

Safe Entry into Inert Atmospheres Pre-Entry Checklist

(RSP-1121-020-FORM01)

Personnel participating in the completion of Pre-Entry Checklist	
Name	Department / Position
	HES Professional
	Area Operations Foreman or Designated Representative
	Area Maintenance Coordinator or Designated Representative
	Inert Entry Contractor Representative
	Nitrogen Contractor Representative
	Tech Service Representative

Section 1 - Work Preparation and Planning

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(1) Has a pre job planning meeting been conducted prior to beginning inert entry operations?	<input type="checkbox"/>	<input type="checkbox"/>			
(2) Have the training records for all personnel involved in the inert entry been verified as current by MPC personnel?	<input type="checkbox"/>	<input type="checkbox"/>			
(3) Does the work permit accurately reflect the requirements and conditions of the inert entry operations?	<input type="checkbox"/>	<input type="checkbox"/>			
Entry operations must adhere to the following temperature parameters: <ul style="list-style-type: none"> • Ambient temperature must not exceed 100°F. • A temperature increase greater than 5°F in 15 minutes requires entrants to immediately evacuate the reactor. 	<input type="checkbox"/>	<input type="checkbox"/>			
(4) Discuss with Catalyst contractor which atmospheric limits will be adhered to. MPC's will be utilized unless contractor's limits are lower.	<input type="checkbox"/>	<input type="checkbox"/>			
(5) Does the Catalyst Contractor have a Decontamination trailer available?	<input type="checkbox"/>	<input type="checkbox"/>			
(6) Is there a hand wash station for Catalyst Contractor near the reactor?	<input type="checkbox"/>	<input type="checkbox"/>			
(7) The dedicated electrical power supply to the life support module/trailer or other essential equipment should be tagged/labelled and connected in a manner in which it cannot be inadvertently removed or tripped.	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

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Section 2 - Inert Gas

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(8) Has the inert gas supply (nitrogen) been verified to contain less than 0.5% oxygen?	<input type="checkbox"/>	<input type="checkbox"/>			
(9) Is the inert gas supply adequate to achieve 2% of less oxygen for initial entry into the reactor and to maintain an inert atmosphere of less than 4% oxygen during catalyst removal activities?	<input type="checkbox"/>	<input type="checkbox"/>			
(10) Is there an adequate independent back up supply of inert gas immediately available and connected to the primary inert gas supply manifold?	<input type="checkbox"/>	<input type="checkbox"/>			
(11) Is a qualified person assigned to monitoring the inert gas supply and available to immediately switch to the backup supply if necessary?	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

Section 3 – Set-up of Oxygen Deficient Area

Task	Answer		Responsible Department	Completed by: (initials)	Date/time:
	Yes	No			
(12) Evaluate the need for scaffold guardrails with swing gate for Fall Protection around Reactor top flange. This scaffold must be built for personnel tie-off while inside the barricade. Post “ Fall Protection required beyond this point ” signs.					
(13) Erect scaffold guardrails with swing gate for Oxygen Deficient Area Barricade .					
(14) Post signs at the base of the ladder on deck below (“ DANGER OXYGEN DEFICIENT ATMOSPHERE, Breathing Air Required ”).					
(15) Erect scaffold guardrails with swing gate for Oxygen Deficient Area Barricade around dump nozzle(s).					
(16) Wrap the Oxygen Deficient Area Barricade with danger tape and post signs on swing gate (“ DANGER OXYGEN DEFICIENT ATMOSPHERE, Breathing Air Required ”).					
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Section 4 – Requirements for Inert Reactor Entry

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
<p>(17) If large boulders or mounds are present, an inert entry permit may be granted ONLY IF a plan is agreed upon with the following items captured or similar:</p> <ul style="list-style-type: none"> a. Catalyst Company has tripod or A-frame with SRL/Rescue Winch in the locking mode for entrant to enter space. b. Catalyst Company has hard ladders and ladder platform with locking chain. c. Catalyst employee is NEVER to go more than 2’ below the top of the catalyst mound(s)/boulder(s). d. As the catalyst mound is knocked down, the Catalyst Contractor Employee may move the ladder platform, but must always obey the 2’ rule. e. Inert entry employee must remain in contact with the Life Support Trailer at all times. A camera must be kept on the Catalyst Contractor Employee to ensure they obey the 2’ rule. f. Permit shall be written in way that states the catalyst removal employee may not go more than 2’ below the top of the catalyst mound(s)/boulder(s) at any time. <p>Note: A tape measure can be used by the Catalyst Contractor to verify the height of catalyst.</p>	<input type="checkbox"/>	<input type="checkbox"/>			
<p>(18) MPC Personnel to conduct initial atmospheric monitoring and record the results on the permit.</p>	<input type="checkbox"/>	<input type="checkbox"/>			
<p>Comments:</p>					

