

6 Feb 2023 JIVZ Forum

Pressure Vessels in Workplaces – An Overview



MINISTRY OF
MANPOWER

Bernard Kwok
Deputy Director (Engineering Safety)
OSH Specialists Dept



A Great Workforce A Great Workplace

Safe Use of Equipment under WSH Act

Risk	Description	Regulatory Requirements
	All equipment used at work	Duties on Owners, Occupiers, Principals and Employers
	Equipment specified in the 5th Schedule of the WSH Act E.g. equipment for operation under pressure	Additional duties on Manufacturers, Suppliers and Installers
	Equipment with requirements in the subsidiary legislations E.g. cranes, steam boilers	Specific duties on Owners/Occupiers



All equipment used at work

Duty of occupier of workplace

11. It is the duty of every occupier of any workplace to take, so far as is reasonably practicable, such measures to ensure that —

- (a) the workplace;
- (b) all means of access to or egress from the workplace; and
- (c) any machinery, equipment, plant, article or substance kept on the workplace,

are safe and without risks to health to every person within those premises, whether or not the person is at work or is an employee of the occupier.

Occupiers

- take measures to ensure that equipment is safe and without risks to health

Duties of employers

12.—(1) It is the duty of every employer to take, so far as is reasonably practicable, such measures as are necessary to ensure the safety and health of the employer's employees at work.

(2) It is the duty of every employer to take, so far as is reasonably practicable, such measures as are necessary to ensure the safety and health of persons (not being the employer's employees) who may be affected by any undertaking carried on by the employer in the workplace.

(3) For the purposes of subsection (1), the measures necessary to ensure the safety and health of persons at work include —

- (a) providing and maintaining for those persons a work environment which is safe, without risk to health, and adequate as regards facilities and arrangements for their welfare at work;
- (b) ensuring that adequate safety measures are taken in respect of any machinery, equipment, plant, article or process used by those persons;

Employers, Principals

- ensure adequate safety measures are taken

(4) Where any machinery moved by mechanical power is used in any workplace, then despite anything in this Act, it is the duty of the owner of the machinery to ensure —

- (a) so far as is reasonably practicable, that the machinery is maintained in a safe condition; and
- (b) that the precautions (if any) to be taken for the safe use of the machinery and the health hazards (if any) associated with the machinery are available to any person using the machinery.

Equipment Owners

- maintain equipment in safe condition
- ensure precautions for safe use of equipment are available



Equipment specified in 5th Schedule WSH Act

FIFTH SCHEDULE

Sections 16(9), 17(7) and 64(1)

MACHINERY, EQUIPMENT OR HAZARDOUS SUBSTANCES

PART 1

MACHINERY AND EQUIPMENT

1. Scaffolds and any materials or components used to erect them
2. All lifting equipment
3. Forklifts
4. Power presses
5. Bar-benders
6. Any equipment or piping intended for operation under pressure, including all statutory pressure vessels
7. Any equipment or piping intended to contain corrosive, toxic or flammable substances
8. Welding equipment
9. Material hoists
10. Explosive devices
11. Equipment used for the operation of a lift or hoist

6. Any equipment or piping intended for operation under pressure, including all statutory pressure vessels

its use and

Duties of manufacturers and suppliers of machinery, equipment or hazardous substances used at work

16.—(1) Subject to this section, it is the duty of any person who manufactures or supplies any machinery, equipment or hazardous substance for use at work to ensure, so far as is reasonably practicable —

(a) that the following information about the safe use of the machinery, equipment or hazardous

Manufacturers, Suppliers

- provide information about the safe use of equipment
- ensure equipment safe when properly used
- ensure equipment examined and tested

Duties of persons who erect, install or modify machinery or equipment and persons in control of machinery for use at work

17.—(1) It is the duty of any person who erects, installs or modifies any machinery or equipment for use at work to ensure, so far as is reasonably practicable, that the machinery or equipment is erected, installed or modified in a manner that —

(2) The subsection person's to

(3) An installed regarded a

(a)

(b)

Installers

- installed in a manner that equipment is safe when properly used e.g. in accordance with the information supplied by the manufacturer or supplier

Equipment with requirements in subsidiary legislation

“pressure vessel” —

- (a) means any container or vessel used for containing any substance under pressure; and
- (b) includes any steam boiler, steam receiver, steam container, air receiver, refrigerating plant pressure receiver and gas cylinder.

