RATCHET LOCKING MECHANISM

The ratchet locking mechanism on the models ST 20, ST 21, ST 21 T, ST 22, ST 23 and ST 23 T is found in several variations manufactured during its 30 plus year production run. There are several modifications that were carried out over the years. Some of the earlier variants are viewed as potentially dangerous in the light of todays pressure vessel legislation.

We had an incident in 1995 when the lid of an ST23 was blown off when it was undone because of residual pressure still in the vessel. As a result of this incident we had a consultation with the HSE and they made the following comments and recommendations:

"Lack of residual pressure device. One method to be explored could be the increase in size of the lugs and brackets to allow a step to be introduced thus containing the movement of the lid if there was residual pressure remaining."

"Interlocking between the lid vent [aircock] valve and the opening mechanism could be effected by increasing the size of this lid vent, fitting a ball valve (90º operation of lever) with its lever designed to interfere with the opening mechanism if it was in the closed position."

"My preferred solution would be to retain the current vent [aircock] (for air), fit a new outlet on the body itself with a ball valve strategically located near to the operating mechanism to allow a mechanical interlock such that the opening of the lid cannot take place with the valve in the closed position."

"I am mindful that GN PM 73 is 'guidance' and also that the maker has sold quite a number of units in the past and this is the first incident recorded. No doubt any ... discussions will include new equipment and also retro fitting."

"Ideally I feel we should push for [an increase in the size of the lugs] and [a residual pressure device] for new units. I feel that for existing units the practicability of retro fitting [an increase in the size of the lugs] is prohibitive involving wholerate cutting off, realigning, welding on etc. With regard to [a residual pressure device] I feel the cost of welding on of a new outlet, fitting a ball valve with interlocking is a reasonable request."

"The lack of both [an increase in the size of the lugs] and [a residual pressure device] in my view is not acceptable."

A B Smith
Specialist Inspector
Mechanical Engineering
Health & Safety Executive
12 January 1995

We therefore recommend any autoclaves found in service with the following characteristics be condemned unless the following work is carried out at the factory.

Locking Lug Length

The six locking lugs on the bottom ring of the earliest models were all the same length. This is potentially dangerous as the lid can disengage from all the lugs while the gasket joint has not yet been broken. The design was modified so that alternate lugs were twice as long. This ensured that the lid was still captive until the gasket joint had been broken.

Any models found with locking lugs all the same length should be condemned. We are able to weld longer lugs onto the ring if the autoclave is returned to the factory.

Residual Pressure Relief Valve (RPRV)

The later models were fitted as standard with an RPRV that was operated by a peg welded to one of the 'C' shaped locking lugs on the upper locking ring. This peg operates a cam attached to a ball valve installed under the lower locking ring. The action of the peg in the cam opens the ball valve as the lid is opened and closes the ball valve as the lid is closed.

Any models found without an RPRV fitted should be condemned. We are able to retro fit an RPRV if the autoclave is returned to the factory.

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