TECHNICAL BULLETIN
ETI FIRE SYSTEM COMPLIANCE

I would like to take this opportunity to clarify why ETI components and cylinders are indeed not made to the same standards as others being sold in the Australian market.

1) GENERAL FIRE SYSTEM COMPLIANCE. Australian Standard AS5062 was released in December 2006 and is now generally accepted as the standard for compliance for fire systems protecting mobile and transportable equipment. ETI undertook a listing program for its complete product package that would be recognised internationally. This was done under advice from the National Association of Testing Authorities (Australia – NATA. Our listing program was exhaustive over 4 years and involved independent audits to an inspection program meeting ISO standards. Furthermore, ETI chose a higher compliance level being an "Engineered Listing". This is because our major customer market is mining where equipment tends to be very large. As such we knew the pre-engineered classification had a test regime far too small to be applied to large equipment. Our listing is now recognised by NATA under its mutual recognition program. For more information see:- **ww.inspectionservicesbody.com**

Customers should also be aware that a Pre-Engineered listings to AS5062 is not an automatic acceptance for any application! The authority having jurisdiction (AHJ) has the responsibility to accept or reject a listing claim. Our advice is that the AHJ should restrict the application of compliant fire systems to a maximum of five times test scale. Currently there are suppliers of fire systems on the market complying to Pre-Engineered classification, using a one nozzle fire test and then listing their system design rules to use as many as 150 nozzles or more in a single system. Clearly this is a ridiculous interpretation of the test results and the AHJ needs to apply a duty of care in applying sensible limits to the acceptance of a claimed compliance. ETI tests on a large scale with a test scenario approved by an independent body including an independent expert fire engineer, for application to large systems typically used in mining!

2) INSTALLATION COMPLIANCE. It is important to note that AS5062 does not hold the manufacturer of the fire system the sole barer of the compliance responsibility. The owner, operator and fire system installer all have their responsibilities detailed. For example, AS5062 makes risk assessment mandatory in designing the fire system. The writer strongly supports this as a competent risk assessment and risk reduction will help the owner and operator reduce the likelihood of a fire, and in the event of a fire, will have equipment, procedures and training that will control the outcome. ETI uses an approved risk assessment procedure which has been incorporated into its listed design rules. Designers and installers receive comprehensive training in risk assessment.

AS5062 goes on to say that the handover of a compliant fire system must include a copy of The Risk Assessment, The Design Documents, The Certificate of Completion, The Service Program and drawings and/or photographic record of the installation. If you bought a fire system under AS5062 and did not get these documents, your installation does not comply! Today, suppliers of fire systems have a duty of care was to provide top shelf training, detailed technical manuals and a design procedures and tools that allow accredited designers to perform these tasks competently and actually deliver on the promise of compliance to AS5062.

3) STORAGE CYLINDER COMPLIANCE.
Storage cylinder compliance is very important. The following information is very detailed, so please take the time to read it so that there are no misunderstandings. There is a significant difference between ETI cylinders and those seen often in Pre-Engineered Listed systems. ETI cylinders are manufactured to AS 2470-2005. Stainless steel cylinders three-piece.This standard provides for gas cylinders produced in large quantities, and includes stainless steel construction. This is the correct and appropriate standard invoked in AS5062 which states in its scope " Pressurized containers above 10 L water capacity shall comply with the requirements of AS 1210, AS 2030, AS 2469, AS 2470 or AS/NZS 3509 as appropriate ".

Lets clearly look at these standards!
AS1210- is a standard that sets out minimum requirements for the materials, design, manufacture, testing, inspection, certification and dispatch of fired and unfired pressure vessels constructed in ferrous or non-ferrous metals by welding, brazing, casting, forging ".

AS2030 - This Standard specifies requirements for the verification, filling, handling, inspection, testing, and maintenance of refillable gas cylinders for the storage and transport of compressed gases, where the cylinders exceed 0.1 kg but do not exceed 3000 kg water capacity, other than acetylene cylinders, non-refillable cylinders and vacuum-insulated cylinders.

AS 2469 AND AS2470 - Steel cylinders for compressed gases, two piece construction and three-piece construction with longitudinal joints.

