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RESPONSIBLE DEPT.	CONTENT CUSTODIAN	APPROVED BY	LEGACY NUMBER:	
HES&S	Brady Emmons	Paul Zawila	SR-55	
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1.0 INTRODUCTION

The proper selection and installation of air movers is vital to control hazards associated with air mover use and air quality within confined spaces where work is to be performed.

2.0 REFERENCES

2.1 Marathon Standards, Policies & Procedures

- R-11-017, Confined Space Entry
- R-50-002, Temporary Pipe
- R-11-010, Utility Connections

3.0 ROLES AND RESPONSIBILITIES

3.1 Maintenance and/or Inspections (Marathon and Contractor)

Maintenance and/or Inspections are responsible for ensuring the proper setup and installation of air movers within the Refinery.

3.2 Operations

The Operator is responsible for ensuring the air mover is properly installed on a piece of equipment within the operator's unit. All installations of air moving equipment shall be approved by the Unit Operator and Operations Supervisor prior to the issuance of any confined space entry permit.

4.0 AIR MOVER SELECTION

Only air movers specifically designed and built for equipment ventilation shall be used. Only steam or air driven air movers shall be used to ventilate equipment that may contain hydrocarbons, until the LEL within the equipment is proven to be within acceptable limits for entry and the type of work to be performed.

Air movers may be used with flexible ducting to ventilate smaller spaces such as heat exchangers (See Figure 1). Flexible ducting shall not be used in steam or steam vapor service unless it is rated by the manufacturer as suitable for the anticipated temperature of the steam or air/steam vapor stream flowing through it.

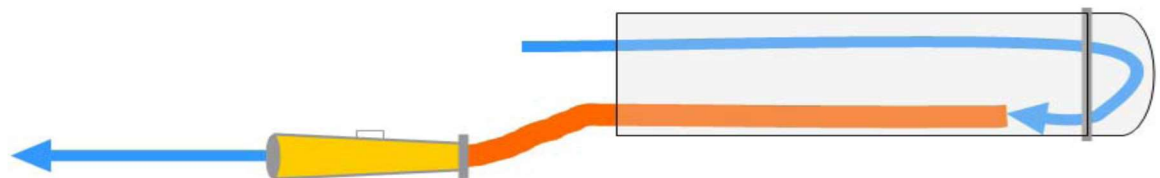


Figure 1 Venturi Ventilators

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5.0 AIR MOVER INSTALLATION

The air mover must be inspected for dents, cracks, defects and overall serviceability before installation. Locate and make note of the pressure rating of the air mover, usually present on a tag attached to the body or stamped into the body near the steam/air supply inlet port.

The steam/air supply must never exceed the pressure rating of the air mover. When using a Coppus CP-20 fan type air mover with 200 lb. steam supply, install a 3/8" restriction orifice plate at the supply union reducing the pressure to the Manufacturer's suggested 150 lb. psig rating. When a CP-20 is supplied by air, only use the high-pressure port as you would for steam. A restriction orifice is not needed for air supplied through the high-pressure port.

Per R-50-002 steam supply piping to air horns must be via temporary piping, not via a utility steam hose. See R-11-010 for steam hose use restrictions. The temporary steam piping shall be insulated as needed to provide adequate personnel protection.

To reduce potential for creating airborne debris, and when possible without impeding proper air flow or safe access of entry openings, air movers shall be installed to exhaust/pull air from the confined space, as opposed to blowing air into it. Prior to installation, ensure the air mover exhaust will be pointed in a safe direction. If necessary to reduce airborne dust particles a bag filter may be added to the outlet of the air mover when pulling from the confined space. Identify and address access/egress issues associated with the air mover and temporary piping.

When driven by air, flagging shall be installed on the air mover exhaust so air flow can be visually confirmed from a distance. Where circumstances require, installations with air blowing into the confined space may be allowed with prior approval of a Safety Specialist and Operations.


Ensure air movers are installed sealed to the ventilation opening so that all air moved is being pulled through or forced into the confined space. Plywood adapter plates may be considered as a solution. When hot work or pre-heating activities are present aluminum adapters should be used unless otherwise directed by the Marathon Field Coordinator. See Figure 2.

