

A detailed photograph of an industrial refinery or chemical plant. The scene is dominated by a complex network of large, silver-colored metal pipes and structures. In the center, there is a large, spherical vessel or reactor. To the right, several tall, vertical cylindrical towers or distillation columns are visible. The background shows a clear sky, suggesting an outdoor industrial setting. The lighting is bright, highlighting the metallic surfaces and the intricate piping system.

IPS ★

Industrial Performance Services

ITCS ★

Industrial Tubular Catalyst Services

PNEUMATIC CHIPPING OF CATALYST PROCEDURE

Pneumatic Chipping of Catalyst Procedure

January 2023

Reactor Conditions

The best way to remove catalyst from the reactor is if the catalyst is free flowing through the dump nozzles or by vacuuming. In the unforeseen event that the catalyst stops flowing due to conditions such as bridged or coked-up catalyst, then the process of pneumatic chipping (Jackhammering) may be needed. In this case, a hold and witness point should be established.

There should be a verification process in place that would help ensure there is not a gap (bridge) between the free-flowing catalyst and the bridged/coked catalyst.

- video monitoring to ensure the bed is lowering while dumping
- Outage markings prior to dumping and before entry (verifies there is no bridge being created)

Modifying Work Scope

- In the event that pneumatic chipping becomes necessary, Ensure the permit is modified or rewritten to reflect the change in work scope.
- Ensure everyone involved understands the new requirements for the work to be performed.
- Rewrite the JSEA to account for both work and area hazards associated with pneumatic chipping of catalyst.
- Personal protective equipment (PPE) is not a substitute for engineering controls or feasible work or administrative procedures. Ensure additional PPE requirements are met, if the existing PPE does not meet the requirements for pneumatic chipping. Always use proper safety equipment for chipping. Chipping hammers throw debris and dust, and in the case of chipping catalyst, heavy metals and chemicals may also be present as well.
 - Additional Hearing Protection may be required (Depending on vessel conditions and model of chipping hammer used)
 - Additional Foot and Hand protection may be required (Depending on vessel conditions and model of chipping hammer used)

Pneumatic Chipping (Jackhammering) under normal atmospheric conditions

- Verify Permit reflects Chipping in the reactor
- Identify both work and area hazards associated with chipping catalyst
- Review JSEA with work crew prior to commencement of work
- Verify adequate PPE is available and donned to perform chipping
- Test the surface of the catalyst with ramrod or equivalent tool prior to putting any body weight on the surface of the catalyst bed; this minimizes the possibility of an engulfment hazard
- Ensure entry personnel are tied-off and secure while performing work
- Hook up chipping guns to Air Lines to eliminate undesirables (Nitrogen, etc.) from entering the reactor (maintains atmospheric conditions)
- Ensure the chipping process does not create an engulfment hazard
 - Maintain a low catalyst hill (between knees and waist)

- Chip in a manner that the reactor walls are not touched by the chipping guns
 - Never chip perpendicular to reactor wall or surface

Pneumatic Chipping (Jackhammering) under inert atmospheric conditions

- Verify Permit reflects Chipping in the reactor
- Identify both work and area hazards associated with chipping catalyst
- Review JSEA with work crew prior to commencement of work
- Verify adequate PPE is available and donned to perform chipping (Inert Helmet, Shock resistant gloves, etc.)
- Install N₂ Horseshoe or Muffler into top of reactor (maintains atmospheric conditions if chipping must be conducted under Nitrogen due to catalyst)
 - Muffler will aid in noise management to allow for better communication
- Test the surface of the catalyst with ramrod or equivalent tool prior to putting any body weight on the surface of the catalyst bed; this minimizes the possibility of an engulfment hazard
- Ensure entry personnel are tied-off and secure while performing work
- Hook up chipping guns to N₂ Lines to eliminate air from entering the reactor (maintains atmospheric conditions if chipping must be conducted under Nitrogen due to catalyst)
- Ensure the chipping process does not create an engulfment hazard
 - Maintain a low catalyst hill (between knees and waist)
- Chip in a manner that the reactor walls are not touched by the chipping guns
 - Never chip perpendicular to reactor wall or surface

