ENVIRONMENTAL RISK MANAGEMENT AUTHORITY
ERMA New Zealand
NGĀ KAIWHAKATŪPATO WHAKARARU TAIAO

11 December 2009

Safety Alert

Aluminium SCUBA Cylinders Manufactured from Alloy 6351

Background:

We have received reports of incidents of cylinder failure worldwide following the filling of SCUBA / SCBA cylinders manufactured from Alloy 6351.

An incident in Australia this year resulted in serious injury to the person filling the cylinder.

The failure is caused by sustained load cracking (SLC) in the neck and shoulder area of the cylinder.

This problem affects **all** cylinders made from 6351 aluminium alloy. It is not limited to any one design of cylinder, or to those from any one manufacturer.

Failures can occur during filling of a cylinder as a result of diametrically opposed neck cracks. Typically, it will take years for a cylinder to develop this type of neck cracking. If thorough visual and hydrostatic tests are undertaken at the required intervals, the cracks will be detected well before they become dangerous. Consequently a cylinder will be removed from service before it reaches this state.

At Risk Cylinders:

- SCUBA cylinders manufactured from aluminium alloy 6351.
- Aluminium alloy cylinders 15 years or older.

Aluminium alloy 6351 is known to be used in cylinders manufactured between 1972 and 1988 with the following specifications (but not limited to): DOT SP6498, DOT E6498, DOT E7042, DOT E8107, DOT E8364, and DOT E8422.

Also, Australian-made aluminium alloy cylinders manufactured before 1991 to AS 1777, and earlier cylinders to DOT 3AL, have been identified as being susceptible to neck cracking.

The most predominant US manufacturer of cylinders with this alloy, between 1971 and 1987, was Luxfer. Walter Kidde cylinders have also been identified.

Preventing a Failure:

ERMA New Zealand recommends all Periodic Testers and Approved Fillers are vigilant with ensuring that at risk cylinders are up to date with annual visual examinations before filling. As always, check for surface gouging, cuts, dents, or damaged fittings, and if in doubt, do not fill the cylinder.

During the annual visual check, Periodic Testers should:

- Thoroughly clean the neck thread prior to conducting visual examinations.
- Use a bright light.
- Use a clean, good-quality, mirror during internal examination.
- Use a magnifying glass.
- Follow procedures in AS 2337.1.

If the early signs of a neck crack are identified, the cylinder shall be condemned to prevent it reaching a critical state.

When at-risk cylinders are regularly filled or held at high pressures (in heavy use), it is recommended that visual checks are conducted every four months.

Good Practice Prevents Failures:

The following recommendations should be part of every-day good practice:

- Do not fill, or use, a damaged cylinder.
- Do not fill a cylinder that is out of test.
- Do not fill a cylinder to a pressure that is greater than the working pressure stamped on it.
- Fill a cylinder slowly to prevent an excessive rise in temperature.
- Do not tamper with the valve unit, safety valve, fitting, or rupture disc.
- Maintain all equipment to prevent water being pumped into the cylinder during a fill.
- **If you suspect the cylinder is leaking whilst filling – STOP FILLING IMMEDIATELY. Evacuate the area and wait for the cylinder to discharge before investigating the cause of the leak.**

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