

	LAR Safety Standing Instruction	HSS-650	
	Portable Grinder Safety	Page 1 of 12	
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1.0 INTRODUCTION

1.1 Purpose

- 1.1.1** The purpose of this Standing Instruction is to protect personnel by specifying the requirements for Portable Grinders within Andeavor LAR facilities
- 1.1.2** It is intended to highlight the safety precautions required for using Portable Grinders (electric and pneumatic) within Andeavor operated refineries and should be used in conjunction with industry standards, manufacturer’s standards, and established risk mitigation practices.

Revision:	Prepared by:	Approved by:	Date:
A01	Rinaldo Edmonson	Mike Kulakowski	12/17/2017
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Portable Grinder Safety			

1.2 Scope

- 1.2.1 This Standing Instruction applies to employees and contractors involved with using Portable Grinders within LAR.

2.0 REFERENCES

2.1 Industry Codes and Standards

- 2.1.1 ANSI - B7.1 Abrasive Wheel

2.2 Government Regulations

- 2.2.1 OSHA 3080 - Hand and Power Tools
- 2.2.2 OSHA 1926.300 Tools - Hand and Power
- 2.2.3 OSHA 1910.243 - Guarding of Portable Tools
- 2.2.4 Cal OSHA- §3557. Switches and Controls for Portable Tools.
- 2.2.5 Cal OSHA- §3583. Portable Abrasive Wheels

3.0 PORTABLE GRINDER SAFETY FEATURES

3.1 Required Safety Features for Portable Grinders (if the safety technology is available in industry, not just the favored manufacture)

3.1.1 Lock-Off Switch

- Lock-Off Switch prevents accidental starting of the portable grinder. The main operating trigger or switch shall automatically return to the "OFF" position once it is released. An unlocking action is required prior to starting. The trigger or paddle switch shall be designed such that the hand maintains a good grip with the grinder when the start switch is released (i.e. paddle switch should not take up the length of the handle).

3.1.2 No Lock-On Switch

- No Lock-On Switch prevents the user from locking the grinder in the run position. Lock-On switches are not allowed.

3.1.3 Anti-Kick Back – Slip Clutch

- Anti-Kick Back automatically disengages the rotating wheel from the motor when a wheel pinch or wheel stall is detected. This greatly reduces kick back of the grinder.

3.1.4 Tool Free Adjustable Safety Guard

- Adjustable Safety Guard protects the user from flying debris.

3.1.5 Quick Disk Change

- Quick Disk Change allows for tool free change out of worn discs.

3.1.6 Adjustable Side Handle

- Adjustable Side handle allows for stability control of the grinder for left or right handed use.

3.1.7 Braking

- Braking allows for rapid coast down (a minimum disc stopping speed of 0-2 seconds) of the rotating disc once power is removed from the portable grinder.

4.0 DESIRABLE SAFETY FEATURES BUT NOT REQUIRED

4.1 Soft Start

- 4.1.1** Soft Start feature allows for slow ramp up to speed to protect the user from unexpected increase in speed.

4.2 Current Interruption Protection

- 4.2.1** Current Interruption protects the user from electrical over current and tool overheating.

4.3 Vibration Reducing Features

- 4.3.1** Vibration reducing features reduce tool vibration and improve ergonomics for the user.

5.0 PORTABLE GRINDER SITE APPROVAL REQUIREMENTS

5.1 Guidelines

- 5.1.1** Only Portable Grinders with the required safety features in 3.1 shall be allowed in Andeavor LAR Refinery.
- 5.1.2** Contractors shall ensure only approved Portable Grinders are used in Andeavor LAR.
- 5.1.3** LAR maintenance and project field supervision are responsible for ensuring only approved Portable Grinders are used on the job sight.
- 5.1.4** Portable Grinders that exceed 7 inches (178mm) shall not be permitted in the refinery.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

6.1 Requirements

- 6.1.1** Refer to the following standing instructions for additional Personal Protective Equipment (PPE) Requirements, FS-205, 222 & SAF 20, 27.

