

HYDROSTATIC TEST REPORT

DATE: 8-2-11 EMS

- Couplings:** Male thread: 10" Campbell Combination Nipple Square Cut, both ends
- Fitting/sleeve system rating to TBD
- Hose:** Water transfer hose: 10" Goodyear Plicord HD rated to 100 psi.
- Attachment:** Crimped: plated steel sleeves
- Goal:** To exceed 300 psi (hose WP of 100 psi. @ 3 to 1 Safety Factor for water service)
- Results:** The hose exceeded 3 times WP. Hose burst at 360 psi.

This test was conducted to ASTM D380 standards except for slow pressurization due to the large volume of the assembly. See engineering details below.

HOSE: 10" Goodyear Plicord HD hose, initial length of 24", WP of 100 psi. This hose can best be described as a thin wall hose comprised of a black slippery inner liner about 1/16" thick, followed by an off-white colored fabric appearing reinforced layer, more rubber, more fabric and the final outer layer of a black colored unknown elastomer.

END CONNECTION #1: Assembled by Campbell, HAS-40 SQ, a new steel 10" Campbell combination nipple with a square cut end, welded to a 1/2" thick plate for closure. A SPS101048 plated steel sleeve was used. The assembly was very easy by placing the hose inside the sleeve, then dropping the hose over the fitting. The hose wall on this end measured between .295" and .304" for a .300" average. The latest crimp chart A, due to expire 4-30-12, was read for the selected sleeve and interpolated for the crimp diameter. This end was crimped to $\phi 10.714$ " using a Custom Crimp CC-1000 with # 215 dies. The crimp was accomplished using multiple hits to creep up on the accurate crimp and not cause finning or bumps since the crimp dies were much smaller than the sleeve. The crimp diameter was verified with a pi tape. A GFS-3 female spud was welded to the closure plate of the HAS-40 SQ and attached to the tester via a length of previously used 1" steam hose with ground joints and ferrules. The end of the sleeve was marked on the nipple and hose end, see first connection photos.

END CONNECTION #2: Assembled by Campbell, HAS-40 SQ, a new steel 10" Campbell combination nipple with a square cut end, welded to a 1/2" thick plate for closure, with the same sleeve and methods as above with the following exceptions. The hose wall on this end measured between .294" and .312" for a .303" average. The latest crimp chart A, due to expire 4-30-12, was read for the selected sleeve and interpolated for a crimp diameter of $\phi 10.718$ ". This end was connected to our standard ground joint valve adapter with valve attached using a GFS-3 female spud that was welded to the closure plate of the HAS-40. The end of the sleeve was marked on the nipple and hose end, see second connection photos. All of the assorted ground joint connection nuts were hand tight.

TEST: The assembly was filled with water while the second end was propped up so air could be evacuated from the system by use of the valve at the free end. Water was flowed through the assembly for about 1 hour while the system was "burped". Inlet water temp was steady around 82° F. See in tester-1, in tester-2, and inlet temp photos. The assembly was made up and crimped 24 hours prior to testing.

Pressure was raised steadily but slow due to the extremely large volume of the tested assembly. Pressure rise was steady throughout the entire test. Pictures showing hose expansion and stretch under the sleeve were taken during the test, see test 200 psi & test 300 psi photos. The hose burst in a violent rip across the entire length of hose between the two sleeves. **The highest pressure recorded was 360 psi**, see hose burst and peak photo.

There was no permanent movement of the fittings or sleeves throughout the entire test. See end 1 and end 2 photos.

Prepared by Eric M Schrack, Engineer