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Hydro-pneumatic Accumulators In Australia
Overview of Regulations & Requirements

Design Registration, Item of Plant Registration and Inspections of Pressure Vessels

There is a national standard covering pressure vessels AS1210 & there is an additional requirement for in service inspections AS3788. There are individual certification and compliance bodies in each state and there is often a lot of confusion. This paper is designed as a brief overview and a layman's guide to understanding the standards, regulations and ongoing requirements for use of Hydro-pneumatic Accumulators in Australia today.

Question: Does my Accumulator need approval ?
Answer: It depends on Hazard Level

How can I calculate the Hazard Level of my pressure Vessel?

The hazard level of a pressure vessel can be evaluated using the Australian standard "AS4343-2005". To determine the hazard level, the vessel **"PV Value"** has to be calculated. **"PVValue"** is the result of multiplying the Vessel Design Pressure in Vessel Volume.

P: Vessel Design Pressure [MPa]
V: Vessel Volume [L]
With reference to Table 1-AS4343-2005, the hazard level can be evaluated:

Table 1: Extract from AS 4343: Hazard Levels for Pressure Equipment

Pressure Vessels including sterilizers except vacuum vessels and boilers				Value of Volume X Pressure in MPaL				
Fluid Type and Contents		Volume in litres	Pressure in MPa	Hazard Levels for Pressure Equipment				
				E	D	C	B	A
Lethal	Gas	> 0.05	> 0.05	Not App	Not App	>=0.05	>= 1	>= 30,000
	Liquid	> 0.2	> 0.05	>= 0.05	>= 0.3	>= 1	>= 10	>= 300,000
Very Harmful	Gas	> 0.2	> 0.05	>= 0.05	>= 3	>= 10	>= 100	>= 3,000,000
	Liquid	> 1.0	> 0.05	>= 0.05	>= 30	>= 100	>= 1,000	>= 30,000,000
Harmful	Gas	> 0.2	> 0.05	>= 0.05	>= 10	>= 30	>= 300	>= 10,000,000
	Liquid	> 1.0	> 0.05	>= 0.05	>= 100	>= 300	>= 3,000	>= 100,000,000
Non Harmful	Gas	> 0.2	> 0.05	>= 0.05	>= 30	>= 100	>= 1,000	>= 30,000,000
	Liquid	> 10	> 0.05	>= 0.05	>= 1,000	>= 3,000	>= 30,000	Not App

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Note 1: The nature of the content being **"Lethal, Very Harmful, Harmful or Non Harmful"** is defined by "Table 2, AS4343-2005".

Note 2: In calculating the hazard level, the safety factors as per **"Note 4, table 1, AS4343-2005"** have to be considered.

Note 3: For Hydraulic accumulators, we refer to the **"Non Harmful Gas"** section for hazard level evaluation.

Do I Need to Register My Pressure Vessel Design?
While Hazard level can be defined following the method as per described in AS4343-2005, the necessity of having the pressure vessel design registered is outlined in **"National Standard for Plant, NOHSC: 1010 (1994)"**
Following the guidelines of "Schedule 1, NOHSC: 1010 (1994)", pressure equipment, other than pressure piping, and categorised as hazard level A, B, C or D requires the registration of the design.

Do I need To Register the Pressure Vessel as the item of plant?
Following the guidelines of **"Schedule 1, NOHSC: 1010 (1994)"**, pressure vessels categorised as hazard level A, B or C, require Registration as Item of plant.
It is the responsibility of the owner of pressure vessel to make sure that the pressure vessel is registered as the item of plant.

Do I need to run an inspection on my pressure vessels? How often?
A registered item of plant requires periodical inspections.
The inspection has to be done by certified inspection personnel.
It is the responsibility of the owner to take the ownership of the documents required for inspection.
The inspections type and intervals is stipulated in **"Table 4.1, AS3788-2009"**

TABLE 4.1 (*continued*)

1		2	3	4	5	6
Pressure equipment		Commissioning inspection required? (see Clause 4.2)	First yearly inspection required? (see Clause 4.4.3)	Inspection interval, years		
				External inspection (see Notes 2 and 3 and Clause 4.4.4.1)	Internal inspection	
					Nominal interval (see Clause 4.4.4.1)	Extended interval (see Clause 4.4.4.1)
10	AUXILIARY VESSELS (see Note 7 and 17)					
10.1	Accumulators					
	$pV \leq 100$ MPa.L	N	N		(See Note 14)	
	$100 < pV \leq 200$ MPa.L	Y	N		(See Note 14)	
	$pV > 200$ MPa.L	Y	Y	2	12	12

Note 14: This equipment is sometimes considered as low risk when operated in accordance with good engineering practice and process control. Despite this low risk, the pressure equipment and control equipment shall be maintained in a fit and safe condition for service, including regular operating surveillance. Hydraulic Accumulators are not categorized in the criteria of Note 14.

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Summary

In Australia you MUST comply with the Australian Standards, no other standards are acceptable. (some state authorities will accept individual items as “fit for use” after “an official design review”, this is case by case specific and has to be checked with the state authority.)

Pressure equipment with foreign certification is difficult to “re-certify” to AS1210 and the cost of such work and approval often exceeds the replacement cost of the unit.

Australia has “National Standards” these are usually prefixed by “AS” (eg. AS1210). Unfortunately, due to State bureaucracy and inefficiency, and with each state competing with the others, some states will not recognise approvals issued by other states. To further complicate things, the list of who is accepted and who is not accepted has changed from time to time. Only in Australia !

International standards like CE, ABS, ASME, DNV and others are available in addition to AS 1210 for special projects that operate offshore or are for export. Bosch Rexroth generally obtain “local certification” to AS1210 through South Australia Workcover or through NSW Workcover, these approvals are presently accepted by all other states.

Local compliance with AS3788 and Schedule 1, NOHSC: 1010 are a matter that can only be determined by:

A) The owner and operator of the equipment (not Bosch Rexroth) &
B) Must be determined and actioned locally in each state with local authorities from the various Workcover and Worksafe bodies (listed below).

Workcover NSW	13 10 50	mailto: contact@workcover.nsw.gov.au
Worksafe Victoria	1800 136 089	mailto: info@worksafe.vic.gov.au
Workcover Queensland	1300 362 128	mailto: info@workcoverqld.com.au
Workcover South Australia	13 18 55	mailto: info@workcover.com
Workcover Western Australia	1300 794 744	www.workcover.wa.gov.au
Worksafe Northern Territory	1800 019 115	mailto: ntworksafe@nt.gov.au

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