

JORDAIR – “BUILDING RELIABILITY & SAFETY”

Safety Circular Rev. #2 - 18.01.2003 Final Oil and Water Separators

- SAFETY WARNING -**DISREGARDING OF THIS SAFETY NOTICE MAY RESULT IN SERIOUS
PERSONAL INJURY OR DEATH**

There are final stage separators in service on breathing air compressors that have or will very soon have reached the end of the safe service life. In general aluminium alloy separators and filter chambers have a life cycle of 10 to 15 years depending on the recommendations of the manufacturer. Separator life is based on the final pressure and the number of auto-drain pressure spike cycles. The safe service life limitation of high pressure compressed breathing air final separators became apparent over 10 years ago as a result of failures in certain classes of separators. Prior to 1991 separators were commonly produced using 7075-T6 aluminium alloys, which was chosen for the high tensile strength and lightweight characteristics.

Most producers have supplied the 7075-T6 alloy separators for compressors used for high pressure breathing air SCUBA and SCBA refilling applications. These failures have taken longer than normal to come to light due to the relatively low operating hours per year in the Fire and Diving industries.

- SAFETY ALERT -

Compressor final separators from 7075-T6-aluminium alloy are not suitable to be used as a high-pressure final oil and water separator and represent a serious safety hazard. The hazard increases drastically at higher pressures and when “pressure spike cycling” occurs from an automatic condensate drain device.

- SAFETY WARNING -

Do not operate a high pressure breathing air compressor with a final oil and water separator if there is any suspicion it is made from this material.

SEPARATORS TO BE REPLACED

The 4” diameter aluminium 7075-T6 alloy separators represent the greatest safety hazard as this design has the shortest cycle life of approximately 5,000 cycles or 1250 compressor operating hours at 5000 PSIG. The key aspects contributing to the separator short cycle life are the final operating pressure and the cycle pressure spike failure characteristic of this material.

The inherent weakness of 7075-T6 materials is the susceptibility to fatigue, corrosion stress cracking and failure during repeated pressure cycle spikes as is experienced in separators when the automatic drain device is activated. The high final operating pressure of up to 6000 PSIG in SCBA recharging applications contributes to these separators short operating life span.

The separator types chamber in this **SAFETY WARNING** can be identified as follows:

- **TYPE 1** final oil and water separators manufactured in material 7075-T6 alloys. These units are typically 4” in diameter and have a top cap, a chamber and a bottom cap. The length will vary from 14 to 22” long.
- The chamber can be identified by size and external characteristics in plain aluminium, gold, blue, black and red anodizing.
- **TYPE 2** is a smaller diameter separator that was produced in a variety of alloys and must be replaced if 7075-T6 materials are used or an unregistered design that does not have a Boiler and Pressure Vessels CRN.

Any separator that falls in **TYPE 1** category should be replaced regardless of compressor operating hours. This type of separator construction can fail catastrophically at any time and it represents a serious safety hazard. Jordair recommends that any compressor unit with a separator of this construction be immediately removed from service and the separator be replaced with a CRN registered code compliant separator.

In order to comply with the Provincial regulations (Boiler and Pressure Vessels) in Canada the separator must be a registered design and have a CRN (Canadian Registration Number).

ACCEPTABLE USE OF 7075-T6 MATERIALS

The 7075-T6 alloys are suitable for use as final purification filters provided corrosion protection is provided by a hard anodize coating and the o’ring area is checked annually for any sign of corrosion. The drying and purifying filters are not subject to **“rapid pressure spike cycling”** provided a pressure-maintaining valve is set at 50% to 80% of the system nominal pressure. Safe operation is achieved by installing a check valve after

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the oil and water separator and a pressure maintaining valve set at 50% to 80% of the final system operating pressure for the SCBA or SCUBA cylinders being recharged.

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