AS3509 LP Gas fuel vessels for automotive use!

ETI cylinders are made to AS2470 because that is the correct standard for the application being a three piece construction stainless steel cylinder which is used for a compressed gas. AS2470 invokes a suite of standards including AS1210 and AS2030 but not AS3509 because that is not an appropriate standard for fire fighting foam under compressed gas!

WHY AUTOMOTIVE LPG CYLINDERS DO NOT PASS STANDARDS SCRUTINY TO AS5062!

Did you know your fire system may be using an AS3509 automotive LPG gas cylinder for an application not covered in that standard!

We would like to make a few comments about this!

A. AS3509 standard was adopted by many fire system manufacturers many years ago before AS5062 because there were standard LPG cylinders on the market that had physical sizes and specifications similar to what was needed to design the new fire systems then being developed. While that may have been an acceptable procedure twenty years ago, after the evolution of standards since and the release of AS5062, substituting a pressure vessel for an application that it was not designed for is totally inapproriate. **It does not pass standards compliance under ETI engineered listing scrutiny or any credible scrutiny!**

B. Furthermore, while AS5062 makes mention of "AS/NZS 3509 with others, it qualifies it with "as appropriate". We feel there is no appropriate circumstance that a pressure vessel cylinder should be substituted for an application not covered in the scope of that standard! Therefore we advise "AHJ" not to accept substitute cylinders. Futhermore, this is unfair trading. ETI has invested heavily in developing correct compliance while others have substituted off the shelf products like automotive LPG cylinders to save development cost.

C. If an Authority Having Jurisdiction (AHJ) does allow the use of this cylinder as a substitute, we would remind all parties that the supplier of this cylinder has an obligation to maintain compliance and adherance to that standard! Three key points of note are :-

- This cylinder is made to different design rules to AS2470. It is only suited to automotive use as stated in that standard. Heavy vehicle application would not be within the scope of that standard!

- AS3509 states "Vessels of thickness less than 2.2 mm and vessels of stainless steel material grade 304 are suitable only for installation within a compartment of a vehicle" It is common knowledge that foam fire system cylinders are not being installed within the vehicles compartments and therefore these AS3509 cylinders are not installed in compliance with the standard they are sold under!

- AS2030 removes any doubt about all aspects of the particular standard applying. It says **"4.1 New gas cylinders intended for use in Australia shall be manufactured as follows: (B) In accordance with National or Supra-national Standards, in which case, the cylinders shall comply in all respects with the design and manufacturing requirements of that particular Standard".**

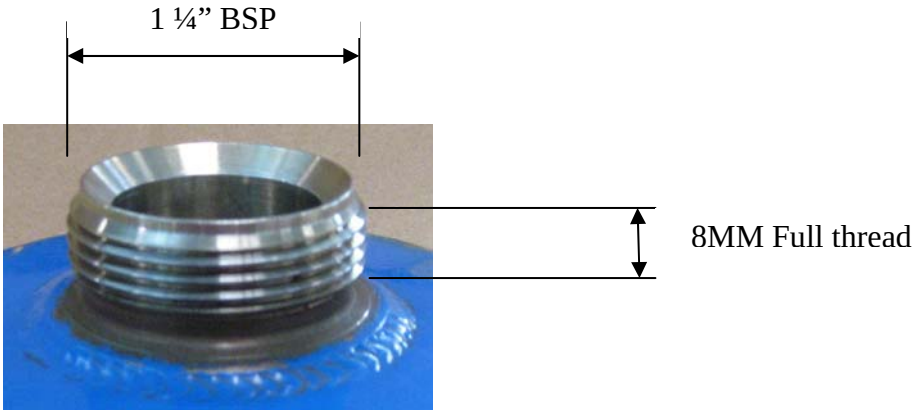
- Further saftey issues arise when refilling these cylinders. This is controlled under AS2030. It states **"6.1 Examination by filler prior to filling for use in Australia (b) The cylinder and valve are of a type and construction suitable for the intended contents".** This places confusion on the safe filling process as a check of the standard will show it to be an Automotive LPG cylinder while filling instructions are saying to fill it with something else. How shall this person be satisfied that this cylinder is suitable to be filled with something not covered in the standard it is made to. A diligent maintenance manager should also query the cylinder not being fitted into a compartment as required in AS3509 and verified by AS2030. Duty of Care responsibility would create a very confusing environment in such a highly safety focused activity, a very doubtful undertaking indeed!

