



AEGIS GAS (LPG) PRIVATE LIMITED

(Wholly owned subsidiary of Aegis Logistics Limited)

Unit 2, Gujarat Pipavav Port Limited, Pipavav Port, Uchhaiya Via Rajula,
Dist. Amreli - 365560 Gujarat State

**Last date for
submission
extended to
10.11.2011**

NOTICE INVITING TENDERS / BIDS

TENDER NO.: TD/AGPL/02 DATE: 30.09.2011

INTRODUCTION

Aegis Gas LPG Private Limited (AGLPL) is a company formed with limited liability in Mumbai on 26th December, 2001. The registered office of the Company is situated at 415-416, Shri Nand Dham, Plot No. 59, Sector 11, CBD Belapur, Navi Mumbai 400 614. AGLPL is a Wholly Owned subsidiary of Aegis Logistics Ltd., a listed public limited company and a leading Logistics player of petroleum products in India.

Brief about the parent flagship company – Aegis Logistics Ltd. (ALL)

ALL is India's leading Logistics Company engaged extensively in Liquefied Petroleum Gases (LPG), Liquid POL products, Petrochemicals and Chemicals, serving the Oil, Petrochemical and Gas Industry since 1977. Aegis group owns / operates India's largest integrated bulk Liquid cum LPG Terminal in the port of Mumbai and also the largest private bulk Liquid Terminal at Kochi port, apart from a pressurized LPG Storage Terminal at Pipavav Port and a LPG Bottling /Blending Unit at Kheda, Gujarat.

The Group aims to create 'necklace' of similar port terminals around the coastline of India. It has firmed up plans to put up new/additional storage capacity at Pipavav, Kochi and Haldia during the next 18-24 months at an investment exceeding INR 4,000 million.



Registered Office: 415-416, Shri Nand Dham, Plot No. 59, Sector 11, CBD Belapur,
Navi Mumbai – 400 614, Tel: 022-27566640 / 27566525, Fax; 022-27566659

ELIGIBILITY CRITERIA FOR TENDERER

The tenderer shall meet all the following conditions for qualifying for the job of construction of LPG Horton spheres

1. The tenderer should be CCOE approved fabricator of Pressure vessels under SMPV rules 1981(unfired). Copy of valid license should be enclosed along with the technical bid.
2. The tenderer should have designed, fabricated, supplied, erected, tested and commissioned spherical pressure vessels of volume 3000 cum. and design pressures above 14kg/sq.cm in the last 7 years.
3. Tenderer shall submit Certificate of Control from Third Party Inspection (TPI)agency showing at least the Mechanical Completion(including Hydro Testing)of the vessel for the job executed.
4. The tenderer should have successfully completed job of fabricating pressure vessels in the last SEVEN financial years any one of the following:

Three similar fabrication jobs each costing not less than 40% value in each
OR
One similar fabrication job costing not less than 80% value.
5. Similar work shall mean “Designing, fabricating, supplying, erecting, testing & commissioning Pressure Vessels under SMPV Rules including cost of steel plates and related civil works”.
6. Average Annual Financial Turnover during the last 3 years, ending 31st March, of the previous financial year should be at least 50% of value. Bidders are required to submit the audited balance sheets, profit & loss statements for the last 3 financial years.
7. Bidder shall furnish documentary evidence i.e. copies of work orders/relevant pages of contract, completion certificate or certified final bill from their clients, annual reports containing audited balance sheets and profit & loss accounts statement, in the first instance itself, in support of their fulfilling the qualification criteria. AGPL reserve the right to complete the evaluation based on the details furnished without seeking any additional information.
8. Parties who are affiliates of one another can decide which Affiliate will make a bid. Only one affiliate may submit a bid. Two or more affiliates are not permitted to make separate bids directly or indirectly. If 2 or more affiliates submit a bid, then any one or all of them are liable for disqualification.