7.0 ENTANGLEMENT HAZARD

7.1 Common Entanglement Risks

- 7.1.1** Loose clothing, drawstrings, jewelry, lanyards, etc. may become an entanglement hazard with the rotating wheel and shall be secured prior to operation.

8.0 SAFE OPERATION REQUIREMENTS

8.1 Portable Grinder Use Requirements

- 8.1.1** Always ask if there is a safer tool that can be used in place of a portable grinder
- 8.1.2** Always follow the manufacturer's instructions on proper use, maintenance, and operating guidelines.
- 8.1.3** Portable Grinders shall always be plugged into a ground fault interrupting GFI in the field.

- 8.1.4** Unplug power cords or depressured and disconnected air hose (for pneumatic grinder connections) before changing abrasive wheels or whenever adjusting the grinder.
- 8.1.5** Position the power cord or airline in a manner that prevents damage from the grinding operation and prevents tripping hazards.
- 8.1.6** Review work area for hazards that would interfere with grinding work. Ensure work surface is level and clear of obstacles. Portable Grinders shall never be operated from ladders or unsecure footings.
- 8.1.7** Ensure the immediate surrounding area is free of combustible material or other objects that may melt or burn in the line of fire of sparks.
- 8.1.8** Install or replace worn abrasive wheels in accordance with the manufacturer's instructions. The wheel shall be rated for the grinder size, speed, and service (grinding or cutting wheels).
- 8.1.9** Never wear an abrasive wheel down to its backing flange/plate.
- 8.1.10** Grinding and cutting wheels must only be used per manufacturer's instructions.
- 8.1.11** Prior to using a cutting wheel user must complete [Attachment A](#) and the attachment remains with the job permit (shops will keep the checklist on the job site until job is complete).
- 8.1.12** Wheels that are cracked, dropped, not marked with a speed rating, wet or contaminated with material shall not be used. They shall be disposed of as soon as possible so they are not found and used by other personnel.
- 8.1.13** Ensure the work surface is secure and will not move because of the rotation of the grinding wheel. Never use your foot, hand, or any part of your body to secure the object while in the process of grinding.
- 8.1.14** Hold the grinder with two hands applying minimum pressure against the work surface, so it doesn't "dig in" and cause kick-back. One hand should be on the handle and the other on the body of the grinder. Never remove the handle unless an exception has been approved.

- 8.1.15** Allow the grinder to "run up to speed" before applying it to the work surface. Apply the correct face of the abrasive wheel to the work surface at a 15 to 30-degree angle to the work. The grinding wheel should always be applied to the working surface such that it is "pulling away" from the user (upper right quadrant for right hand use and upper left quadrant for left hand use).
- 8.1.16** Never use a grinder between the legs while sitting on the floor.
- 8.1.17** To prevent kickback don't bump the grinder onto the work surface or let the abrasive wheel contact adjacent surfaces while grinding.
- 8.1.18** The guard shall be adjusted to protect the user from flying metal debris. Guards shall never be removed to accommodate larger disks. Retrofitting or field repairing of any guard is not permitted. Never remove guard unless a variance has been approved prior to work beginning.
- 8.1.19** Stop the grinder at regular intervals to rest your arms.
- 8.1.20** Keep two hands on the grinder and allow the grind wheel to fully stop once the grinding wheel is removed from work surface. (i.e. **Do not lay the grinder down while the abrasive wheel is still rotating**).
- 8.1.21** Never retrofit or modify any part of the portable grinder. Only manufacturer's approved parts shall be used.

9.0 EXCEPTIONS

- 9.1.1** Exceptions to any part of this standard shall require an approved variance prior to work commencing (see HSS 004 Variance Procedure in DMS).

