

Business Procedure

Portable Pressure Hose Safety Document Number – OHS-PROC-120

This document applies to the following sites:

All Sites	<input type="checkbox"/>				
Rockhampton Office	<input type="checkbox"/>	Brisbane Office	<input type="checkbox"/>	Tarong Site	<input checked="" type="checkbox"/>
Barron Gorge Hydro PS	<input checked="" type="checkbox"/>	Kareeya Hydro PS	<input checked="" type="checkbox"/>	Mica Creek PS	<input checked="" type="checkbox"/>
Koombooloomba Hydro PS	<input checked="" type="checkbox"/>	Swanbank PS	<input checked="" type="checkbox"/>	Mackay Gas Turbine	<input checked="" type="checkbox"/>
Wivenhoe Small Hydro PS	<input type="checkbox"/>	Stanwell PS	<input checked="" type="checkbox"/>	Meandu Mine	<input type="checkbox"/>

Table of Contents

1.0	Purpose	2
2.0	Scope	2
3.0	Actions.....	2
3.1	Use of Hoses	3
3.2	Safety Devices	4
3.2.1	Pressure Hose Restraints (Whipchecks).....	4
3.2.2	Air Fuses	5
3.2.3	Safety Clips	5
4.0	Training and Competence Requirements.....	6
5.0	References (Including Information Services).....	6
6.0	Definitions.....	7
7.0	Responsibilities.....	7
8.0	Appendices.....	7

WRITTEN BY: ENDORSED/CHECKED BY: APPROVED BY: DATE:
NAME: J.Paull NAME: M.Joy / T.Hooper NAME: I.Gilbar

Doc No: OHS-PROC-120 Revision No: 0 Revision Date: 27.10.2014 Page: 1 of 7

THIS DOCUMENT IS UNCONTROLLED IN HARD COPY FORMAT

1.0 Purpose

This Business Procedure describes Stanwell's minimum mandatory requirements for the use and management of portable pressure hoses.

2.0 Scope

This Business Procedure applies throughout Stanwell, all its sites and all activities under Stanwell's control. It applies to all Stanwell employees and contractors, including visitors to Stanwell workplaces.

This Business Procedure does not apply to:

- hoses or flexible hoses which are permanently installed;
- hoses associated with hot work equipment (e.g. plasma cutters);
- hoses associated with breathing apparatus equipment;
- low pressure water hoses (e.g. garden hose);
- vacuum cleaning hoses; and
- fire hoses (lay flat).

3.0 Actions

The following applies:

- Pressure hoses shall be inspected and subjected to a proof pressure test (i.e. by the manufacturer) in accordance with AS 1180.5:1999 Methods of test for hose made from elastomeric materials – Hydrostatic pressure.
- Pressure hoses shall be designed, manufactured and used in accordance with the relevant standard, for example;
 - *AS/NZS 2554:1998 Hose and hose assemblies for air;*
 - *AS 2594:1983 Hose and hose assemblies for liquid chemicals;*
 - *AS 3791:1991 Hydraulic hose; and*
 - *AS 4233:1994 High pressure water (hydro) jetting systems - Safe operations and maintenance.*
- The standards to be met for hose and fittings, and the quality assurance required, should be clearly nominated prior to purchase, and documented on the store stock description for each item.
- If needed, a 'use-by-date' should be nominated, to take into account the degradation of the hose over time, when exposed to the service conditions.
- Only approved connections, fittings, clips etc. are used and are compatible and used as per the manufactures instructions. Worm drive and 'o' clips are not approved for use.

3.0 Actions (cont'd)

Air hoses shall be classified and used according to their rated maximum working pressure and duty as shown in Table 1 below (Note: 1 MPa = 1000kPa).

Table 1 Air Hose Classifications

Type	Maximum Working Pressure MPa	Proof Pressure Test	Minimum Burst Pressure MPa	Recommended Application
AA	2.5	5.0	10.0	Extra heavy (mining)
A	1.6	3.2	6.4	Heavy (mining)
B	1.6	3.2	6.4	Heavy duty (construction work)
C	1.0	2.0	4.0	General purpose, oil resistant
D	1.0	2.0	4.0	General purpose
E	0.7	1.4	2.8	Light duty

The following shall occur:

