Hose Assembly Inspection and Testing

Introduction:

Typically, hoses are designed to transfer product(s) and to operate in a dynamic work environment. This operation can present a serious safety hazard if safe operating procedures are not followed!

It is always necessary to know the conditions and application concerning the intended service of any particular hose before you use or request a hose.

Different hoses for different application are made from one or a combination of many different materials. Applications mostly use nylon, polyurethane, polyethylene, PVC, or synthetic or natural rubbers, based on the environment and pressure rating needed.

All hose and hose assemblies have a finite life. Proper care, inspection and testing will prolong the service life and reduce the incidence of failures in service. Service life of hoses can not be predicted because service conditions vary.

The Hose Inspection and Test Plan in the QC manual shall be followed to insure unsafe hose and/or worn, damaged or corroded couplings are removed from service.

Personnel performing the inspection and test, shall be trained in product and hose safety, inspection and test procedures, and rejection criteria. A record of this training shall be kept in the employment files of those personnel.

Personal safety and following cautions shall be taken when inspecting and testing hose assemblies:

1. Not over pressurizing hose assemblies. (working pressure should never be exceeded)
2. Using water as a test medium in hose testing. (In the freezing situations, Transport Canada's specialists suggested to perform the testing in a heated location)
3. Always rate the Working Pressure of the hose assembly by the lowest rated component (hose W.P. or coupling W.P. attachment method, whichever is lowest)
4. Using Nitrogen as a hose testing medium, is prohibited based on the followings:
    - Regulatory (according to item 7.2.10.5(c) of CSA-B620)
    - Temperature-Nitrogen made hose temperature very cold and most hoses will become rigid if their temperature were be less than their limit
    - Health-Inhalation of a Nitrogen may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness, and ultimately: death.

External inspection and test:

All hose assemblies shall be inspected as recommended by QC Manual or B620 standard, for the following items. Prior to inspection, the hose must be depressurized and laid in a straight position.

Inspect cover for cuts, gouges, worn spots, soft spots when not under pressure, bulging under pressure, or loose outer covering or any other condition that exposes the reinforcement.

Inspect cover for smashed, kinked, bulges, flattened, or permanently deformed wire braid, blisters or soft spots.

Inspect couplings for coupling movement or slippage which could be manifested by misalignment of the coupling with the hose, or excessively worn hose couplings; or coupling parts. Also cracked, damaged or badly corroded couplings or other signs of significant deterioration and loose, missing or damaged marks, bolts or fastenings on bolted hose coupling assemblies, bands, clamps, shields or guards plus deteriorated legibility or absence of the serial or identification number and HAWP.

Pressure test:

Each hose assembly if doesn't have any damage identified in external inspection shall be pressure tested annually. We conducting hydrostatic test as a pressure test

The hydrostatic test not only tests for leakage, it confirms the assembly's structural integrity. The assembly shall be pressurized with water to the maximum test pressure of the assembly and maintained for a sufficient length of time to permit a visual examination. Contact the manufacturer for maximum test pressure for each hose. To guard against corrosion, the chloride content of the water used for testing austenitic stainless steel should be controlled to less than 50 ppm (parts per million). The minimum testing time should be five (5) minutes. Any evidence of leakage or permanent deformation is cause for rejection.

Each hose assembly shall be pressure tested in accordance with the following test pressure:

- for gravity off-load hose assemblies (drop hoses), not less than 69 kPa (10 psi);
- for vapour recovery hose assemblies on TC 406 tanks and the equivalent and substitute tanks identified in CSA B621, not less than 69 kPa (10 psi);
- for vacuum hose assemblies on tanks loaded by vacuum, used exclusively for vacuum loading, and marked "vacuum only" in place of HAWP, not be less than 69 kPa (10 psi); However it is not applicable to vacuum hoses that are an integral part of a boom assembly or vacuum system on tanks loaded by vacuum; and used exclusively for vacuum loading;
- for all other hose assemblies, the greater of 120% of the marked HAWP of the hose assembly and 518 kPa (75 psi).

Note1: If the hose and its attached couplings/ fittings are documented as conforming to CSA B51 or ASME B31.3 and marked "CSA B51" or "ASME B31.3" by the manufacturer, or documented as CSA-certified hose assemblies and marked "CSA-approved", they can pressurized and tested with Nitrogen

Note2:
In cold temperature where make water freezes and make it hard for hose testing, hanging the hose up to drain and then just blow shop air from their compressor through it for a while.

To pass the pressure test, the hose assembly shall hold the pressure without bulging, distortion, or leaks for at least 5 minutes when isolated from the pressure supply.

Markings and report:

A hose assembly that has passed the inspection and pressure test shall be marked in a manner that will endure the rigours of daily use, either by stamping on an end fitting or by using a securely attached metal tag or washer, in letters not less than 5 mm (0.2 in) high, with the month and year of the test and inspection. The depth and location of the stamping shall not degrade the pressure rating of the hose.

Following an inspection or test, a report outlining the results shall be prepared by the facility performing the hose testing and inspection and shall be retained for at least two years by this facility and by the hose assembly owner. The report need not comply with Clause 7.3 but shall identify the name and address of the facility responsible for the inspection and test, the hose assembly serial or identification number, the HAWP, the date, and the nature of the inspection or test.