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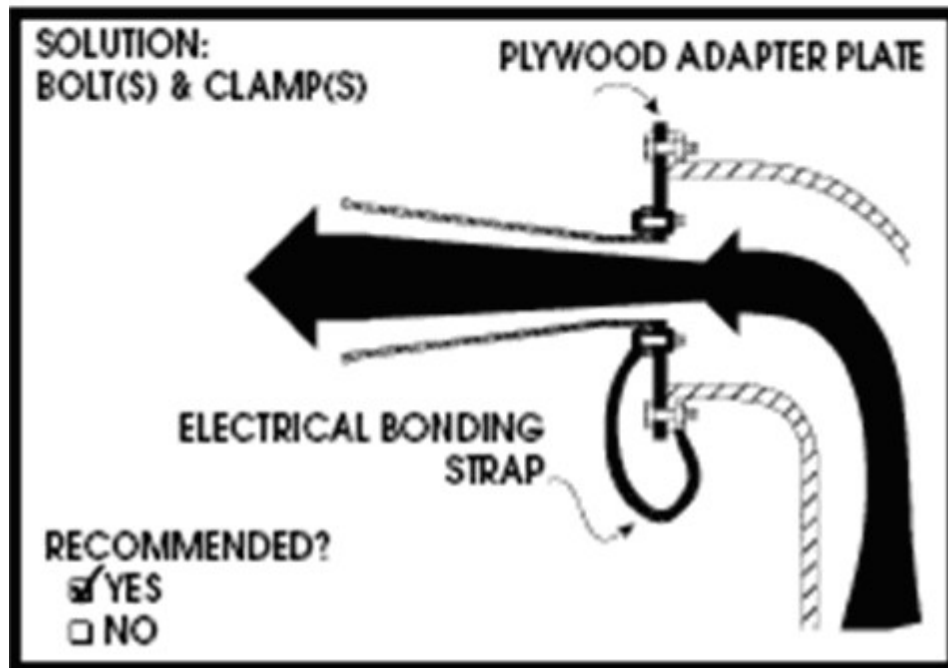
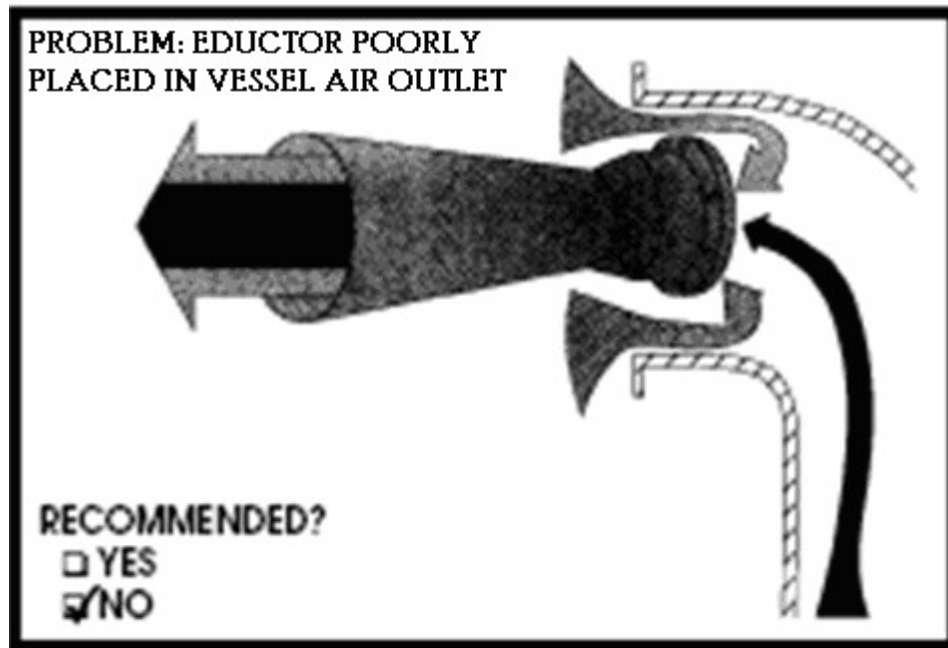


Figure 2 Plywood/Aluminum Adapter Plate Use

Source: AIHA: *The Occupational Environment: Its Evaluation, Control, and Management*

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Air mover flexible ducting connections shall be secure and adequate to prevent leakage. Figures 3 & 4 Air Horn Sleeve Connection, illustrate a sleeve designed to eliminate or minimize leakage. Flexible ducting must be free of unsealed cracks or holes.