NOTICE INVITING TENDERS / BIDS

M/s _____

Kind Attn:

Dear Sir,

Subject : Tender Enquiry for the design, supply fabrication, Site Erection including civil works and Commissioning of 2 Nos. of 3000 cum water capacity each LPG Horton Spheres at the Aegis Gas (LPG) Private Limited (AGPL) LPG Import Terminal at Pipavav (Gujarat).

AGPL is progressing their plans for Expansion of LPG Import / Storage facilities at the above location. AGPL is pleased to invite your offer for the design, supply, fabrication, erection and commissioning of 3000 cum LPG spheres as per the scope of work given below:-

1. Location Pipavav Import Terminal No. of spheres.2
2. You are requested to submit your offer in two parts (unpriced and priced bids) Separately for this location.
3. Your offer should reach us within four weeks of the date of this enquiry, i.e on or before 31.10.2011. Please note that any request for extension of the due date shall not be entertained. The offer should be submitted in duplicate.
4. The time schedule for completing the above job including commissioning shall be 15 months from the date of the letter of intent. You are requested to attach a project schedule along with your offer fitting within the above time frame.
5. AGPL also reserves the right to accept or reject any of the offers received without assigning any reasons thereof.
6. A site layout drawing and the data sheet for the spheres is enclosed with this enquiry.
7. The entire job right form design (including foundation), plate procurement, fabrication (shop and site) erection, stress relieving, hydro test and commissioning shall be carried out under the stage wise inspection of TPIA.

8. The contractor shall also obtain the necessary approvals from CCOE for the vessels as per the requirements of SMPV (unfired) rules 1981.

The Vessels have to be built near the existing working LPG Spheres and contractor has to design and provide the Approved Fire Screen / Heat Shields for the existing Spheres and Other Infrastructures.

9. **The contractor also shall have to obtain the approval of the owner's designated consultants for the foundation design of the spheres.**

10. The broad scope of the work consists of:

- a) Design of the pressure vessels with associated foundation and structurals, including stairways.
- b) Supply of the required BQ plates for fabrication. Please note that the owner may supply the BQ plates required for the job. Therefore, the contractor is requested to quote for two options i.e
 - i) With BQ plates supply in contractor's scope and
 - ii) BQ plates supply by the owner. In the case of option ii) the contractor is to indicate the quantity along with the bid and the size preference (dimensions) of the plates required, the thickness, material specifications and the time by which the owner should arrange for the plates within a week of the issue of the LOI. The contractor should also indicate the location and address of his works where the BQ plates should be delivered.

It should be noted that in this option, the BQ plate requirement for the crown, top and bottom polar and equatorial petals and the material required for the columns and stub ends and pad plates should be included. The material required for structural like base plates, roller assembly, columns, material for nozzle connections, sway rods, staircase and walkway and foundation bolts shall be arranged by the contractor.

The contractor shall also arrange for the required forgings, self reinforcing nozzle necks, flanges (including blind flanges) gaskets and bolts for all the nozzle connections and the man way as well as the dip pipes required for the instruments and the vapour return lines.

- c) Shop fabrication of the plates mock assembly, transportation of petals and structural to the site.
- d) Construction of civil foundation for the spheres, site erection of the

spheres with structural including necessary fabrication. The tentative soil properties at the location are given in Section E. The contractor may quote a lump sum cost for the foundation based on the above. However, the contractor also should separately indicate the various civil works items associated with the foundation work, their quantities and unit rates assumed in arriving at the lump sum cost of the foundation. The above unit rates shall be the basis for determining the actual value of foundation work executed, if the soil conditions at the site warrant increase/decrease in the executed quantities of the various civil work items

It should be noted that upto 10% of the originally assumed quantities, only the lump sum rate would prevail.

- e) Radiograph, field stress relieving hydro test, painting, fire proofing of the columns (uniting) and commissioning.
- f) The supply of safety fittings and instruments for the sphere shall be made by the owner. The vendor however, has to provide the necessary appurtenances with the flanges of the requisite size and also mount the fittings on the sphere. Commissioning of the sphere fittings and instruments shall be in owner's scope.