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Section 5 – Requirements for Inert Reactor Entry (For Entry onto Top Tray)

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(19) Catalyst handling entrant and attendant is required to wear the following PPE: a. Pressure Demand supplied air helmets with built in communications supplied with 2 breathing air lines and 5-minute escape pack. b. Full body disposable coveralls. c. Cut Resistant / Impact Gloves with nitrile liner (recommended). d. Full body harness.	<input type="checkbox"/>	<input type="checkbox"/>			
(20) Catalyst Contractor Confined Space Back-up Attendant has the following PPE: a. Same level of respiratory protection as Entrant b. Harness/SRL is only required for fall protection	<input type="checkbox"/>	<input type="checkbox"/>			
(21) Personnel inside the Oxygen Deficient Area Barricade (e.g., Top Supervisor/Backup Attendant) have the following PPE: a. Full face pressure demand supplied air respirator. b. Full body disposable coveralls c. Harness/personal SRL for fall protection when inside the Fall Prevention Barricade.	<input type="checkbox"/>	<input type="checkbox"/>			
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Section 6 – For Entry onto Bed(s) Below Top Tray
(These Steps Must Be Performed for Each Successive Tray)

Task to be Performed	Answer		Responsible Department:	Completed by: (Initials)	Date/Time:
	yes	no			
(22) Ensure previous requirements for “Inert” Reactor Entry are still in compliance. (23) Video catalyst bed to determine if large boulders or mounds on the sidewall are present. If no mounds are present and no catalyst is under the tray, the inert entry permit can be granted.	<input type="checkbox"/>	<input type="checkbox"/>	Distributor Tray	Distributor Tray	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 1	Bed 1	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 2	Bed 2	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 3	Bed 3	
	<input type="checkbox"/>	<input type="checkbox"/>	Distributor Tray	Distributor Tray	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 1	Bed 1	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 2	Bed 2	
	<input type="checkbox"/>	<input type="checkbox"/>	Bed 3	Bed 3	
Comments:					

Section 7 - Attendant and Backup Attendant

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(24) Has the restricted area outside of the opening of the inerted confined space been defined and delineated by MPC personnel?	<input type="checkbox"/>	<input type="checkbox"/>			
(25) Is the inert entry attendant designated on the permit and will they be positioned at the vessel opening during entry operations?	<input type="checkbox"/>	<input type="checkbox"/>			
(26) Has a backup inert entry attendant been designated, and will they be controlling access to the restricted area?	<input type="checkbox"/>	<input type="checkbox"/>			
(27) Is the backup entry attendant designated to maintain a log of workers entering and exiting the restricted area?	<input type="checkbox"/>	<input type="checkbox"/>			
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Section 8 - Air Monitoring and Atmospheric Conditions

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(28) Does the inert entry contractor have a plan to continuously monitor the internal atmosphere of the inert confined space for O ₂ , LEL, CO, H ₂ S and temperature?	<input type="checkbox"/>	<input type="checkbox"/>			
(29) Is the oxygen concentration in the inert confined space being maintained less than 4% during inert entry activities?	<input type="checkbox"/>	<input type="checkbox"/>			
(30) Are all other atmospheric conditions of the inert confined space being met? (LEL, H ₂ S, CO, temperature)	<input type="checkbox"/>	<input type="checkbox"/>			
(31) Has testing been completed to confirm that hazardous levels of nickel carbonyl do not exist?	<input type="checkbox"/>	<input type="checkbox"/>			
(32) Has a Back Pressure Test been conducted to verify that inert gases introduced to the vessel vent properly through the catalyst and do not build back pressure due to catalyst crusting?	<input type="checkbox"/>	<input type="checkbox"/>			
(33) Has atmospheric monitoring equipment used to analyze the confined space been used according to manufacturer's specifications for monitoring in oxygen deficient atmospheres?	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