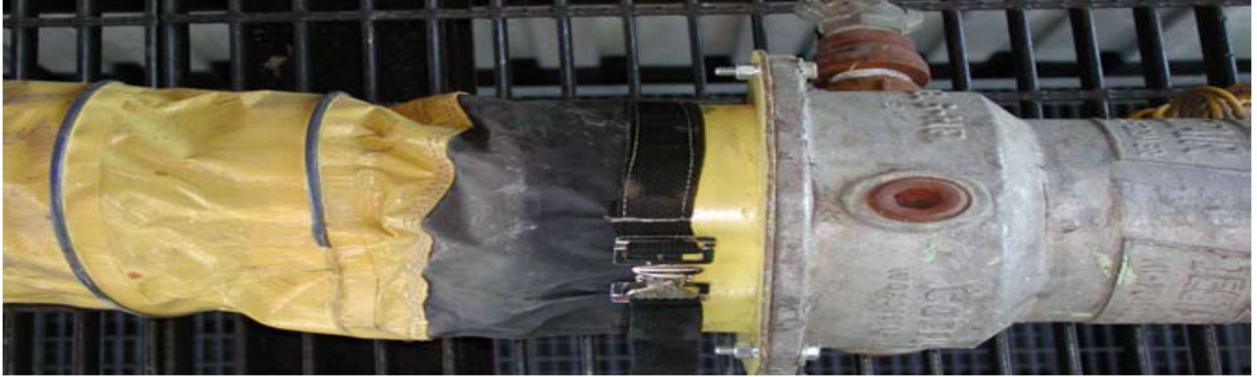


Figure 3 Venturi Ventilators connection to Flexible Duct



Figure 4 Air Horn Sleeve Connection


6.0 BONDING/GROUNDING

In order to provide a discharge path for static electricity generated by steam/air flow through an air mover attached to a tank, vessel, or column, the air mover shall be bonded (grounded) to permanently installed, grounded structures. Grounding through temporary structures such as scaffolds is not allowed.

- Inspect the bonding cable: Bonding cables shall be #6 stranded copper cables with oil and UV resistant flexible insulation. Replace cables that are excessively worn, have lost flexibility, have broken wire filaments or damaged lugs. Each end of the cable shall be fastened to the air mover and the C-clamp utilizing appropriate cable lugs and bolts/nuts/lock washers. See Attachment 1.

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- Inspect the C-clamp: C-clamps shall be constructed and configured as shown in Attachment 1. Replace excessively corroded clamps and clamps with irreparable damage to the clamp bolt or clamp contact surfaces.
- Bonding cables and clamps shall be routed and secured so they do not present a safety hazard or come loose due to the work activity.
- C-clamps and cables shall be used to bond air movers to a grounded structure as follows:
 - Nonconductive protective coatings, rust, or spilled material at bonding contact surfaces shall be removed to ensure good electrical continuity or be connected by means of attachment designed to make such removal unnecessary.
 - The C-clamp bolt shall be installed wrench tight, with sufficient pressure to ensure adequate contact with the base metal.
 - The C-clamp bolt lock nut shall be wrench tight to prevent the clamp from loosening.
 - The C-clamp shall be attached to a permanently installed, (i.e., welded, not bolted) metal structure to which the air mover is attached.
- Exception A-5-d:

Where it is impractical to attach a bonding c-clamp to a welded structure, the clamp may be attached to a bolted surface or to the ventilated equipment's permanent grid bonding cable, provided the bond is tested with an ohm meter. The measured resistance between the air mover and the grounded structure should be 25 ohms or less (See Attachment 2).

7.0 PUTTING AIR MOVER IN SERVICE AND IN-SERVICE INSPECTIONS

The Installer shall ensure the air-mover is securely grounded. After initial installation, it shall be the responsibility of the Unit Operator to routinely inspect grounds on air movers in their assigned area.

All motive force supply controls for the air mover (i.e. steam/air valves or electrical switches) shall be tagged open/on with an Operations Danger Tag while the air mover is in operation.

The Entry Supervisor or their designee shall periodically during each shift, monitor air mover function and the integrity of the air mover installation when entry permits into the ventilated equipment are active.