Pressure
vessels with
specific
duties under
the GP Regs

“**air receiver**” means —

- (a) any vessel for containing compressed air and connected with an air compressing plant;
- (b) any fixed vessel for containing compressed air and used for the purpose of starting an internal combustion engine;
- (c) any blast air bottle; or
- (d) any vessel in which any substance in the form of solid or liquid is stored and from which it is forced by compressed air

“**steam receiver**” means any vessel or apparatus used for containing steam under pressure greater than atmospheric pressure

“**steam boiler**” means any closed vessel in which, for any purpose, steam is generated under pressure greater than atmospheric pressure

“**refrigerating plant pressure receiver**” means any vessel which contains refrigerant under pressure



Registration Requirements

As an owner:

- Register a new pressure vessel before it is used

Conditions before steam boiler, steam receiver, air receiver or refrigerating plant pressure receiver may be used

27.—(1) Subject to paragraph (2), it shall be the duty of the owner of any steam boiler, steam receiver, air receiver or refrigerating plant pressure receiver (referred to in this regulation as the relevant equipment) who intends to put the relevant equipment into use in a workplace to —

- (a) obtain, in such form and manner as may be determined by the Commissioner, a report of the examination and test by an authorised examiner as the Commissioner has been satisfactorily carried out;
- (b) ensure that such examination and test by an authorised examiner as the Commissioner has been satisfactorily carried out;
- (c) obtain from the authorised examiner a report of the examination and test by an authorised examiner as the Commissioner has been satisfactorily carried out, specifying the safe working pressure of the relevant equipment and its fittings have been determined;
- (d) keep the report referred to in sub-paragraph (c) available for inspection;
- (e) mark the relevant equipment so as to enable it to be identified as the relevant equipment referred to in the report refers.



GUIDELINES FOR THE REGISTRATION OF PRESSURE VESSEL IN WORKPLACES BY AUTHORISED EXAMINER

Occupational Safety and Health Division, Ministry of Manpower
(Version 1.1 – Feb 2007)

Engage an Authorised Examiner

- Conduct necessary tests and examinations
- Issue report of examination and test
- Register the PV

Information Required

- Construction drawing
- Design calculations
- Layout plan
- Steam piping diagram
- Fabrication survey report



Registration Requirements

As an owner:

- Register a new pressure vessel before it is used

Exempted from Registration

- Steam boilers where the maximum permissible working pressure does not exceed 0.5 bar
- Air receivers, steam receivers or refrigerating plant pressure receivers where the safe working pressure does not exceed 0.5 bar or the product of its safe working pressure and volume does not exceed 100 bar litres



Registration Requirements

As an owner:

- Register a new pressure vessel before it is used
- Re-register a Pressure Vessel, when
 - You buy an already-registered pressure vessel from a company
 - You move a pressure vessel from one workplace location to another (non-mobile units only)
 - Your company changes its UEN



Registration Requirements

As an owner:

- Register a new pressure vessel before it is used
- Re-register a Pressure Vessel, when
- **De-register a pressure vessel, if**
 - You no longer need it
 - It is no longer in use



Test and Examination Requirements

Type of vessel	Inspection interval	Type of inspection
Steam boiler	Every year	Visual inspection and running tests by AE
Autoclaves	Every 2 years	Visual inspection and running tests by AE
	Every 6 years	Visual examination of the surface of the external shell by AE
Steam receiver Air receiver	Every 2 years	Visual inspection and running tests by AE

- Steam boilers and receivers to be examined after extensive repairs
- At least one hydrostatic test and thickness gauging must be conducted every 10 years
- AE may, in his discretion, arrange to make the examination within 3 months after expiry



Pressure Vessel Extension Scheme

- Workplaces with pressure vessels that are part of a continuous process plant and units that are designed for extended run length, and
- Owners wish for flexibility in planning for shutdowns and for manpower and cost savings,

Can have the **examination period** of pressure vessel **extended**

- By demonstrating that **a robust system** to manage and safely operate all pressure vessels and its associated components/equipment is in place,
- **No danger will arise** with its continual use beyond the statutory period.