Section 9 - Personal Protective Equipment and Emergency Rescue

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(34) Will inert confined space entrants and attendants utilize a positive pressure helmet style full face piece airline supplied respirator with an auxiliary self-contained escape unit?	<input type="checkbox"/>	<input type="checkbox"/>			
(35) Is a back-up air supply of sufficient capacity to the primary supply immediately available to pressurize the airline system?	<input type="checkbox"/>	<input type="checkbox"/>			
(36) Does the back-up attendant have PPE similar to the inert entrant immediately available to don to assist in an emergency?	<input type="checkbox"/>	<input type="checkbox"/>			

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(37) Will a trained person continually monitor the breathing air supply of all entrants and attendants and be immediately available to switch to the backup supply? Or is a system in place to automatically switch to a secondary breathing air supply upon the primary supply hitting a low pressure set-point?	<input type="checkbox"/>	<input type="checkbox"/>			
(38) Will a hardwired or radio communication system be used by the entrants, attendants, and personnel stationed on the platforms and ground to maintain communications between all personnel?	<input type="checkbox"/>	<input type="checkbox"/>			
(39) Has a communications radio been provided to the nitrogen truck operator so the inert entry supervisor can be notified if needed to switch to the back-up inert gas supply?	<input type="checkbox"/>	<input type="checkbox"/>			
(40) Will all inert entrants wear a full body harness with a lifeline attached to a retrieval device outside the vessel?	<input type="checkbox"/>	<input type="checkbox"/>			
(41) Have rescue provisions been established by the inert entry contractor and have MPC personnel verified their rescue capabilities?	<input type="checkbox"/>	<input type="checkbox"/>			
(42) Is the facility's rescue team available on site to supplement the inert entry contractor rescue team?	<input type="checkbox"/>	<input type="checkbox"/>			
(43) Has a written rescue pre-plan been developed by the inert entry contractor?	<input type="checkbox"/>	<input type="checkbox"/>			
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Section 10 – Arsenic Regulated PPE for Catalyst Contractor

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(44) Does the Catalyst Contractor have the following PPE? <ul style="list-style-type: none"> • Full face pressure demand supplied air (When Operating Dump Nozzles) • Half face P100 cartridge respirator (anyone working or passing through Arsenic Regulated Area). • Full body FR disposable coveralls • Cut Resistant / Impact Gloves with Nitrile liner (recommended). Note: Personal air conditioners must be considered due to the use of impermeable clothing and elevated ambient temperatures.	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

Section 11 – Catalyst Removal / Loading

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(45) Is adequate lighting provided inside the inerted vessel?	<input type="checkbox"/>	<input type="checkbox"/>			
(46) If pneumatic tools are used, are they powered with nitrogen?	<input type="checkbox"/>	<input type="checkbox"/>			
(47) Are provisions in place to cover the openings of the inerted vessel with a locked physical barrier when left unattended?	<input type="checkbox"/>	<input type="checkbox"/>			
(48) During inert entry, will the entrants be supported above the catalyst or will their lifeline attached to the harness D-ring remain taut when removal activities necessitate standing on the catalyst?	<input type="checkbox"/>	<input type="checkbox"/>			
(49) For multiple bed reactors, will an additional attendant be positioned on the tray section/level above the entrants removing catalyst as needed?	<input type="checkbox"/>	<input type="checkbox"/>			
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Section 12 – Required for Active Unloading Spent Catalyst

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(50) Is hard barricade (scaffold) with top/mid-rails wrapped in DANGER tape.	<input type="checkbox"/>	<input type="checkbox"/>			
(51) Are barricades placed at least 15 feet (where possible) from dump nozzles and around area where flow bins are to be closed/vacuumed.	<input type="checkbox"/>	<input type="checkbox"/>			
(52) Signs stating, “ DANGER ARSENIC CANCER HAZARD, Respirator Required ” on all sides (if arsenic is present).	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

Section 13 – Required for Unloading of Spent Catalyst (O2, Arsenic, and Heat Hazards)

Decontamination and Dust Control Shall Consist of the Following:

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
<ul style="list-style-type: none"> Dust collection/containment systems must be used to prevent emissions from hoppers, flow bins, and conveyor systems. No visible dust is allowed during unloading. Spilled catalyst must be vacuumed (not swept or blown). Visibly contaminated coveralls must be removed and bagged for disposal upon leaving Arsenic Regulated Area. Flow bins will be secured, and catalyst vacuumed from the top before leaving Arsenic Regulated Area to be weighed. 	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