D. There are other safety issues. The neck ring on fire agent cylinders makes the connection between the valve and the cylinder. This joint can be subject to significant forces if it receives an impact while being under significant pressure in the order of 1.2 to 2.0 Mpa normally. ETI responsibly contacted an Industry Expert who worked in Australian stainless steel pipe fitting manufacturing, and who was an eminent member of the Australian Stainless Steel Development Association (ASSDA). Mr. Kim Burton.

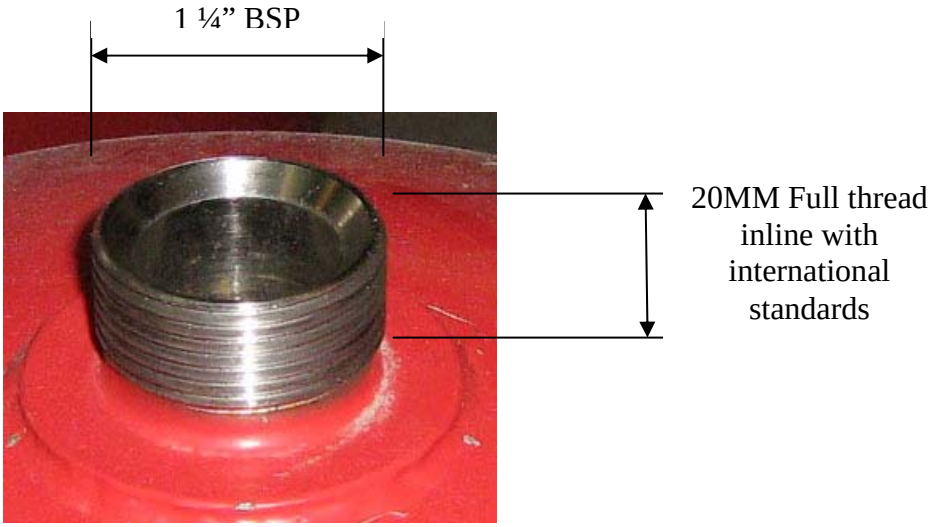
This expert had written comment within that organisation regarding many non conforming threads being sold on the market. He also sits on European standards comittees as an expert on pipe thread manufacture. He agreed with our design approach an agreed with our concerns about the fastening threads being used on these LPG cylinders. Examples we had seen had as little as three threads to make the connection on a 1 ¼" BSP pipe thread. As a qualified engineer and qualified trade machinist, I knew that this was totally inadequate. Study of the related standard AS1722.2 "Pipe Threads of Whitworth Form – Fastening pipe threads" does not specifically define minimum lengths of full thread for externally threaded connections. I acknowledge Mr Kim Burton, the prominent expert in the ASSDA, who assisted me in this matter. I quote him directly: **" As I explained there is no minimum thread length specified within AS1722.2, but there are some standard lengths published in other standards when it comes to these threads. DIN3852-2 gives you three lengths for the male thread, 20mm for standard fitting, 14mm for a short series and 16mm for screw plugs. I have gone through some other standards that reference G1¼ threads and they mostly call for 20mm length".**

SEE FOLLOWING PAGE FOR ILLUSTRATIONS

The photos below show a neck ring on an LPG cylinder with only three threads with an effective full thread height of only 8MM!



