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1 Introduction and Purpose

The purpose of this SOP is to define the process to be followed for designing and using temporary Type 2 hot work enclosures. A Temporary type 2 hot work enclosure consists of a skeleton of scaffolding, with polythene walls and roof, the polythene supported on the scaffolding and wooden planks. This SOP also links to Checklist 36 “Pre-Use of Temporary Type 2 hot work shelters”.

Temporary type 2 hot work enclosures have been used extensively for Remedial Blasting and Painting. They can provide the following benefits (justifications for creating them).

However, they also create additional hazards. Blast and Paint shelters are only justified when the benefits outweigh the additional hazards created.

1.1 Benefits

- **Work efficiency improvement (= cost saving, personnel risk exposure reduction[1])**
  - Less rain delays. Do not have to wait for dry weather to carry on with work.
  - Less painting delays. Require less than 85% relative humidity and greater than 10°C temperature.
  - Curing time for paint is reduced improving paint quality and lifetime.
  - Reduced rework.
- **Reduced Garnet Drift**
  - Less Damage to equipment causing more maintenance in future.
  - Reduces neighbouring areas grit in eyes incidents.
  - Garnet contained in small area, easier to clean up.
- **People**
  - Comfortable, warm, and dry environment. No need for hot & bulky wet weather gear. Enables more productive work force.
- **Isolates Job**
  - Separates work from others so less permit constraints between neighbouring work groups.
- **Noise**
  - Minor noise reduction benefit.

[1] Personal risk exposure reduction comes from reduced workforce exposure hours to these activities risks and other background risks involved with them being on site and travelling to/from site.

1.2 Identified Hazards

- Paint solvents concentrated in enclosure.
- Hydrocarbon release from process concentrated in enclosure.
- Explosion or fire from process hydrocarbons or paint solvents
- Static build-up with polythene from blasting
- Ignition sources on site – compressor, non-IS electrical equipment.
- Polythene roof drooping/melting/burning when exposed to heat/hot oil lines.
- Lack of escape routes
- Reduced peripheral vision when working within the enclosure.
- Garnet dust and debris
- Filling enclosure with contaminated air from the compressor
- Wind loading on polythene causing structural failure.
- Fire hazard from polythene igniting.
- Falls from height during construction/dismantling.

2 Scope

This procedure applies only to temporary enclosures to be used for Type 2 hot work.

3 Procedure

3.1 Design Requirements

Follow these steps and fill in the design checklist (Appendix 1 end of this document) as you do so:

3.1 Justify to yourself that the overall benefit of using temporary enclosures outweighs the additional risks of enclosing the area (refer section 1).

3.2 Decide how large an area to enclose in the temporary enclosure. Use the rule of thumb that work within the enclosure should be planned to be completed within 2 weeks, with the enclosure being built just before and dismantled immediately afterwards[2].

3.3 Whenever possible completely de-pressure all equipment and piping to be enclosed before the enclosure is built and until it is dismantled. (Includes both Hydrocarbon HC containing process and potential toxics/asphyxiants, e.g., Nitrogen and analyser test gas cylinders, etc).

3.4 Convince yourself from inspection and maintenance history and pre shelter construction inspection that there are no process containment weaknesses which increase the probability of HCs, toxics and/or asphyxiants leaking into the enclosure. If there is an increased risk the equipment must be totally depressured and risked consideration given to HC, toxics, asphyxiants freeing, before enclosing it.

[2] Minimising the time the enclosure is present minimises the time that gas can accumulate within it and minimises the time that potential explosion vent paths are constricted.

3.5 Do not enclose any pressured equipment which has an increased probability of leaking into the enclosure, e.g., flammable or toxics pump seals, sample point vents, relief valve tail pipes to atmosphere, analyser vents, equipment or piping with an estimated maximum wall thickness loss >2.5 mm, as per PTW checklist 16.

3.6 The inside of all enclosures where flammables could be present is to be treated as IP15 Zone 1 Hazardous area with respect to ignition sources control regardless of whether all enclosed equipment has been fully depressured or not.

3.7 All enclosures will be designed to always ensure at least 12 complete air changes per hour, without stagnant areas, with particular emphasis on how this will be ensured when people are not in the enclosure[3]. Typical methods of achieving this are:

- When people are not in the enclosure: remove wooden framed window panels, roll up sides, open taped closed windows in polythene walls.
- When people are working in the enclosure: compressor cooling air will be ducted into enclosure via fans, eductors, etc.

