

PPE NEED ANALYSIS				Document ID :	
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				Contractor Reference :	
				6601000283	
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Doc. Type: PRC	Discipline: CSE	Phase: DE	Class: 2	Page 1 of 13	
Vender Reference : N/A			System / Subsystem: NN	Equipment Type: N/A	

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HYUNDAI
ENGINEERING & CONSTRUCTION

AMIRAL PROJECT

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PPE NEED ANALYSIS

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1 PURPOSE

This PPE Need Analysis is intended to ensure that all employees wear appropriate PPE for their work tasks in the AMIRAL PROJECT

Everyone on the work site shall be required to use PPE. Personnel in the vehicle parking area, administrative areas, canteen, control room and medical center will not be required to wear PPE unless otherwise advised to do so by instruction, notices and signs.

As a minimum PPE required, personnel will be required to wear protective clothing, safety shoes/boots, safety glass and hard-hat in a construction site

2 PPE REQUIREMENTS

▪ Green Field Areas

Location	Safety Shoes	Coveralls	Safety Helmet with chin strap	Safety Harness	Protective Clothing	Safety Spectacle Glasses	Ear plug	RPE	Safety Gloves	Surgical Gloves	Reflective Vest	Others
Workers Camp		✓										
Clinic										✓		
Parking Area											✓	
Admin Area												
Canteen												
Medical Centre	✓	✓										
Control Room	✓	✓										
Warehouses	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	

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Workshops	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Fabrication Areas	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Construction Areas	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Laydown Areas	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Brown Field Areas	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Specific Activities			PPE for location plus additional PPE for specific hazards.									
Gas monitors			PPE for danger of confined space and need gas monitor.									

PPE for location plus additional PPE for specific hazards

[Note] PPE requirement shall comply with Local Law or COMPANY regulations.

- It is recommended that a pair of safety gloves is carried at all times for use when needed.
- High visibility vest and ear plugs shall be worn when working with or near moving vehicle/equipment or poor visibility condition.
- PPE shall meet applicable ANSI requirements or equivalent as specified in writing by the SA Loss Prevention.
- PPE shall be visually inspected by the user before each use. Defective or damaged PPE shall not be used and shall be immediately replaced
- Each worker shall be provided with his own personal water bottle/insulated container (2-liter capacity) and have it with him at all times. _Heat Stress Management Plan
- **Surgical gloves applicable for medical staffs working inside the clinic.**

3 EVALUATION AND SELECTION

The standard of equipment that is selected and purchased will be at least equal to or higher than the standards identified in this procedure. Selection of the appropriate PPE depends on the hazards associated with the work activities and the environmental condition where the work will be executed.

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When selecting PPE, foreseeable emergency situations must be evaluated, as well as taking into consideration the correct fit and comfort of the wearer. The tables below provide an example of the PPE evaluation and selection process.

3.1. Hazards Present

Additional PPE shall be selected and used based upon the results of a documented risk-based PPE needs analysis, which shall consider the exposure hazards, materials handled, and activities performed by personnel mentioned in CSM 3.1 to 3.11.

Hazards	Body Zone Protected	PPE Required
Toxic substances / chemicals	<ul style="list-style-type: none"> • Eyes • Face • Airways • Body • Hands 	<ul style="list-style-type: none"> • Safety goggles • Face Shield • Respiratory mask (full face type only) • Chemical resistant gloves <p>Refer to Material Safety Data Sheet (MSDS) on PPE requirements for specific chemicals</p>
Noise	<ul style="list-style-type: none"> • Ears 	<ul style="list-style-type: none"> • Ear muff or Ear plugs
Extreme Temperature	<ul style="list-style-type: none"> • Hands 	<ul style="list-style-type: none"> • Gloves

3.2. Hazardous Conditions

Hazardous Condition	Body Zone Protected	PPE Required
Flying sparks / particles	<ul style="list-style-type: none"> • Eyes 	<ul style="list-style-type: none"> • Safety goggles • Face Shield

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Dust / mist/ smoke and fumes	<ul style="list-style-type: none"> Eyes Airway 	<ul style="list-style-type: none"> Safety goggles Respiratory mask
Arc Flash (Energized Substation)	<ul style="list-style-type: none"> Body 	<ul style="list-style-type: none"> Arc flash Clothing

3.3. Hazardous Activities

Hazardous Activities	Body Zone Protected	PPE Required
Working at heights	<ul style="list-style-type: none"> Body 	<ul style="list-style-type: none"> Fall Body Safety Harness Suspension Trauma Strap Fall Arrestor
Welding, Brazing, Grinding Works	<ul style="list-style-type: none"> Eyes Body 	<ul style="list-style-type: none"> Face Shield fitter with helmet Apron Welding Gloves
Electrical work on electrical equipment operated at higher than 240 volts	<ul style="list-style-type: none"> Body 	<ul style="list-style-type: none"> Arc Rated Clothing High Rated Face Shield and Arc rated rubber Gloves

4 PPE TRAINING

Employees must be trained to know at least the following:

1. When PPE is necessary.
2. What PPE is necessary.
3. How to properly put on, take off, adjust and wear the PPE.
4. The limitations of the PPE.
5. Proper care, maintenance, useful life and disposal of PPE.