8.0 REVIEW AND REVISION HISTORY

Revision #	Preparer	Date	Description
0	Mark Willand	12/3/2021	Reformatted and Numbered per Document Control Policy, R-63-001.
1	Brady Emmons	4/19/2022	Line-by-line review.
2	Mark Willand	5/3/2022	Changed Approver from Mike McClure to Paul Zawila

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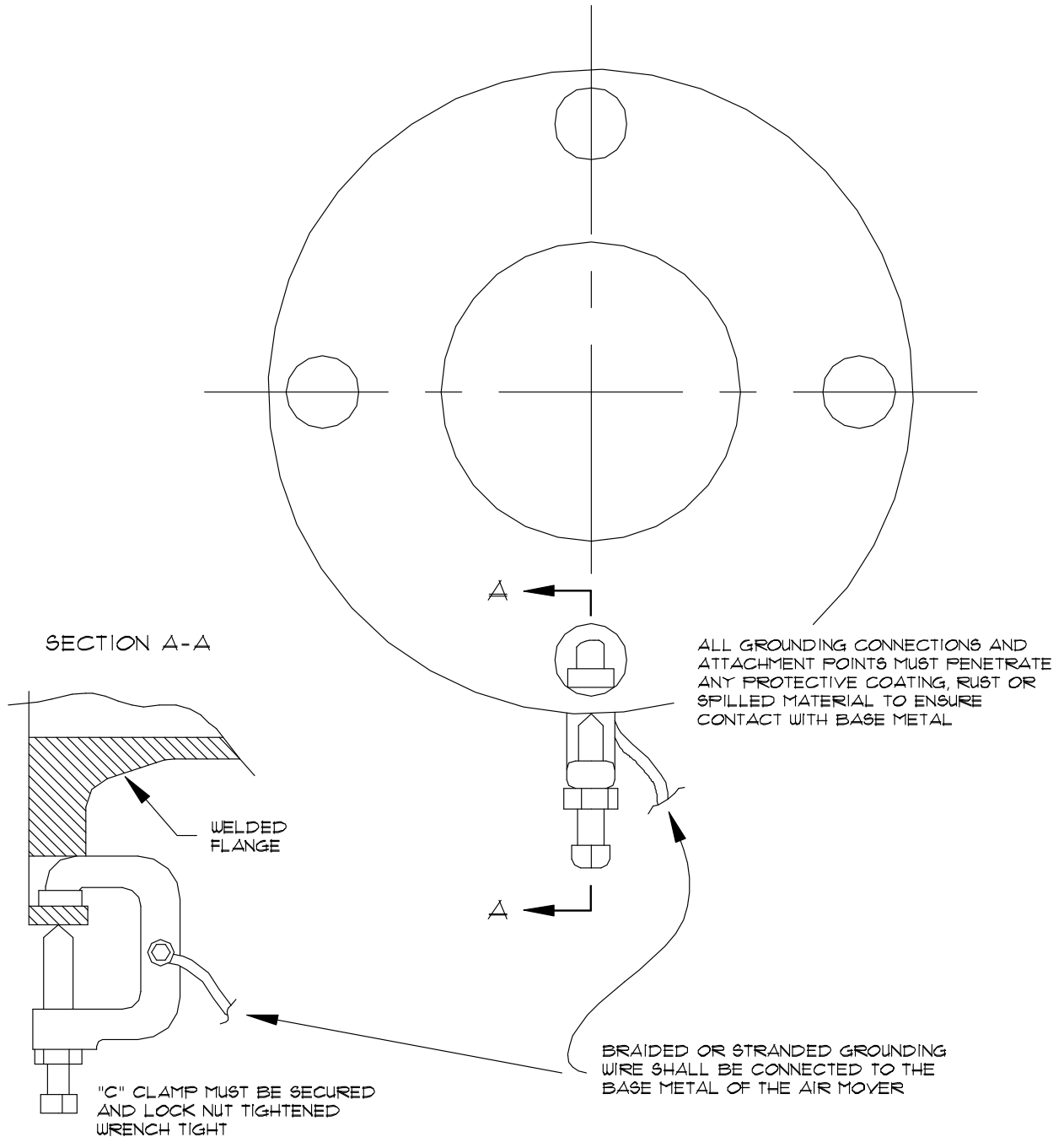
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9.0 ATTACHMENT 1 – GROUNDING ATTACHMENT



