

SPE PPE Grid																								
Chemical	Hazard	Pathway of Exposure and Affected Body Part	Task	Degree of Exposure	Eyes/Face		RESPIRATORY						Body			FEET		Hand				Misc		General Comments : The list of PPE noted is considered to be the minimum PPE required to perform each of the given tasks. Higher levels of PPE may be used if desired. Standard FRC (Nomex) is issued to all Dow and in-house Maintenance employees. Due to the variability in business and block requirements, higher levels of PPE may be
					Chemical Goggles (Monogoggles)	Face Shield	Half-Face with Organic Vapor	Full-Face (air purifying via Airline : Full Face Supplied Air (via air contained breathing)	Dust mask	General coverall suit (i.e. Tyvex)	Chemical protection suit (i.e. Aluminized Suit	Full body protection (Neoprene)	Chemical Resistant boots	Di-electric rubber boots	Kevlar/Cut Resistance Gloves	Cut resistance sleeve	Nitrile glove	Heat Resistant (GLOVE CRUSADER FLEX)	PVC glove	Aluminized glove	Double Hearing Protection	Fall Protection		
Minimum PPE for SPE : Hard hat, safety glasses, leather glove, hearing protection, FRC/Nomex suit, safety shoes (ESD type)																								
Solvent (C7-C8 n-Parfin)	Highly flammable, Irritating to skin, may cause lung damage if swallowed. Vapours may cause drowsiness and dizziness	Inhalation and skin	01.01 Loading/ Unloading (isotank)	Moderate		X	X												X		**			
			01.02 Line/Equipment Openings - <i>not verified free of contaminants (i.e. initial breaking and entering) Includes hot bolting</i>	Moderate to high during line breaks.	X	X*	X													X				
			01.03 Line/Equipment Openings - <i>verified free of contaminants</i>	Low		X*														X				
			01.04 Equipment maintenance (Includes filter changes)	Low	X																X			
			01.05 Sample Collection	Moderate		X	X														X			
			01.06 Sample Collection (Close system)	Low																	X			
Ethylene and Fuel Gas	Extremely Flammable, Asphyxiant, Anesthetic at high concentrations	Inhalation, full body exposure to flash fire hazard	02.01 Line/Equipment Openings - <i>not verified free of contaminants (i.e. initial breaking) Includes hot bolting</i>	Moderate to high during line breaks				X											X					
			02.02 Line/Equipment Openings - <i>verified free of contaminants and /or or working with small quantities that can't be cleared</i>	Low to moderate during line breaks	X*	X*																		
			02.03 Equipment maintenance (Includes filter changes)	Low	X																			
			02.04 Sample Collection	Low	X																			
Butene	Irritate, frostbite and impaired vision Irritate and frostbite skin. If inhale, may cough, dizziness, shortness of breath, drowsiness, unconsciousness	Inhalation, eye and skin	03.01 Line and equipment opening- <i>not verified free of contaminants</i>	Moderate to high during line breaks.				X											X					
			03.02 Line and equipment opening- <i>Verified free of contaminants</i>	Moderate to high during line breaks.	X*	X*														X				
			03.03 Equipment maintenance	Low																				
Octene	Irritating to skin and respiratory tract. Inhalation produces CNS effects. Flammable.	Inhalation of vapors and skin contact with liquid.	04.01 Line/Equipment Openings - <i>not verified free of contaminants (i.e. initial breaking and entering - Includes hot bolting</i>	Moderate	X	X*	X												X					
			04.02 Line/Equipment Openings - <i>verified free of contaminants and /or or working with small quantities that can't be cleared</i>	Low		X*														X				
			04.03 Equipment maintenance (Includes filter changes)	Low	X															X				
			04.04 Sample Collection	Low		X	X													X				
Hydrogen	Flammable	Inhalation - simple Asphyxiant	05.01 Line/Equipment Openings - <i>verified free of contaminants and /or or working with small quantities that can't be cleared</i>	Low	X*	X*																		