11. AGPL will provide the Power and Water as a free issue material at Construction site. The power will be provided at one location and the contractor has to make his own arrangement for further distribution. All arrangement made by contractor shall be as per state electricity board / IES regulations. The contractor shall provided necessary fuses / switches and energy meter on his temporary line.

The water for hydro testing purpose shall be supplied free of cost at one location and contractor has to make further arrangement including of suitable transfer pump, hoses etc for hydro testing of tank.

The contractor will have to provide estimates for the requirement in un-priced bid.

- 12. The contractor has also to arrange for the security of his construction/.equipment and material site. Owner shall however, provide the required space for locating the contractors site office and stacking the construction material and equipment.
- 13. The contractor has to comply with in all respects the **Safety Requirements** brought out in section F of this document and ensure 100% implementation of the same during the course of execution. The contractor also has to explicitly indicate in the attached price schedule the amount being charges by him for implementation of the safety requirements.

14. The preliminary soil data shall be provided to the contractor along with the LOI by the owner. The contractor however, should get the same corroborated by carrying out a soil study through his own agency.
15. The contractor has to comply with all statutory labour, customs, insurance, excise and other Central/State Govt. regulations and obtain all requisite pre and post approvals/ NOC's connected with the contract.
16. Price basis: The contractor has to separately indicate the price for every item in the schedule of quantities indicating.
 - a. The basic price, the rates of applicable taxes and duties.
 - b. If there is any foreign exchange component involved in the supply items, the contractor has to separately indicate the same and parity rate of the currency considered while quoting. This shall be the basis for according any compensation/rebate towards exchange rate fluctuations.
 - c. The contractor has to arrange for the insurance of the material being supplied by, him till delivery of same at site. Erection insurance however, shall be in the owners' scope.
 - d. The contractor should acquaint himself with the local/site conditions prior to making his offer. This shall not be a basis for claims at a later date.

The address of the AGPL's site is as follows:-

- (I) PIPAVAV:

**Aegis Gas (LPG) Private Limited
Unit 2
Gujarat Pipavav Port Limited
Pipavav Port, Uchhaiya Via Rajula
Dist. Amreli – 365560, Gujarat State.**

17. In addition to the above clauses, the contractor has to comply with the general and special conditions of the tender brought out in Section A-G in this document.
18. Validity: The offer should be valid for a period of 90 days. In the event of the job being awarded, the same shall remain valid till the issue of the final completion certificate by the designated Engineer-In-Charge.
19. Earnest Money Deposit (EMD): The contractor should submit an earnest money deposit of Rs. 20,00,000/- (rupees Twenty Lakh only) by way of demand draft favoring "Aegis Gas (LPG) Private Limited, Payable at Mumbai. The same shall be returned to the unsuccessful bidders, after finalization of the tender by the owner.

The offers should be addressed to:-

President – Operations & Projects
Aegis Gas (LPG) Private Limited
C/o. Sea Lord Containers Limited
Ambapada, Mahul Village,
Near BPCL refinery main gate,
Chembur,
Mumbai – 400 074.
Tel. : 022-25535523/24
Fax : 022-25546093

On behalf of,

Aegis Gas (LPG) Private Limited
415-416, Shri Nand Dham
Plot No. 59, Sector 11,
CBD Belapur, Navi Mumbai – 400 614
Tel: 022-27566640 / 27566525
Fax; 022-27566659

In case any further information is required, you may get in touch with us.

Thanking you,
For Aegis Gas (LPG) Pvt. Ltd

Authorised Signatory

AEGIS GAS (LPG) PRIVATE LIMITED

**TENDER FOR FABRICATION AND
ERECTION OF LPG HORTON SPHERES**

**LPG PROJECTS
PIPAVAV**

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SECTION A

GENERAL CONDITIONS OF TENDER

AEGIS GAS (LPG) PRIVATE LIMITED

GENERAL CONDITIONS OF TENDER

1.0 DEFINITIONS: The following expressions hereunder and elsewhere in the contract documents used will have the following meanings hereunder respectively assigned to them namely:-

1.1 The “Owner” shall mean “Aegis Gas (LPG) Private Limited” incorporated in India and having its registered office at , 415-416, Shri Nand Dham, Plot No. 59, Sector 11, CBD Belapur, Navi Mumbai – 400 614 and also have its corporate office at “403, Peninsula Chambers, Peninsula Corporate Park, G.K. Marg, Lower Parel (west), Mumbai – 400 013 shall include its successors and assigns.