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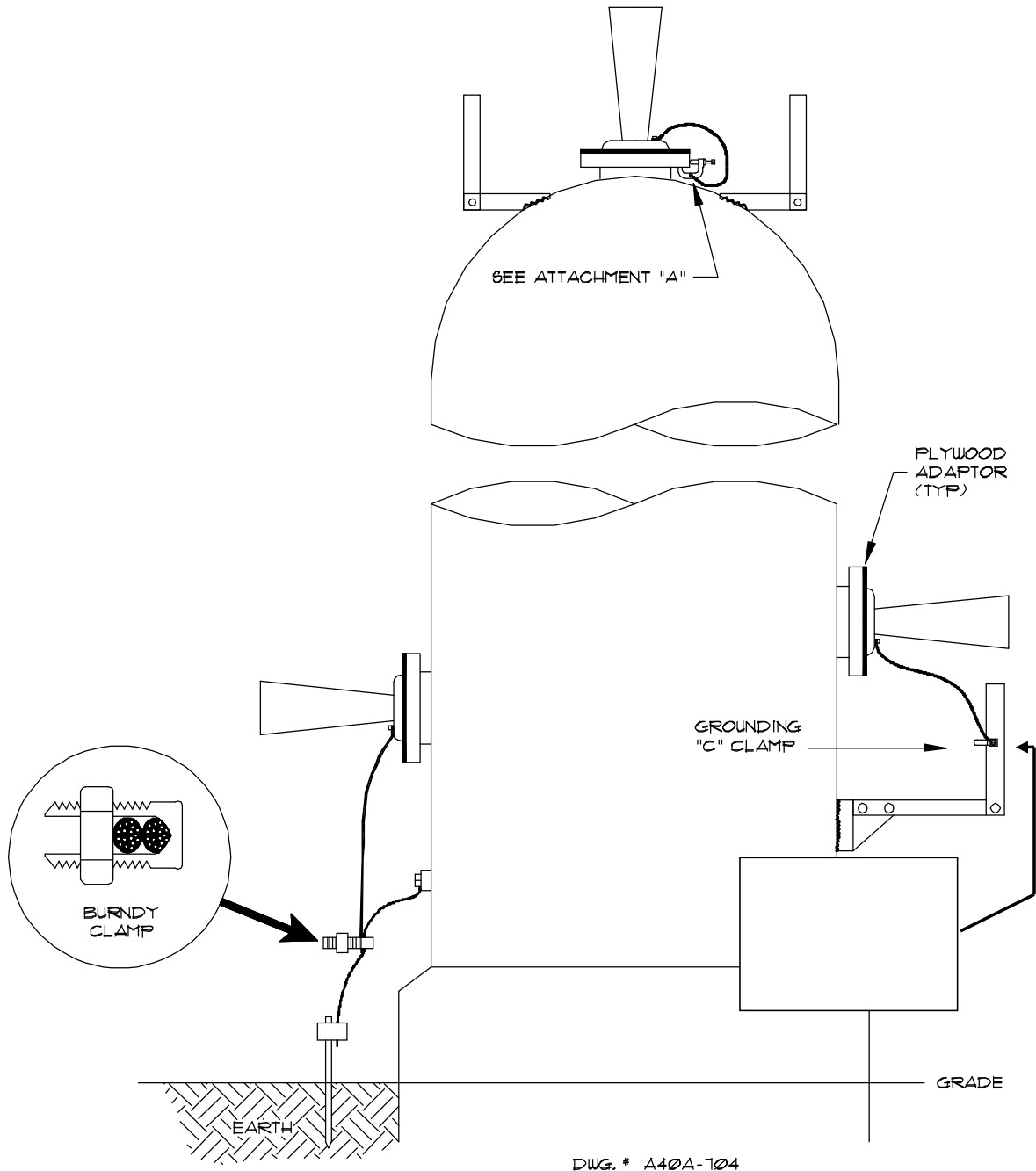
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10.0 ATTACHMENT 2 – EXCEPTION A-5-D

ATTACHMENT "B"

AIR MOVERS SHALL BE GROUNDED ONLY TO PERMENANTLY INSTALLED STEEL STRUCTURES OR DIRECTLY TO EARTH (TYP)



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