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Supervisors shall ensure their personnel are trained in inspection, use, maintenance, and storage of PPE according to the manufacturer's instructions as per CSM I-3 Personal Protective Equipment (PPE)

5 FITTING

For PPE to be effective it must fit correctly. It is the responsibility of all supervisors to ensure that PPE, where applicable, is correctly fitted when issued and is correctly worn when in use.

6 MAINTENANCE, STORAGE AND RECORD

PPE shall be kept, stored and maintained in accordance with the recommendations of manufacturers. Issue of record shall be kept in the safety office. A record of inspections, maintenance and tests carried out shall be kept for all PPE.

When not in use all PPE should be stored in conditions that are hygienic and will not cause deterioration or damage to the material. A designated room, purpose-built storage containers or racks that are dry, cool, contamination free and away from direct sun light or extreme cold shall be provided.

7 SAUDI ARAMCO PPE REQUIREMENT

SN	PPE	Specification	Remarks
1	Hard Hat/Smart Safety Helmets	ANSI Z89.1, Type "1", Class "E" (electrical)	Mandatory / ALL Areas Quantity of smart safety helmet has been estimated at 2% of the total construction workforce
2	Safety Glass (Dark)	ANSI Z87.1	Mandatory / ALL Areas (Day Time)

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3	Safety Glass (Clear)		Mandatory / ALL Areas (Night Time & Low Lighting)
4	Prescription Safety Glass	with side shields and shatter proof lenses	Personnel requiring them
5	Safety Gloves	Type of gloves shall be selected based on materials or equipment being handled.	Mandatory / ALL Areas (except near moving machinery / rotating equipment or activities that could present hazard)
6	Safety Footwear	ASTM F 2413-05	Mandatory / ALL Areas
7	Ear Plugs	ANSI S3.19-1974	High Noise (85db higher) Level Areas
8	Safety Coverall	Flame Resistant Clothing (FRC), Tyvek, leather or non-permeable materials	Mandatory / Brown Field Areas
9	Respiratory Protection Equipment (RPE)	ANSI Z88.2	Activities w/ presence of air contaminants
10	Full Body Harness w/ Suspension Trauma Strap	ANSI Z359.1	Working at Heights Any activities above or at 1.8m from the ground/platform level requires harness use as per clause 3.3.2 of SA-AMI-000-ECST-000001.
11	Welding Helmet	with proper lens shade	Welding Activities
12	Face Shield	ASTM F 2178	Cutting and Grinding, Blasting Activities
13	Arc Rated Clothing	DuPont NOMEX (APTV>12cal/cm ²)	Electrical equipment operated at higher than 240 volts
14	Jackets with fluorescent strips	ANSI CLASS 2	Near moving vehicle/equipment or poor visibility condition

Clothing shall be free of holes, excessive wear and other defects. Only proper work clothing (e.g., coveralls, long pants and sleeved shirt) shall be worn by personnel performing construction, maintenance and operations work (e.g., traditional loose flowing "Eastern"

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style clothing shall not be worn, since it presents tripping and entanglement hazards).
 Portable Toxic / Combustible Gas Monitor kit / Packet hold Gas-monitor Alarm meter
 protective device shall be free
 CSM I-3 Personal Protective Equipment (PPE) Section 3.3.9

Documented PPE issuance shall be made available for all contractor staff based on the skills and job category. e.g. PPE issuance form signed by personnel that specifically indicates what type of PPE being issued to them.

Plain cotton earplugs shall not be used for hearing protection. CSM I-3 Personal Protective Equipment (PPE) section 3.8.2

Personnel shall not be exposed to impulse or impact noise levels that exceed the requirements of SAES-A-105. The need for additional hearing protection devices shall be evaluated prior to performing work. CSM I-3 Personal Protective Equipment (PPE) section 3.8.3

FRC for protection against flash fire shall be per the SA Safety Management Guide for Flame Resistant Clothing (FRC). The FRC specified in this safety management guide does not provide sufficient protection against electrical arc flash hazards. The proper arc flash rated PPE shall be provided and worn per GI 2.721. CSM I-3 Personal Protective Equipment (PPE) section 3.9.3 and as per CSM Section 3.9.2 FRC required in specific locations & operational area (Brown Field Areas).