1.2 The “Contractor / successful tenderer shall mean the tenderer selected by the owner for the performance of the work and shall include the successors and permitted assigns of the Contractors.

1.3 The “Project” shall mean design, supply fabrication, Site Erection including civil works and Commissioning of 2 Nos. of 3000 cum water capacity each LPG Horton Spheres at the Aegis Gas (LPG) Private Limited (AGPL) LPG Import Terminal at Pipavav (Gujarat).

1.4 The “Project Manager” shall mean the officer nominated by owner to co-ordinate and supervise all the activities connected with the implementation of project on their behalf. The “Project Manager” may at his discretion depute owner’s officer to co-ordinate/supervise the work of Contractor.

1.5 The “Site-in-Charge” shall mean the Engineer nominated by the owner for the purpose of the contract or any work covered there under.

1.6 The “Job Site” shall mean any site at which the work is to be performed by the Contractor under the contract.

1.7 The “Work” and “Scope of Work” shall mean the totality of the work by expression or implication envisaged in the contract and shall include all material equipment and labour required for or relative or incidental to or in connection of any work and/or for incorporation in the work.

1.8 The “Works” shall mean the product(s) of the work.

1.9 The “Contracts” shall mean the totality of the agreement between the parties as derived from the contract documents.

- 1.10** The “Contract Documents” shall mean the contract documents as laid out in the Owner’s standard contract format which is based on General and Special conditions of Tender.
- 1.11** The “Specification(s)” shall mean the various specification as set out in the specifications forming part of the tender documents and as referred to derived form the contract and any order (s) or instruction(s) there under, and in the absence of any specifications as aforesaid covering any particular work or part of portion thereof, shall mean the relevant Indian Standard Institution specifications for or relative to the particular work or part thereof, and in the absence of any Indian Standard Institution Specification covering the relative work or part or portion thereof, shall mean the standard or specification of any other country applied in India as a matter of standard engineering practice an and approved in writing by the Site-in-Charge with or without modifications.
- 1.12** “Order” and Instruction” shall respectively mean and written order or instruction given by the Owner/Site-In-Charge within the scope of their respective powers in terms of the contract.
- 1.13** “Plans” and “Drawings” shall mean maps drawing, sketches, tracings and prints forming part of the tender documents and any details or working drawings, amendments and/or modifications thereof approved in writing by the Site-In-charge or any agency notified by the Site-In-Charge, to the contractor for the purpose and shall include any other drawings or plans in connection with the work as may from time to time be furnished by or approved in writing by the Owner /Site-In-Charge or any other agency nominated by the Owner/Site-In-charge in this behalf in connection with the work.
- 1.14** “Inspector” means Third Party Inspection Agency” (TPIA) as specified by the Owner/Owner’s authorized representative as specified in the special condition of tender.
- 1.15** “Final Test Certificates” shall mean the final Test Certificate issued by Owner.
- 1.16** “Completion Certificate” shall mean the completion certificate issued by the Site-in-Charge”
- 1.17** “Final Certificate” shall mean the final certificate issued by the Site-In-Charge.
- 1.18** “Acceptance of Tender” shall mean the Acceptance of Tender issued by the Owner of the Tenderer”