- hoses are selected with specific regard to Table 1 above and to the specific use, considering factors such as pressure, temperature, type of fluid or gas being used, chemicals e.g. oil in the compressed air, special requirements e.g. abrasion, fire resistance, anti-static, or cryogenic service;
- prior to issue and / or use, pressure hoses and associated components are inspected by a competent person, including for any cracks, cuts, bulges, kinks, splits, perished or degraded sections, corroded fittings, loose or damaged ends, damaged threads or quick release fittings;
- all air hoses made on site are constructed by a competent person in accordance with the manufacturer's recommendations / specifications, and suitably tested prior to use;
- pressure hoses and associated components identified as being damaged are removed from serviced, tagged out and repaired by a competent person in accordance with the manufacturer's specifications;
- an airline tail is installed on all impact pneumatic tools. The tail must only have one fitting connecting the hose to the tool (multiple fittings at the tool are not permitted); and
- brass air line fittings are not used on portable pressure hoses / equipment, unless specifically approved as suitable by a competent person (brass fittings are permissible on permanently installed equipment / structures including retractable hose reels).

3.1 Use of Hoses

- Hoses shall be positioned such that they do not create a trip hazard.
- Where practicable (e.g. minsup fittings) hoses are to be depressurised prior to adjusting any fittings or connections.
- Compressed air is not to be directed towards the user or another person's body / skin.
- When using air tools, excessive force is not to be exerted on the tool or fittings.

3.2 Safety Devices

3.2.1 Pressure Hose Restraints (Whipchecks)

Pressure hose restraints (i.e. 'whipchecks'), shall be fitted to air hose connections where the hose diameter is greater than or equal to 25mm and the operating pressure is greater than or equal to 760 kPa, and outside of this, where there is a risk of injury to workers resulting from pressure hose / hose connection failure, as identified by a risk assessment.

Whipchecks shall be constructed of woven stainless steel, galvanised steel wire rope, chain or similar material.

It is preferable that a strength rating certificate is obtained for whipcheck devices from the manufacturer / supplier, and that the rating is marked on the whipcheck.

Recommended minimum strength requirements for whipchecks for pressure hoses used to convey compressed air are shown in Table 2 below.

Table 2 Recommended Minimum Strength Requirements for Whipchecks

Hose Diameter	Operating Pressure		Minimum Strength
	PSI	kPa	
Up to 2 inch / 50mm	Up to 150psi	1034.25 kPa	8.4kN / 0.9 ton
	350psi	2413.25 kPa	19.6kN / 2 ton
	700psi	4826.5 kPa	39.1kN / 4 ton
	1000psi	6895 kPa	55.9kN / 5.6 ton
3 inch / 75mm	Up to 150psi	1034.25 kPa	18.9kN / 1.9 ton
	350psi	2413.25 kPa	44kN / 4.5 ton
	500 psi	3447.5 kPa	62.9kN / 6.3 ton
4 inch / 100mm	Up to 150psi	1034.25 kPa	33.5kN / 3.4 ton
	350psi	2413.25 kPa	78.2kN / 7.9 ton
	500 psi	3447.5 kPa	111.7kN / 11.3 ton

(Developed from - Restraint Devices for Flexible High Pressure Hoses, 1998)

Where a hose is fitted with an internal whipcheck, this does not negate the need to also fit the hose with an external whipcheck.

External whipchecks shall be fastened to a suitable mounting point, supplied for that purpose with shackles or other appropriate fittings. The shackles shall be rated to the same or greater strength than that of the whipcheck.

Note: Where any doubt exists regarding the suitability of a whipcheck, mounting point and/or associated shackles and fittings, a suitably qualified and experienced engineer or technical specialist shall be consulted to ensure suitability / strength rating/s etc.

Mounting points shall be positioned in an appropriate location, protected from damage and excess wear.

Where an application requires two hoses to be joined together this is to be accomplished by either:

- fitting each hose with a separate whipcheck and shackling the two together; or
- using one whipcheck to overlap the joint.

3.2.2 Air Fuses

Air fuses shall be used to ensure that air flow ceases, at an appropriate pressure, in the event of a rupture / breakage in the air system, hose etc. Air fuses are available in various sizes and in either a standard or high flow rate. Air fuse sizes and their associated cut off air flow rates, for both standard and high flow air fuses, is shown in Table 3 below.

Table 3 Air Fuse Size and Cut Off Air Flow Rate

Air Fuse Size	Cut Off Air Flow Rate	
	Standard Flow	High Flow
1/4 inch	8 L/s	14 L/s
3/8 inch	19 L/s	32 L/s
1/2 inch	32 L/s	48 L/s
3/4 inch	48 L/s	80 L/s
1 inch	92 L/s	128 L/s
1 1/2 inch	186 L/s	268 L/s

Only high flow air fuses shall be used.

Before installing an air fuse it is important to identify the required flow rate of the tooling to be used. It is important that the air demand from the tool is not greater than the cut-off flow of the air fuse.