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			05.02 Equipment maintenance (Includes filter changes)	Low																							
Nitrogen	Asphyxiant	Inhalation	06.01 Loading/ Unloading/ Handling Raw Materials and Process Chemicals	Low due to Engineering Controls and																							
			06.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering - see Note 5) Includes hot bolting	Moderate to high	X	X*																					
			06.03 Line/Equipment Openings - verified free of contaminants and /or working with small quantities that can't be cleared	Low		X*																					
			06.04 Equipment maintenance	Low																							
Additive (Solvent IRGANOX B 973 FF, IRGANOX 1010, IRGANOX 1076, Calcium stearate)	Potential irritation to skin and respiratory tract. Potential sensitizer in some cases.	Inhalation and/or skin contact	07.01 Unloading/loading	Low		X*	X																				
			07.02 Line/Equipment Openings - not verified free of contaminants	Low	X	X*	X																				
			07.03 Line/Equipment Openings - verified free of contaminants	Low		X*																					
			07.04 Sample Collection	Low		X	X																				
			07.05 Make batch additive	Low	X		X																				
Dry additives	Potential irritation to skin and respiratory tract. Potential sensitizer in some cases.	Inhalation and/or skin contact	08.01 Loading/ Unloading/ Handling Raw Materials and Process Chemicals/Mixing additives	Low	X		X																				
			08.02 Cutting bags																								
			08.03 Equipment maintenance (Includes filter changes)	Low to Moderate depending on																							
			08.04 Sample Collection	Low	X																						
			08.05 Lab Analysis	Low																							
Metal Alkyl Catalyst (BEM,TEA, EADC, MMAO)	Exposure may cause irritation, buring or contact dermatitis.	Inhalation of vapors and skin contact with liquid.	09.01 Unloading/loading chemical	Low			X						X										X				
			09.02 Line/Equipment Openings - not verified free of contaminants	Moderate			X							X										X			
			09.03 Line/Equipment Openings - verified free of contaminants	Low											X									X			
			09.04 Sample Collection	Low			X							X											X		
Dowtherm Q	Primarily irritation to skin, eyes and possibly respiraotry tract. Contact with hot liquid will produce thermal burns.	Inhalation/skin contact with vapors or liquids.	10.01 Unloading/loading	Low to moderate	X	X																					
			10.02 Line&Equipment Openings - not verified free of contaminants	Moderate	X*	X*	X*																				

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			10.03 Line/Equipment Openings - verified free of contaminants	Low		X*																																
			10.04 Equipment maintenance (Includes filter changes)	Low		X																																
			10.05 Sample Collection	Low		X																																
DOWTHERM* SR-1 Heat Transfer Fluid, Dyed	Primarily irritation to skin, eyes and possibly respiratory tract.	Inhalation/skin contact with vapors or liquids.	11.01 Unloading/loading	Low to moderate	X	X																																
			11.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking) Includes hot bolting	Moderate	X*	X*	X*																															
			11.03 Line/Equipment Openings - verified free of contaminants and /or or working with small quantities that can't be cleared	Low		X*																																
			11.04 Equipment maintenance (Includes filter changes)	Low		X																																
			11.05 Sample Collection	Low		X																																
Paratherm	Mildly irritating to eyes and skin after product is used. Exposure to smoke or mist while product is use may cause irritaion to upper respiratory tract and lungs	Primarily skin contact, with possible inhalation at higher temperatures or if agitated.	12.01 Loading/ Unloading/ Handling Raw Materials and Process Chemicals	Low to moderate	X	X																															**	
			12.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering) Includes hot bolting	Low to moderate	X*	X*	X*																															
			12.03 Line/Equipment Openings - verified free of contaminants	Low		X*																																
			12.04 Equipment maintenance (Includes filter changes)	Low		X																																
			12.05 Sample Collection	Low		X																																
Mineral Oil	Potentially irritating to skin, eyes and respiratory tract. Combustible. Heated material will produce thermal burns.	Primarily skin contact, with possible inhalation at higher temperatures or if agitated.	13.01 Loading/ Unloading/ Handling Raw Materials and Process Chemicals	Low to moderate		X*																															**	
			13.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering) Includes hot bolting	Low to moderate		X*																																
			13.03 Line/Equipment Openings - verified free of contaminants	Low		X*																																
Mineral Oil (Con't)	Potentially irritating to skin, eyes and respiratory tract. Combustible. Heated material will produce thermal burns.	Primarily skin contact, with possible inhalation at higher temperatures or if agitated.	13.04 Equipment maintenance (Includes filter changes)	Low																																		
			13.05 Sample Collection	Low		X																																
			13.06 Refil oil to seal pot	Low		X																																