- 1.19** The “Total Contract Value” shall mean the total contract value as specified in the acceptance of Tender, and after calculation of the entire remuneration due to the Contractor the contractor on successful of the works.
- 1.20** “Progress Schedule” shall mean the time schedule of progress of work.
- 1.21** “Running Account Bill” shall mean a bill for payment of “on Account’ to the Contractor.
- 1.22** “Security Deposit” shall mean the Security Deposits as specified in Clause 4.0 hereof and associated clauses there under.
- 1.23** “Schedule of Prices” shall mean the schedule or prices annexed to the Acceptance of Tender and shall include any remuneration payable to the Contractor for any work determined in accordance with the conditions.
- 1.24** “Tender Documents” shall mean the Tender Documents comprising Part-I (Unpriced Bid) – Invitation to Tenders, Project information, General Conditions of Tender, Special Conditions of Tender, Tender Schedule, Drawings/Sketches, Data Sheets, Form of Tender and Price Schedule, Annexure, and Part II (Price Bid)-Form of Tender and Price Schedule, and Annexure.
- 1.25** “Agreed Variation” shall mean the statement of Agreed Variation annexed to the Acceptance of Tender or a further amendment annexed to the Contract forming part thereof.
- 1.26** The “Sub-Contractor” means any person of firm of Company (other than the Contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Owner.
- 1.27** The “Permanent Work” means and includes works which will be incorporated and form a part of the works to be handed over to the Owner by the Contractor on completion of the Contract.
- 1.28** The “Construction Equipment” means all appliances and equipment of whatever nature for the use in or for the execution and completion of the works unless intended to form part of the permanent work.
- 1.29** “Letter of Intent” shall mean intimation by a letter to tenderer that the tender has been accepted in accordance with the provisions contained in the letter.
- 1.30** The “Alteration Order or Variation Order” means an order given in

writing by the Owner to effect additions to or deletions from and alterations in the works.

- 1.31** All headings of the Clauses in these General Conditions of Tender or otherwise in any contract document are intended solely for the purpose of giving a broad indication of the contents of the clause and not as a summary of the contents thereof.
- 1.32** Unless otherwise specifically stated, a masculine gender shall include the feminine and natural genders and vice-versa and the singular shall include the plural and vice versa.

2.0 GENERAL

- 2.1** Tender documents shall remain the property of the owner and if obtained by one intending tenderer shall not be utilizable by another without the consent of the Owner. No more than 3 copies of Tender documents shall be issued to any one intending tenderer.
- 2.2** The tenderer should study all tender documents and understand the conditions/drawing/specification etc., before quoting. If there are any doubts, he should obtain clarification from Owner. This shall not be the justification for late submission of compensating date or time to the tender. All tender documents shall govern the contract, shall form part of the contract and shall be binding during the execution till completion of works
- 2.3** The tenderer should visit the site and acquaint himself with the site condition at his own cost.
- 2.4** Under no circumstances, tenders may be withdrawn or modified after submission to the Owner. Negligence on the part of the Tenderer in preparing his tender confers no right for withdrawal or modification of his tender after the tender has been opened.
- 2.5** Tenderer are required to make the lowest offer for the work as per the enclosed specification and details available therein. Please note the estimated quantities given in the schedule are approximate. As the work progresses, it is possible that there may be variations.
- 2.6** The rates quoted should be inclusive of all materials, labour, equipment, tools/tackles, transportation of material and labour, excise, custom, octroi duty, sales tax and turn-over tax etc. All materials are to be supplied by the tenderer unless otherwise stated. Power and Water will be supplied by AGPL.
- 2.7** Canvassing in connection with the tender is strictly prohibited and the tender submitted by the tenderer resorting to canvassing shall be liable for rejection.
- 2.8** Incomplete/Conditional tender quotation or those received late and/or not conforming to the terms and conditions in the tender documents will be rejected.
- 2.9** The Owner reserves the right to reject any or every tender without assigning any reason whatsoever/or to negotiate with the tendered (s) in the manner the Owner considers suitable.