Section 14 – Monitoring of Catalyst Decontamination Process

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(53) Confirm that O2, LEL and CO can be read from monitors on the ground.	<input type="checkbox"/>	<input type="checkbox"/>			
(54) Catalyst can be unloaded to flow bins can begin when LEL is 20% or below and reactor temperature below 120 F.	<input type="checkbox"/>	<input type="checkbox"/>			
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Section 15 – Required Preparations for Non-Inert (Atmospheric) Reactor Entry

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(55) Verify all spent catalyst and pyrophoric residue is removed from the reactor internals before informing Operations to stop N2 flow to Reactor	<input type="checkbox"/>	<input type="checkbox"/>			
(56) Verify all sources of nitrogen (truck and plant utility) have been physically disconnected from the Reactor.	<input type="checkbox"/>	<input type="checkbox"/>			
(57) Fully ventilate the reactor internal space. Install air horn (5000 cfm) against the bottom dump nozzles and seal the upper dump nozzles (plastic and duct tape).	<input type="checkbox"/>	<input type="checkbox"/>			
(58) Place Danger Barricade and post “DANGER DO NOT ENTER OXYGEN DEFICIENT ATMOSPHERE” signs around dump nozzles prior to turning on air horns.	<input type="checkbox"/>	<input type="checkbox"/>			
(59) Approved ladder (cable or hard) and tripod or A-frame mounted SRL/winch must remain in place from the Requirements for “Inert” Reactor Entry section of this procedure.	<input type="checkbox"/>	<input type="checkbox"/>			
(60) After vessel is ventilated, turn off the ventilation (air horns) for at least 15 minutes before requesting MPC Personnel to perform atmospheric initial.	<input type="checkbox"/>	<input type="checkbox"/>			
(61) MPC Personnel conducted an air monitoring assessment of the atmosphere inside the Reactor and exposure control measures (e.g. ventilation; fall protection) before the initial entry permit was issued.	<input type="checkbox"/>	<input type="checkbox"/>			
(62) Once MPC Personnel have verified by atmospheric monitoring that O2 levels have returned to normal (20.9%) throughout the vessel and verified no contaminants are above MPC exposure limits, DANGER DO NOT ENTER OXYGEN DEFICIENT ATMOSPHERE, Breathing Air Required signs are to be removed.	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

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Section 16 - Required to Protect Against Cobalt, Nickel, Dust, Falls, and Falling Objects During Catalyst Loading

Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(63) Arsenic Regulated Area with hard barricade will be maintained (without Arsenic Signs) until completion of catalyst loading. This still serves as a barricade for suspended loads.	<input type="checkbox"/>	<input type="checkbox"/>			
(64) Persons working on top deck of Reactor(s) during catalyst loading shall have the following PPE: a. ½ face respirator with P-100 cartridges. b. Goggles (unless a full-face respirator is being used in place of a ½ face respirator). c. Fall protection may be required depending on barricade/loading equipment configuration. Note: Ensure adequate tie-off points are being used (e.g. scaffold, vertical of fixed guardrail below mid-rail, etc.).	<input type="checkbox"/>	<input type="checkbox"/>			
(65) Persons entering Reactor during catalyst loading shall have the following PPE: a. Supplied air respirator. b. Full body disposable coveralls (Tyvek). c. Cut Resistant / Impact Gloves with Nitrile liner (recommended). d. Full body harness attached to Tripod or A-frame (with ¼" steel cable). e. Maintain radio communications with personnel outside Reactor.	<input type="checkbox"/>	<input type="checkbox"/>			
(66) Platform has been erected above hopper to support super sacks or a procedure acceptable to MPC Personnel has been proposed to prevent work under a suspended load during opening of super sacks.	<input type="checkbox"/>	<input type="checkbox"/>			
(67) Ensure a tripod (or similar for rescue) is installed during the loading process and ensure the installation of the loading hopper does not block entry/exit into the space. NOTE: Hopper is typically offset to allow tripod use and not block the entry point.	<input type="checkbox"/>	<input type="checkbox"/>			
(68) Catalyst Contractor(s) has completed loading of support media and catalyst.	<input type="checkbox"/>	<input type="checkbox"/>			

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Question	Answer		Responsible Department	Completed by: (initials)	Date/time:
	yes	no			
(69) MPC inspection has completed inspection of tray(s) and confirmed that Catalyst Contractor has closed internal man-ways.	<input type="checkbox"/>	<input type="checkbox"/>			
Comments:					

#	Recommendations, Corrective Actions, Opportunities for Improvement	Responsible Person	Due Date