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Minimum PPE for SPE : Hard hat, safety glasses, leather glove, hearing protection, FRC/Nomex suit, safety shoes (ESD type)																																				
Lube oil	Low hazard for health	Skin and eye contact	14.01 Drain lube oil	Low		X																														
			14.02 Loading/Unloading	Moderate		X																														
Sodium Hydroxide 32%, Sulfuric Acid, Sodium Hypochlorite, OX1201, NX1100, MD4106, MS6207, GN7004, GN8203	May cause chemical burn and corrosive, strong respiratory irritant	Skin, inhalation and eye contact	15.01 Loading / Unloading	Moderate	X	X*					X						X																			
			15.02 Line and equipment opening- not verified free of contaminants (Loading unloading activities)	Moderate to high during line breaks.					X			X																								**
			15.03 Line and equipment opening- Verified free of contaminants	Low	X	X*																														**
TEMPERED WATER + MD4106	May cause slight irritation to the skin, moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract. May cause gastrointestinal irritation.	Inhalation, eye and skin	16.01 Line and equipment opening- verified free of contaminant temperature < 60 C	Low	X	X*																														
			16.02 Take sample temperature > 60C	Low	X	X*																														
Propylene	Extremely Flammable, Asphyxiant, Anesthetic at high concentrations	Inhalation, full body exposure to flash fire hazard	17.01 Unloading/loading chemical	Low to moderate					X																											
			17.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering) Includes hot bolting	Low to moderate during line breaks					X																											
			17.03 Line/Equipment Openings - verified free of contaminants	Low to moderate during line breaks	X*	X*																														
			17.04 Equipment maintenance (Includes filter changes)	Low																																
Hexene	Aspiration hazard. May be fatal if swallowed and enters airways	Inhalation and swallow	18.01 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering - Includes hot bolting	Low					X																											
			18.02 Line/Equipment Openings - verified free of contaminants and /or or working with small quantities that can't be cleared	Low	X*	X*																														
			18.03 Equipment maintenance (Includes filter changes)	Low																																
			18.04 Sample Collection	Low																																
Freon R22	Central nervous system depressant. Liquid can cause frostbite.	Inhalation of vapors. Skin contact with liquid.	19.01 Unloading/loading chemical	Low																																
			19.02 Line/Equipment Openings - not verified free of contaminants (i.e. initial breaking and entering) Includes hot bolting	Medium to high					X																											
			19.03 Line/Equipment Openings - verified free of contaminants	Low		X*																														
			19.04 Equipment maintenance (Includes filter changes)	Low																																
NA	Cut		20.01 Change knife assembly	Low																																