Air fuses shall:

- be installed directly between fixed or rigid pipework and the flexible hose to protect the whole length of the flexible hose (only hose after the air fuse is protected);
- be installed in the correct orientation; and
- be installed after any size reduction couplings at the mains.

Where an air fuse is required, at least one air fuse must be in the system and it cannot be more than a 1/4 inch larger than the smallest diameter hose in that system. It is possible that extended hose lengths or reduction in size may restrict the flow enough to remove the protection of the air fuse. If in doubt, test that the air fuse is offering protection before starting the job (ensure the end of the hose is secure).

Best practice is to include an air fuse within each hose and size it the same diameter as the hose. For example if using a 3/4 inch hose, then use a 3/4 inch air fuse.

Air fuses are not required where full air flow is integral to the performance of the activity e.g. air lancing and use of purge compressors.

3.2.3 Safety Clips

Safety clips shall be used on all minsup fitting connections

4.0 Training and Competence Requirements

Evidence of training and competency shall be obtained and maintained as per Stanwell's requirements.

The competence requirements for the provision of technical support or engineering advice are as follows:

- The engineer or technical specialist providing the advice must be working within their area of expertise, be experienced with pressure piping systems, and be familiar with the standards that apply. They must have a good working knowledge of this type of equipment and the application being considered;
- the decision to call for engineering support and guidance will be on a case-by-case basis, and is at the discretion of the competent person, or if it is identified as a requirement in the Work Method Statement;
- for portable pressure hose applications, an engineering approach that is risk-based should be used. The concepts for assessing portable pressure hose risks are similar to those used for other pressure equipment – e.g. the class of hose, the hazardous nature of the contents, the pressure, temperature and volume of the fluid, the amount of stored energy involved, the nature of the application, and the level of risk to personnel, the environment and other equipment; and
- this type of work by an engineer or technical specialist would not usually require an RPEQ sign-off – unless there is a particular requirement to exercise engineering judgement, or to document a design that is not as prescribed by the standards.

In summary, the engineer or technical specialist providing the support must be experienced and competent in this particular field, to be able to provide sound practical advice.

A competent person must have, through a combination of training (trade back ground and / or specific training in hose design, standards, manufacturing and application principles), education and experience, acquired the knowledge and skills enabling that person to correctly perform the specified task associated with portable pressure hoses.

5.0 References (Including Information Services)

Source	Reference
Legislation	<ul style="list-style-type: none"> • Queensland Work Health and Safety Regulation 2011, s244
Australian Standards	<ul style="list-style-type: none"> • AS/NZS 2554:1998 Hose and hose assemblies for air • AS 2594:1983 Hose and hose assemblies for liquid chemicals • AS 3791:1991 Hydraulic hose • AS 4233:1994 High pressure water (hydro) jetting systems-Safe operation and maintenance • AS 1180.5:1999 Methods of test for hose made from elastomeric materials – Hydrostatic pressure
Stay Safe	<ul style="list-style-type: none"> • OHS-PROC-120A - Portable Pressure Hoses
Tools	<ul style="list-style-type: none"> • Nil

6.0 Definitions

Term	Meaning
Pressure hose	A complete fluid or air transfer system comprising portable flexible hose and attached adaptors, end connectors, clamps/swages and securing devices.
Whipcheck	A hose restraint device which is fitted to a pressure hose to prevent uncontrolled movement of the hose in the case of hose and / or hose connection failure. Whipchecks are to be fitted in accordance with manufacturer's specifications. They are usually fitted to the hose clamp / connection, or to the actual hose itself (i.e. 'sock' type) and can be internally or externally fitted.
Air fuse	A fixed, uni-directional excess flow automatic shut off valve inserted in line within an air system. If a sudden rupture occurs in a compressed air system or hose, the air fuse automatically cuts off the air supply when the air flow exceeds a set value.
Competent person	A person who has through a combination of training (trade background and / or specific training in hose design, standards, manufacturing and application principles), education and experience, acquired the knowledge and skills enabling that person to correctly perform the specified task.
Airline tail	An appropriately sized section of air hose connecting an air powered tool to the main air hose; preventing the need for reducers etc. at the tool itself.

7.0 Responsibilities

The competent person is responsible for assembling, testing, inspecting and assessing the fitness-for-purpose and fitness-for-service of portable pressure hoses and fittings.

The *Manager Technical Services* is responsible for the provision of corporate engineering support to generation sites.

The relevant site *Engineering Manager* is responsible for the provision of technical support to the competent persons at generation sites.

8.0 Appendices

Appendix A Portable Pressure Hose Document Flowchart