10.0 DAILY PORTABLE GRINDER VISUAL INSPECTION

Note: A daily portable grinder visual inspection shall be completed by the user, prior to each use and periodically during extended use. Inspection shall include the following:

10.1 Abrasive wheel

- 10.1.1** Rated for grinder speed (RPM)
- 10.1.2** Designed for the application
- 10.1.3** Free of physical damage and imperfections
- 10.1.4** Not wet or contaminated
- 10.1.5** Fit snugly to the grinder spindle
- 10.1.6** Attached to the grinder spindle with the correct flanges, backing plate and locking nut
- 10.1.7** Wheel is not worn – replace if necessary

10.2 Guard

- 10.2.1** Attached to grinder (guard shall never be removed from grinder while in use unless an exception is approved)
- 10.2.2** Positioned for maximum personnel protection for required task (i.e. 180 degrees)
- 10.2.3** Adequately cover the circumference of the abrasive wheel
- 10.2.4** Free of physical damage or imperfections
- 10.2.5** Guard positioned to be between the operator and the wheel during use.

10.3 Body of Tool

- 10.3.1** Free of physical damage
- 10.3.2** Clean and free of dust or debris in ventilation ports
- 10.3.3** No "homemade" or improvised devices attached to grinder
- 10.3.4** Power cord is free of nicks, cuts or abrasions
- 10.3.5** Grab handle is attached and secure
- 10.3.6** Verify all components are intact, e.g. switches, buttons etc. (No non-manufacturer approved and verified alterations to any grinder components).

11.0 AUDITS AND REVIEW

11.1 Audit Responsibilities

- 11.1.1** Andeavor Maintenance supervision, Health & Safety Coordinators and Contractor supervision are responsible for auditing employee and contractor adherence to this standard.

12.0 PORTABLE GRINDER SAFETY AWARENESS TRAINING

12.1 Training Requirements

- 12.1.1** All Andeavor employee and contract personnel who use Portable Grinders are required to take Grinder Safety Awareness Training.
- 12.1.2** Andeavor personnel will receive the portable grinder safety training as part of their normal craft training. In addition, a CBT refresher will be required every two years.
- 12.1.3** Contractors are responsible for ensuring their employees are properly trained and qualified in using Portable Grinders. Contractors shall also train their employees on this standard. They shall be able to show proof upon request that employees have been trained on this standard.

13.0 RESOURCES, ROLES AND RESPONSIBILITIES

13.1 Roles and Responsibilities Matrix

Role	Responsibilities
Andeavor Maintenance or Project Supervisor and Contractor site leadership	<ul style="list-style-type: none"> • Ensure the requirements of this standard are followed by performing frequent audits. • Initiates any variance request to this standard and ensure mitigation steps are in place to prevent injury. • Ensure the requirements of this standard are understood and followed. • Ensure workers are trained on initial portable grinder safety training or refresher training (as applicable) and provide documentation that your company certifies each employee can perform grinding work safely. • Ensure workers are trained in the requirements of this standard. • When required, any variance request to this standard with appropriate mitigation steps to ensure the job can be performed safely.
Craftsperson (Andeavor or Contract)	<ul style="list-style-type: none"> • Complete awareness training and fully understand the requirements of this standard. • Follow safe operating guidelines in this standard to ensure Incident and Injury Free work. • Perform daily inspections of the grinder per the requirements of this standard. • Review and follow the manufacturer’s documentation
Procurement	<ul style="list-style-type: none"> • Ensure suppliers of Portable Grinders are aware of our requirements.
Maintenance Training Department	<ul style="list-style-type: none"> • Incorporate Grinder Safety Awareness standard into the Formal Maintenance Training program (CBT craft training).

14.0 REVISION LOG

<i>Title & Procedure Number:</i>	HSS 650 Portable Grinder Safety		
<i>Author/Owner:</i>	Rinaldo Edmonson	<i>Approver:</i>	Mike Kulakowski
<i>Reviewed By:</i>	Policy & Procedure Committee	<i>Document Administrator:</i>	D. R. Cannon
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<i>Revision Date:</i>	12/17/2017	<i>Next Review Date:</i>	12/17/2020
<i>Revision Summary</i>			