PVES 2021

+ max ext of 5 yrs from last exam date





2 Jul 2013



02 July 2013

Authorised Examiners (Pressure Vessels and Lifting Equipment), and
Other Interested Parties

**CIRCULAR ON PROHIBITION OF USE OF PROXIES TO CONDUCT TESTS & EXAMINATIONS OF
EQUIPMENT REQUIRED BY WORKPLACE SAFETY AND HEALTH LEGISLATION TO BE CERTIFIED BY AN
AUTHORISED EXAMINER**

The Ministry of Manpower (MOM) has recently received feedback from the industry that a few Authorised Examiners have engaged proxies to conduct prescribed tests and examinations on their behalf, during the certifications of equipment required by Workplace Safety and Health (WSH) legislation to be certified by an Authorised Examiner. These include lifting equipment and some types of pressure vessels.

2. This circular serves as a reminder to all Authorised Examiners that using proxies to conduct the prescribed tests and examinations of all such equipment for the certification of the equipment is strictly prohibited. All such equipment is to be thoroughly examined by the Authorised Examiner himself. The Ministry will not hesitate to take stringent enforcement action against Authorised Examiners who use proxies for such equipment, which can include initiating suspension or cancellation of the approval given to them as Authorised Examiners by MOM. They may also be prosecuted for offences under the WSH Act and its regulations. An offence under Section 53(b) carries a punishment of a fine not exceeding \$5000, or imprisonment for a term not exceeding 6 months or to both.

Prohibition of use of proxies to conduct tests & examinations of equipment required by legislation to be certified by an Authorised Examiner

All such equipment is to be thoroughly examined by the Authorised Examiner him/herself

Non-destructive testing e.g. thickness gauging shall be carried out by a testing laboratory which is accredited by the Singapore Accreditation Council under the Singapore Laboratory Accreditation Scheme (SAC-SINGLAS)



26 July 2017



26 Jul 2017

Authorised Examiners

**REQUIREMENTS FOR NON DESTRUCTIVE TESTING/EXAMINATION OF STATUTORY EQUIPMENT
(LIFTING EQUIPMENT AND PRESSURE VESSELS) UNDER WSH ACT**

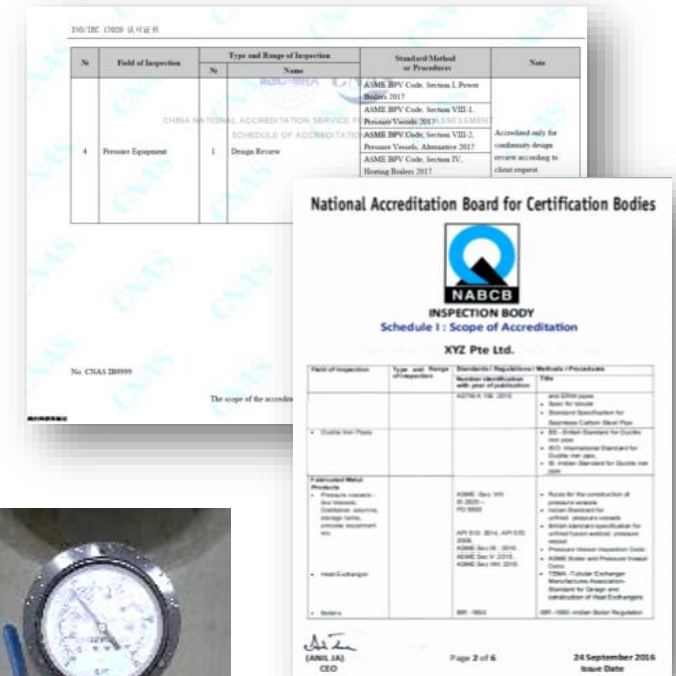
This document sets the guideline for the conduct of non-destructive testing/examination (NDT) on hoist or lift, lifting gear, lifting appliance, lifting machine, steam boiler, steam receiver, air receiver, refrigerating plant pressure receiver, pressure vessels, or any other machinery required under the 'Workplace Safety and Health Act ("WSH Act")' (hereafter referred to as "statutory equipment") to be tested and examined by an Authorised Examiner ("AE").