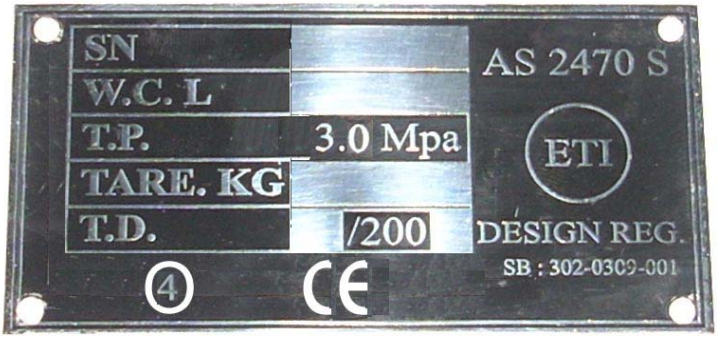
EXAMPLE OF A NECK RING ON AN LPG CYLINDER MADE TO AS3509 AND SUBSTITUTED AS A FOAM STORAGE CYLINDER!



EXAMPLE OF NECK RING ON AN ETI CYLINDER MADE TO AS2470.

HOW ARE ETI CYLINDERS CERTIFIED?

The reasons that different standards and markings appear on the manufacturers stamping are largely as a result of other suppliers substituting LPG automotive cylinders forfFire agent cylinders. These have different stamping requirements under that standard. ETI cylinders have always been supplied to the correct standard AS2470. ETI contract manufacturers were required to manufacture and supply to these standards. In March 2009 ETI achieved its full certification under the ISB inspection body to meet AS5062 under an international ISO standard recognised by NATA under its mutual recognition Agreement. ETI therefore implemented compliant manufacturing of cylinders to AS2470S in 2009. Our compliance plate is shown below as fitted to the base ring of our cylinders with a layout compliant to AS2470S.



AS2470 requires:-

(a) Manufacturer's mark. SEE - (ETI)

(b) Owner's mark (where applicable). - N/A

(c) Identification number (manufacturer's). STAMPED AT "SN"

(d) The water capacity, STAMPED AT "WCL"(LITRES)

(e) Test pressure, in megapascals. STAMPED AT "T.P"

(f) Date of original pressure test (month and year). STAMPED AT "TD"

(g) The tare mass. STAMPED AT "TARE. KG"

(h) The surface coating symbol. (4) INDICATES POWDER COATED.

(j) Design Registration number issued by a statutory authority. SEE - SB 302 0307 001

NB: The SB number meets the requirements at the country of manufacture. A NSW Work Cover certificate is also supplied to Australian customers for recognition under Australian law.

TESTING AND VERIFICATION TO AS2470

ETI cylinders have been independently verified to the requirements of AS2470. This has involved the implementation of advanced test aparatus by the Inspection Body, and the support of an internationally accredited laboratory of a major university. This testing briefly may be summarised as follows:

- A complete design is carried out to meet the all the requirements of AS2470 in regard to materials used, design and manufacturing processes used. This design has been checked and verified by Workcover NSW Australia. A copy of the certificate is enclosed.

- Mechanical tests are carried out at regular intervals to AS2470. These particularly verify that welding processes and materials continue to meet the design requirements.This involves laboratory tensometer testing to AS1391 and a range of specialised weld bend tests to AS2205.
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- A suite of pressure tests has been carried out by ETI that are called up in AS2470 that deal with stretch testing, hoop stress testing and a 10,000 cycle pulse test which also serve to verify the design's integrity.
- Each cylinder in production undergoes welding inspection and a proof hydraulic test to verify each and every cylinder as required by AS2470.

Finally I would like to note that there has been some rumours and innuendo in the marketplace that ETI fire systems and storage cylinders do not meet the same compliance requirements as other cylinders on the market. Firstly one must be aware that Australia has very good laws in the form of the Australian Trade Practices Act (1975 and amendments). If any person makes comments about another supplier, we recommend that you ask for those comments to be confirmed in writing. Alternatively you can write it down simply as a diary note, as a record of what that person has said. People who are careful about the claims they make, will have no problem confirming it. Deceitful people will avoid confirming in writing, and expose themselves as such.

A further deceptive practice currently doing the rounds in the Australian market place is that fire systems must have CSIRO listing to comply. This is not true! AS5062 does not restrict listing bodies to only the CSIRO. If you receive any such information, please report this to ETI or directly to the ACCC for breach section 52 of the Trade Practices Act (1975) and amendments.

Please do not hesitate to contact me, if I can be of further assistance on this matter.

Yours sincerely

L D Waldon

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