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			20.02 Change screen pack	Low		X*														X							**	
			20.03 Pallet water tank activity	Low		X*																						
Poly Pellets/Poly Granules	Essentially inert. Contact with dust can dry out the skin. Dust can irritate respiratory tract.	Inhalation/skin contact	21.01 Clean dust	Low	X																							
			21.02 Change filter (FLR-XXX, FLR-XXXX)	Moderate	X					X																		
Poly, Molten	Causes thermal burns	Skin contact	22.01 Remove polymer at the die	Low		X																						
Side Arm Additive		Inhalation and/or skin contact	23.01 Loading	Low	X*																							
Molecular sieve and Selexsorb,COS	Irritation of nose and throat. Redness or burn with skin. And irritating to eye	Inhalation of dust and contact to skin	24.01 Unloading bed media Unit: Ethylene, Butene Feed, Fresh Solvent and Solvent Recycle	Low	X		X			X	X															X		Use N95 Particulates filter for dust mask
			24.02 Loading new bed media Unit: Ethylene, Butene Feed, Fresh Solvent and Solvent Recycle	Low					X	X																X		Use N95 Particulates filter for dust mask
Any pressure Steam, Hot water (>60°C, low pressure steam 35 psi or less) For example, using a hose			25.01 Line/Equipment Openings - Hot	Moderate to high	X	X							X															
			25.02 Line/Equipment Openings - Cold	Low	X	X*																						
			25.03 Equipment maintenance (Cold)	Low																								
Hydrochloric Acid	Severe irritation and/or chemical burns to the eyes, skin, and respiratory tract. Primarily inhalation of vapors or skin/eye contact with liquid or vapor.	Skin, inhalation and eye contact	26.01 Line and equipment opening- not verified free of contaminants (Loading unloading activities)	Moderate to high during line breaks.				X			X																	
			26.02 Line and equipment opening- Verified free of contaminants	Low	X		X*																					
Pellet Cooling Water	Causes thermal burns	Inhalation/skin contact with hot vapors or liquids	28.01 Line/Equipment Openings - Hot	Moderate to high		X							X															
			28.02 Line/Equipment Openings - Cold	Low		X							X															
			28.03 Equipment maintenance (Cold)	Low																								
Recycle/Waste Oil	Potential skin irritant. Produces thermal burns when hot.	skin contact	29.01 Loading/ Unloading/ Handling Raw Materials and Process Chemicals	Low	X																							
			29.02 Equipment maintenance (Includes filter changes)	Low																								
Dust	Irritation to respiratory tract, potential carcinogen.	Inhalation of dusts	30.01 Dust exposure	Low	X																							
Non-Metal Alkyl Catalyst (CGC-1301, HEC, TiPt, RiB-2)	Exposure may cause irritation, burning or contact dermatitis.	Inhalation of vapors and skin contact with liquid.	31.01 Unloading/loading chemical	Low	X	X	X																					
			31.02 Line/Equipment Openings - not verified free of contaminants	Moderate	X	X*	X																					
			31.03 Line/Equipment Openings - verified free of contaminants	Low	X	X*																						
			31.04 Sample Collection	Low	X	X*	X																					
Cooling water (with chemical dosing)	May cause chemical burn and corrosive, strong respiratory irritant	Skin, inhalation and eye contact	32.01 Line/Equipment Openings - verified free of contaminants	Low	X	X*																						
			32.02 Sample Collection	Low	X	X*																						

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Minimum PPE for SPE : Hard hat, safety glasses, leather glove, hearing protection, FRC/Nomex suit, safety shoes (ESD type)

Ceramic Fiber		Skin, inhalation and eye contact	33.01 Dust exposure (Spray rigidizer, internal inspection, scaffold work, install insulation)	Low	X		X						X															Half face + cartridge#1050		
			33.02 Dust exposure (Install insulation pin - Grinding)	Low	X	X	X					X																		
			33.03 Dust exposure (Insulation removal)	Low				X				X																		
Acid in Battery (Sulfuric Acid)	Skin contact: Corrosive, irritant, permeator Eye: irritant, corrosive. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract.	Skin, inhalation and eye contact	34.01 Working in Battery Room (*Wear when entering this room. If there is no battery broken, half face can relax.)	Low	X		X*																							

- Remark**
- This PPE grid applies also to Visitor.
 - "X" marks the required PPE for the task.
 - "X*" marks the PPE that is required for the specific task. Once the task is finished, the PPE could be relaxed
 - Cartridge filter type is #1053 is able to handle most of substance in PE, unless specified for other type. Dispose after used.
 - ** Follow Elevated work requirement
 - Downgrading of PPE over the course of a task is at discretion of the permit writer. Minimum requirements of grid must still be met.
 - Dust protection suit (Tyvek) shall be used when risk of exposure to dusty material is identified.
 - Chemical protection suit (Saranex) shall be used when risk to penetration enhancer
 - Additional PPE shall be used if the person is within the distance to the hazard.
 - "Full face respirator" could replace the combination 2 out of Face shield, half face, goggle because it give higher protection.

History

Date	Updated by	Approved By	Changes
4-Oct-18	Suwimon P.	Nattaya B.	Review with no change
4-Sep-17	Pattamawadee A.	Phayoongsak P.	Add task 21.02 Change filter FLR-XXX, FLR-XXXX)
13-May-17	Pattamawadee A.	Phayoongsak P.	Add "N95 Particulates filter for dust mask using in bed media changing task"
7-Apr-17	Pattamawadee A.	Phayoongsak P.	Add PPE for Working in Battery Room
28-Dec-16	Pattamawadee A.	Phayoongsak P.	- Add Ceramic fiber (PPE is from risk assessment together with plant and IH) - Review all remarks
4-Oct-16	Pattamawadee A., Phakdee A. and Somsak P.	Phayoongsak P.	- Separate non-pyrophoric from catalyst group. - Specify safety shoes to ESD type as per LPP requirement. - Add Cooling water in PPE grid