable of retaining the latching lugs in the connected position.

**60700-1
HYDRANT
COUPLER**



**64800
HYDRANT
COUPLER**

* Applicable to all Carter API Couplers including model numbers 60600, 60700-1, 61525, 64702, 64800, 64801, 64802, 64803, 64900, 64901 & 64902

Figure 1 (top right) shows the results of an excessively worn Coupler and how the collar shifted from the centerline and rotated around the lugs directly opposite the operating handle. The surface where the collar ID contacts the coupler body OD must be excessively worn for this to occur. This rotation results in the Collar lifting on one side (directly opposite the operating handle) .100 of an inch (2.5 mm) or more when the coupler is pressurized. When the Collar is lifted, the latching lugs become partially unsupported and the lugs start rotating toward the disengaged position. The lugs are made of 7075-T6 aluminum with an ultimate strength of 83,000 psi, and the collar is a casting made of 356-T6 aluminum with an ultimate strength of 30,000 psi. As pressure increases the lugs (being stronger) rotate and deform the internal ring in the collar until the collar is lifted to the full disengaged position and the coupler separates from the hydrant valve.

RECOMMENDATION The following procedure should be incorporated into your maintenance program for all Carter Couplers (regardless of Coupler part number) and Hydrant Valves made to API/IP 1584 Specification:

1. Periodically use the 60554ST1 Gauge on all API style hydrant valves to determine whether the interface configuration is within acceptable wear limits. See the appropriate service manuals for instructions on its use. If the hydrant valve fails the 60554ST1 wear test, then the upper housing or replaceable API ring must be replaced.
2. DO NOT resurface or machine any of the surfaces on the interfaces on either the hydrant valve or the coupler. Removing material from these parts will increase clearances within the coupler/hydrant valve interface and make it more likely to result in a coupler ejection.
3. Periodically inspect all Carter Couplers for wear limits, as determined by the user. (Please note that the couplers that separated from the hydrant valves were over ten (10) years old and were excessively worn.) Quarterly inspections should be more than sufficient to identify possible problems well before the coupler wears beyond the safe useable limits.

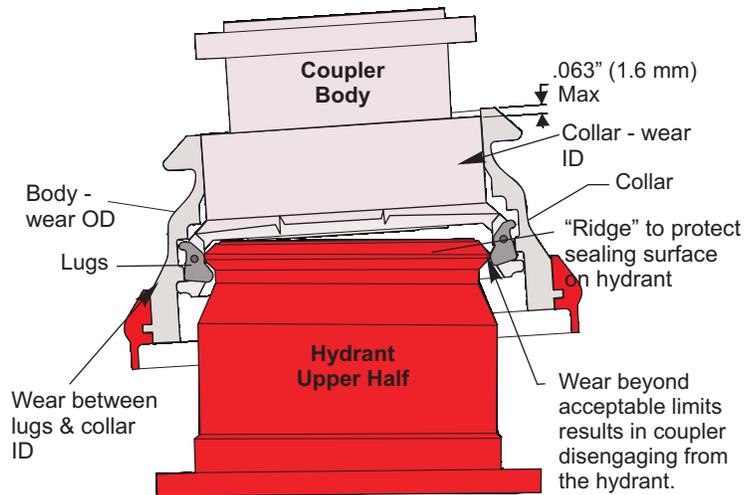


FIGURE 1 - RESULTS OF WEAR ON COUPLER/HYDANT INTERFACE

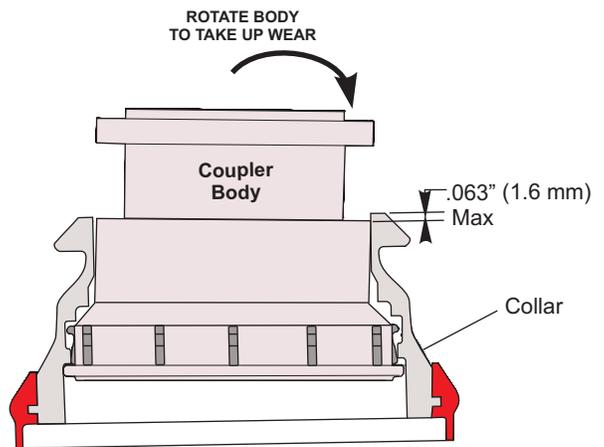


FIGURE 2 - INSPECTION PROCEDURE

A. Install the coupler to be tested onto a non-pressurized API/IP 1584 adapter that is within allowable wear limits (see Figure 1 above). Ensure that the collar has dropped completely into the engaged position. It is not necessary or recommended to open the poppet; however, if the coupler is pressurized or is full of fuel, this should be done over a basin to catch any fuel that may spill. Opening the poppet removes the capability to rotate the parts relative to each other. This test may require the participation of two people to achieve an accurate measurement.

B. See Figure 2. Using hands only (no tools), push down on one side of the collar to hold it stationary relative to the coupler body, while simultaneously lifting firmly upward from beneath the collar on the coupler's opposite side. This action takes up the clearance between the housing and collar. If these components are worn, this will result in the top of the collar lifting away from the coupler housing, which normally is flush with the collar. Take note of the offset of the collar relative to the housing (directly opposite the operating handle). Refer to Figure 2, and if the offset exceeds .063 inch (1.6 mm), the coupler has too much wear for continued use. On a new coupler these surfaces would be flush or the housing would be slightly proud of the collar by approximately .025 inch (.6 mm) due to manufacturing tolerances.

C. If the coupler is within the above acceptable limits, then use the 61362 Gauge to complete the additional wear checks on the latching lugs. These checks will indicate wear on the individual latching lugs when the new gauge is used in accordance with the Service Manual or our Product News PN900051505.

D. If a lower coupler half fails the "lift test" outlined in A. thru C. above, it can be disassembled and inspected and maybe one of the two components may be reused with a new mating part, as long as the "lift test" is repeated following the assembly and it passes the limits set forth above.

The majority of wear will be found on the latching lugs, and they will be found worn and require replacement many times before the excessive housing and collar wear will be seen. Please note that changing only the latching lugs when excessive housing and collar wear is present will NOT fix the problem. In fact, the new lugs will only aid to deform the ID of the collar further accelerating the collar clearance and the possibility of a coupler separation.