Revision History

Rev	Rev Date	Rev By	Approved By	Description
1.0	1.3.2022	Shayne Torrans	Shayne Torrans	Initial Procedure Document
1.1	12.5.2022	Shayne Torrans	Shayne Torrans	Format Revision

Approvals:

Procedure Owner

_____ Date _____

_____ Signature

Competency Assessment

No.	Questionnaire	C/NYC
Q1		
A1		
Q2		
A2		
Q3		
A3		
Q4		
A4		
Q5		
A5		

Enclosed Attachments	
Risk Assessment	<input checked="" type="checkbox"/>
Environmental Aspect and Impact	<input checked="" type="checkbox"/>
Training and Competency	<input checked="" type="checkbox"/>
Measure and Evaluation Tools	<input checked="" type="checkbox"/>

Competency Checklist

To be filled out by Trainer and signed by Employee, Assessor and Supervisor before being returned to the HSEQT Manager for recording purposes.

Procedure	Competency	Date	Competent YES / NO	Employee Signature

(Please tick appropriate box)

This employee is competent in performing the job.

This employee has not attained the competency level.

*

* *If the employee has not attained all competency levels, the General Manager must assess the action to be taken, provide an extension of training or alternative action as listed below.*

Alternate action to be taken: _____

Signed By	Employee:	Date:
	_____	_____
	Trainer:	Date:
	_____	_____
	Assessor:	Date:
	_____	_____
	Regional Manager:	Date:
	_____	_____

Environmental Aspects and Impacts

Identified Environmental Aspects and Impacts

The following table is a summary of the likely environmental aspects and impacts that may be identified during site inspections. The significance of each impact needs to be assessed using the Risk Assessment Model.

Activity	Aspect	Impact
Purchasing & Administrative Work	Consumption of goods	Conservation of natural resources
	Consumption of energy (eg. Electrical equipment and facilities)	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of waste (eg. Paper)	Consumption of space for waste disposal; Habitat loss
Climate Control	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Habitat loss
	Generation of noise	Disturbance to community; Habitat loss
Cleaning of – offices / vehicles	Storage, use and release of chemicals	Contamination of air, water or soil; Risk to human health
Transport (Fleet vehicles / staff travel)	Consumption of energy	Release of greenhouse gases and atmospheric pollution; Consumption of natural resources; Loss of habitat at all stages of generation; Light pollution
	Consumption of goods (eg. Oil)	Consumption of natural resources; Generation of waste; Habitat loss; Biodiversity impacts
	Generation of waste (eg. Oil)	Consumption of space for waste disposal; Potential contamination of water or soil; Habitat loss
	Exhaust emission	Release of greenhouse gases and atmospheric pollution
	Use of dangerous goods (eg. Batteries)	Potential contamination of air, water or soil; Risk to human health
	Generation of noise	Disturbance to community; Habitat degradation
Operations		

Sample only.
To be filled in

Risk Assessment

Risk Assessment // insert name here					
Step No: Logical sequence	Sequence of Basic Job Steps documented in the Procedure, Work Instruction and project plans. Break down Job into steps. Each step should be logical and accomplish a major task.	Potential Safety & Environmental Hazards/Impacts at the site of the Job Identify the actual and potential health and safety hazards and the environmental impacts associated with each step of the job.	Risk Rating Refer to the risk matrix or HSEQT.PRO. Risk Mgt	Recommended Corrective Action or Procedure <i>Determine the corrective actions necessary to reduce the risk to as low as reasonably practical (ALARP) refer to HSEQ.PRO.Risk Mgt. The risk must be reduced or controlled to ALARP before work commences.</i> Document who is responsible for implementing the controls to manage each hazard identified.	Risk Rating refer to the risk matrix or HSEQT.PRO.Risk Mgt
1.					
2.					
3.					
4.					
5.					

Audit



Process: insert// Procedure: Insert //		Date:		Audited by:	
		Location of Audit:		Area Mgr/Supervisor:	
Item	Question	Evidence Sited	Comments		Conformance Score 0,3,5
1.					
2.					
3.					
4.					
5.					
6.					
7.					
AUDITOR'S SIGNATURE:		CONFORMANCE SCORE: / 25		0 – Non-Conformance	
SAFETY REP'S SIGNATURE:		CONFORMANCE %:		3 – Continuous Improvement Opportunity	
				5 – Total Conformance	