Employees shall be trained on how to use RPE safely and efficiently. CSM I-3 Personal Protective Equipment (PPE) section 3.11.3

Breathing air quality shall meet Compressed Gas Association (CGA) Grade 'D' requirements (see GI 1780.001) and shall be supplied via an SCBA, air-line cascade system, or air-fed hoods with proper particulate/moisture filters and air temperature monitoring. e.g. abrasive blasting activities.

8 PPE NEED ANALYSIS CHECKLIST

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Additional PPE shall be selected and used based upon the results of a documented risk-based PPE needs analysis, which shall consider the exposure hazards, materials handled, and activities performed by personnel.

- When personnel entering confined space or where there is possibility of deprived oxygen, Personnel shall have a portable Oxygen detector or oxygen periodically monitored.
- Disposable earplugs shall be discarded at the end of each shift.
- Personnel when entering work location susceptible for hazard like H2S, CO etc. shall check the concentration prior to work.

Contractor's documented PPE needs analysis was being made and available from Contractor Work Permit system (Figure No.1)

Figure No.1 – PPE needs analysis

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Time / Duration

1. Activity which involves toxic substances and/or chemicals		
<input type="checkbox"/> Face Shield <input type="checkbox"/> Cartridge Type Mask <input type="checkbox"/> Mono Goggles	<input type="checkbox"/> Full Face Type Mask <input type="checkbox"/> Dust Mask <input type="checkbox"/> Others _____	<input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Disposable Coverall <input type="checkbox"/> Others _____
2. Activity which involves welding, brazing, cutting, grinding works		
<input type="checkbox"/> Welding Mask <input type="checkbox"/> Ear Plug <input type="checkbox"/> Welder Leggings	<input type="checkbox"/> Face Shield <input type="checkbox"/> Abrasive Resistant Gloves <input type="checkbox"/> Others _____	<input type="checkbox"/> Welding Apron <input type="checkbox"/> Welding Sleeves <input type="checkbox"/> Others _____
3. Activity which involves use of jackhammer, soil compactors, concrete breakers		
<input type="checkbox"/> Ear Plug <input type="checkbox"/> Others _____	<input type="checkbox"/> Face Shield <input type="checkbox"/> Others _____	<input type="checkbox"/> Safety Shoes with Metatarsal Guards <input type="checkbox"/> Others _____
4. Activity which involves electrical equipment operated at higher than 240 Volts		
<input type="checkbox"/> Arc Rated Clothing <input type="checkbox"/> Non-conductive Safety Shoes	<input type="checkbox"/> Arc Rated Face Shield <input type="checkbox"/> Others _____	<input type="checkbox"/> Arc Rated Gloves <input type="checkbox"/> Others _____
5. Activity which involves heating or high temperature		
<input type="checkbox"/> Flame Resistant Clothing <input type="checkbox"/> Others _____	<input type="checkbox"/> Heat resistant Gloves <input type="checkbox"/> Others _____	<input type="checkbox"/> Face Shield <input type="checkbox"/> Others _____
6. Activity which involves near high noise areas		
<input type="checkbox"/> Ear Plug <input type="checkbox"/> Others _____	<input type="checkbox"/> Ear Muff <input type="checkbox"/> Others _____	<input type="checkbox"/> <input type="checkbox"/>
7. Activity which involves working in elevated area (>6ft/ 1.8m) (if required)		
<input type="checkbox"/> Full Body Harness & Double Lanyard with Suspension Trauma Strap <input type="checkbox"/> Others _____		

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9 REFERENCE

- 1. Saudi Aramco Construction Safety Manual (CSM) I-3 Personal Protective Equipment
- 2. G.I. 2.721 Electrical Arc Flash Hazard Mitigation
- 3. AMIES-A-105 Noise Control
- 4. GI 1780.001 Atmosphere Supplying Respirators
- 5. GI 8.005, Protective (Safety) Footwear.
- 6. GI 8.002, Safety Spectacles

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10 ATTACHMENT

Attachment No.1 – PPE Request Form

<u>PPE REQUEST FORM</u>					
Name: _____			Date: _____		
ID Number: _____			Section: _____		
NO.	Description	Specification	QTY.	Unit	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Section Head: _____			Received by: _____		
Signature: _____			Received Date: _____		