2 Non-destructive testing/examination of statutory equipment shall be carried out by a testing laboratory which is accredited by the Singapore Accreditation Council (SAC) under the Singapore Laboratory Accreditation Scheme (SAC-SINGLAS). The NDT reports shall be documented and endorsed in accordance with SAC-SINGLAS requirements. Examples of NDTs required to be conducted by laboratory accredited under the SAC-SINGLAS include thickness gauging, magnetic particle inspection and radiography of statutory equipment.

Other Specific Requirements

Ensuring safe use of equipment

- Steam boilers/receivers shall be of good construction, sound material, adequate strength, free from patent defects and properly maintained
- Air receivers shall be of sound construction and properly maintained
- Safety devices such as safety valves
- Monitoring devices such as steam pressure gauges, water gauges, low-water alarm



Other Specific Requirements

Management of equipment

- Obtain report of examination and test from Authorised Examiner
- Keep report and use the information
- Mark equipment so as to enable it to be identified
- Obtain written approval before the repairs are carried out

FORM A
WORKPLACE SAFETY AND HEALTH ACT 2006
THE WORKPLACE SAFETY AND HEALTH (REGISTRATION AND
OTHER SERVICES-FEES AND FORMS) REGULATIONS

REPORT OF EXAMINATION OF
Steam Boiler

NAME OF OWNER :
LOCATION :
POSTAL ADDRESS :

WORKPLACE NO. :
NEXT INSPECTION DATE : 19/06/2021

Registration No.
Safe Working Pressure :
900.0 kNsq.m.

PARTICULARS OF VESSEL

BRAND NAME :
COUNTRY OF MFG :
DISTINCTIVE NO. :
TYPE OF VESSEL : Heat-Exchanger
POSITION : Horizontal
MDMT (°C) :
DESIGN TEMPERATURE (°C) : 220

YEAR MANUFACTURED : 2020
DATE REGISTERED : 20/06/2020
MOBILITY : Stationary

DESCRIPTION

TANK/VESSEL

HEAD1	SHAPE	SIDE PRESSURE ACTS
HEAD2	Flat	Others
SHELL	Ellipsoidal	Concave
DIA1 WIDTH (mm)	1750	
HEIGHT/LENGTH (mm)	2050	

PRESSURE TEST DATE : 20/06/2020

DESCRIPTION OF TEST PERFORMED

Hydrostatic Test
Running Test
Visual Examination

OBSERVATIONS

Tag No: C-2212
Vessel is a gas steam riser
Medium: EPV (shell side) & Regen gas (tube side)
Vessel cone is of material SA516 Gr 70 with 12.7mm length x 12.7mm
Channel shell is of material SA345 Gr 304L with (D) 1270mm x 12.7mm
Channel flange is of material SA192 304L with (D) 1450mm x 95mm

CONDITIONS

Subject to the reservation above, I certify that on 20/06/2020, I have examined the vessel and found it to be fit for service, subject to the conditions of the certificate and any other conditions of the certificate.

Apply for permission to perform repair or modification on Pressure Vessel

1 Enter details of the case:

Name of owner or company *

Workplace number *

Pressure vessel registration number *

You can enter more than 1 pressure vessel registration numbers, separated by commas.

Details of the repair or modification *

Include: a) Reasons or justifications for repair/modification, b) Nature of repair and damage mechanism, c) Procedures for repair or modification (Endorsed by AE), d) Name of Authorised Examiner, e) Owner's assessment of AE's suitability and competency.

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Attachment

Click the "Choose file" button to attach supporting documents. You may attach up to 10 files with a total size of 5 MB.

0 Attachment

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Choose file



Thank You



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