15.0 ATTACHMENT A: CUTTING WHEEL CHECKLIST

Table 1: Tool Determination Questions	Yes	No
Can a "Clam Shell" be used to perform this cut? Note: Clam shell is good for a precision cut where hot work may or may not be allowed.		
Has an acetylene and oxygen torch set up been considered for use to perform the cut? Note: Acetylene and oxygen would be used where the material is going to be demoed thus leaving a rough cut and where hot work is allowed.		
Can a "Port O Band Saw" or "SawZall" or "German Air Saw" be used to perform the cuts needed? Note: Port O Band Saw, German Air Saw or SawZall all give the metal a clean cut without the use of a hot work application also making the material salvageable.		
Were any additional cutting methods considered that could be used to perform this work in a safer method? (i.e. Hack Saw, Metal Chop Saw, etc.) See Appendix A:		
Does the grinder to be used have an automatic braking system (0-2 seconds) when toggle switch is disengaged? Note: If answer is "No" a regular grinder shall not be used for cutting applications. Please refer to Section 3.0.		
Is required safety technology available in the industry for the grinder to be used? See Section 3.0.		
Is the user trained in using a grinder for cutting purposes? Note: If user is not trained, the user will need the training.		
Note: If it has been determined that using a cutting wheel is the safest and only other method for performing work, continue to Table 2.		
Table 2: Cutting Questionnaire	Yes	No
Is the maximum RPM rating of each abrasive cutting wheel compatible with the RPM rating of the grinder motor? If "No" the cutting wheel cannot be used for cutting activities. RPM of the cutting wheel and the grinder must be compatible.		
Does each grinder have an individual Lock off switch that prevents accidental starting of the grinder? If "No" the grinder cannot be used for cutting activities.		
Does the grinder have an anti-kick-back that automatically disengages the rotating wheel from the motor when a wheel pinch or wheel stall is detected? If "No" the grinder cannot be used for cutting activities.		
Is the grinder designed in such a manner that the guard is adjustable so that the guard can be positioned to protect the worker from flying debris? If "No" the grinder cannot be used for cutting activities.		
Before new abrasive cutting wheels are mounted, are they visually inspected and ring tested?		
Have obstructions been removed to allow safe operation of the grinder. If "No" obstructions must be removed before cutting activities may take place.		
Reason for use of cutting wheel:		
Mitigations Proposed (i.e. PPE, guarding/shielding, review of body positioning etc.):		

Requester's Name: _____ Date of Use: _____

Requester's Supervisor Signature _____ Date: _____

I hereby acknowledge that I have reviewed the area to be cut and alternative tools, and have determined that the requested use of a grinder with a cutting wheel is the safest option for this task.

Andeavor Coordinator/Supervisor Signature: _____ Date: _____

Appendix A: Examples of alternative tools that should be considered before using a cutting disk

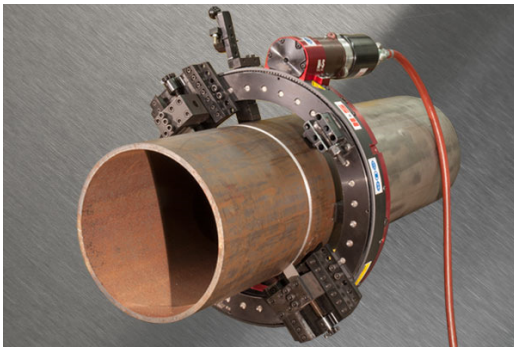
"Port O' Band"



"Metal Chop Saw"



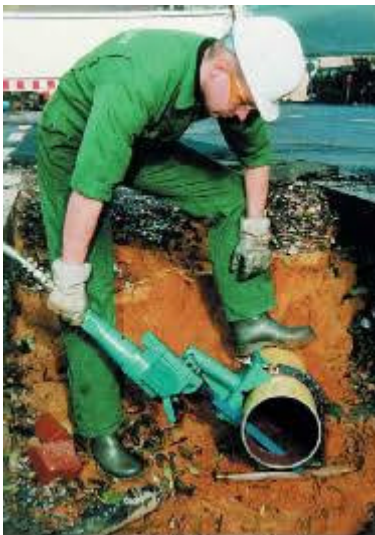
"Clam Shell Cutting device"



"Hack Saw"



**"German Air Saw"
Cutting Torch"**



"Acetylene & Oxygen"