Calculation for Forced Ventilation

Temporary Enclosure Volume: ____m^3 x 12 = _____ m^3 Total volume to move per hour

Capacity of Air Mover: _____m^3 per hour must exceed Total volume per hour

Note: CPTW requirement 12 Air changes per hour.

3.8 Enclosure cladding fabric shall be fire resistant and shall not sag onto people within the enclosure when exposed to heat, e.g., from hot oil lines or should ignition occur. Currently approved cladding fabrics are:

- Premium clad containment sheeting (supplier: www.mineralscorp.com)
- 250MU natural B&A polythene plastic

3.9 All areas and levels in enclosures shall have at least 2 reasonably accessible escape routes to safe locations. These shall be clearly marked “EXIT” with signs that conform to NZ/AS1319. Minimum acceptable spacing and location of escape routes shall be based on time it would take a person to reach them rather than a specific distance between them. The time to exit an enclosure and reach a safe area shall normally be <10 seconds[4].

3.10 Cladding fabric shall be attached to the inside of the scaffolding frame. Approved fixing methods include:

- Wooden battens
- ‘Bungy’ cords.

3.11 All proposed temporary enclosure designs are to be approved by the Permit Issuer, Plant Manager and Asset Integrity Coordinator before they are built.

[3]Generally a purge rate greater than 12 times the volume of the enclosure per hour will be required to ensure that dead spots achieve the minimum requirement of 12 air changes per hour. The aim of this requirement is to make the normally IP 15 Zone 2, a safe area when the habitats are not in use.

[4]For effects from an incident arising within the enclosure.

Appendix 1 Design Checklist for Type 2 Hot Work Temporary shelters for Blast and Paint shelters)

Site:	
Location:	
Work to be Undertaken:	
Designed By:	
Contact Details:	Email: _____
	Phone: _____

		Y	N	N/A
1	Photo or drawing attached with sketched extent of temporary enclosure including approximate dimensions.	☐		
2	Use of temporary enclosure has been risk assessed as at ALARP	☐		
3	Temporary enclosure is planned to be in place for 2 weeks or less. (If answer NO, then a Technical Issues Register variation is required.) TIR # _____	☐	☐	
4	Confirm only Cold Work or Hot Work 2 to be carried out in enclosure.	☐		
5	Pressurised equipment within the enclosure will be depressured. (If answer NO, then a Technical Issues Register variation is required.) TIR # _____	☐	☐	
6	Confirm from Inspection and Maintenance history that no known process containment weaknesses are located within the enclosure. (See 3.5) (If answer NO, then a Technical Issues Register variation is required.) TIR # _____	☐	☐	
7	Confirm any pump seals, sample points or relief valve vents to atmosphere are NOT located within the enclosure. (See 3.5) (If answer NO, then a Technical Issues Register variation is required.) TIR # _____	☐	☐	
8	Confirm all equipment within the enclosure will meet IP 15 – Zone 1 requirements. (If answer NO, then a Technical Issues Register variation is required.) TIR # _____	☐	☐	
9	Enclosure has been designed for a minimum of 12 air changes per hour when occupied without any stagnant areas.	☐		

		Y	N	N/A
10	Enclosure cladding fabric is an approved type. (See 3.8) (If answer NO, then a Technical Issues Register variation is Deviation required. TIR # _____	☐	☐	
11	Deviation Approval and attached if required	☐	☐	

APPROVALS RECORD	NAME	DATE	SIGNATURE	COMMENTS
Designer				
Permit Issuer				
Plant Manager				
Asset Integrity Coordinator				

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Revision and Approval Details

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1	21/12/2022 10:40:32 AM	Approved for Use	Kim Fawcett	Peter Martin;Janice Waitere-Cross;Cameron Murray;Mike Klenner;Brendan O'Connor;Grant MacDonald;Brooke Gamlin;Dion West	16/12/2022 12:00:00 AM	Scott Hodges	20/12/2022 2:19:54 PM	18/11/2022 9:33:14 AM
2	30/08/2023 1:26:36 PM	Approved for Use	Brooke Gamlin	Stephanie Richardson;Peter Martin	31/07/2023 12:00:00 AM	Scott Hodges	30/08/2023 9:46:26 AM	5/07/2023 11:51:58 AM