3.0 SUBMISSION OF TENDER

- 3.1** Tender document Part-A-Unpriced Bid and Part B-Priced Bid should be sealed in separate covers, clearly marking ‘PRICED BID’ on the cover containing priced bid. Both the above covers should be sealed in one cover clearly marking the Tender No. and Vendor’s name and address. The quotation must be submitted only in the prescribed tender schedule form supplied by the Owner along with draft for the earnest money deposit as specified in Clause 4.0 of General Conditions of Tender.
- 3.2** The sealed tender should be addressed and sent by Registered post or personally handed over to the Tender Receiving Authority specified in Tender Notice or put in the Tender Box designated for the specific work located at the address specified in the Tender Notice.
- 3.3** The sealed Tender must reach the specified address before the date and time specified in the Tender Notice. Tender received after the due date and time will not be considered.
- 3.4** The tenderer should quote for all items in the tender schedule. The rate should be expressed both in figures and words. Where discrepancy exists between the two, the rates expressed in work will prevail. Similarly if there is any discrepancy between unit rate and total amount the unit rate will prevail.
- 3.5** The rates should be quoted in the same units as mentioned in the tender schedule.
- 3.6** All entries in the tender documents should be in ink/typed. Corrections if any should be attested by full signature of the tenderer.
- 3.7** Every page of the tender documents shall be “SIGNED” by the tenderer or his authorized representative.
- 3.8** Tenderer are required to state in the tenders their addresses fully and correctly. All notices, communications and reference to any tenderer by the Owner shall be deemed to have been duly given to the tenderer if delivered to the tenderer or left at or posted to the address given by the tenderer and shall be deemed to have been so given in the case of posting on the day on which they would have reached such address in the ordinary course of post and in other cases on the day on which they were so delivered or left.

4.0 EARNEST MONEY AND SECURITY DEPOSIT

- 4.1** The tenderer shall be required to submit Bank Guarantee or Bank Draft drawn in favour of Aegis Gas (LPG) Private Limited for a sum of Rs. 20,00,000/-. The earnest money deposit shall be returned to the unsuccessful tenderer after the selection of the successful tenderer.
- 4.2** If the successful tenderer is unable to accept or execute orders when placed upon him or fails to deposit the initial security deposit or withdraws/revise his quoted prices and quantities offered, within the validity period of his tender or after placement of the Order/Letter of Acceptance, his Earnest Money Deposit shall be forfeited.

4.3 In case of successful tenderer, the Earnest Money Deposit will be adjusted towards the security deposit. The Contractor shall offer security deposit of Rs. 40 Lacs in the form of Bank Guarantee in the proforma attached. The security deposit shall be released to the Contractor after completion of the entire work, covered under the contract to the satisfaction of the Owner.

4.4 Please note that no interest shall be paid in Earnest Money Deposit and Security Deposit.

5.0 CONTRACT AGREEMENT.

The successful Tenderers shall within 15 days the Owner's communication to him of the acceptance of the tender, execute a formal agreement with the Owner and also submit a Bank Guarantee for security deposit amount. The cost of stamping the Agreement shall be borne by the successful tenderer. The Agreement shall be in conformity with Indian Laws and shall be subject to the jurisdiction of Court of Mumbai. The language in which the contract documents shall be drawn up is English.

6.0 VALIDITY

The validity of the tender shall be as mentioned in the Special Conditions of the Tender. It shall there after continue to be valid, until,

- a) A written advice is given to the Owner giving 10 days clear notice of their intention to reverse/alter the terms.
- b) The work is completed to the satisfaction of the Owner and so certified in writing by Owner or their accredited representative in the case of successful tenderer.

7.0 QUANTITY MEASUREMENT

7.1 The quantities of work shown in the tender schedule are approximate and payment shall be made as per actual measurement. The contractor is not entitled for any sort of compensation towards material procured/stored in excess of the measured quantities.

7.2 The owner reserve the right to increase or decrease the tendered quantity or replace specifications, drawings, design of any or every item or delete them at any stage of work. The contractor's claim for compensation or damages on account this shall not be entertained. Such deviation shall be adjusted at the rates contained in the contract or arrived at by calculation from contract rates.

7.3 Detailed measurement of the work carried out shall be taken jointly by the Contractor and Owner/Site-in-Charge at every stage of work before proceeding to the next stage of work and shall be measured as per procedure laid down and payment shall be made as per measure quantities subject to their conforming to the quantities ordered as per drawing/schedules and not as per tender schedule quantities.

8.0 TIME FOR COMPLETION OF WORK

The tenderer should indicate the time required to complete the entire work from the date of receiving the order. The time indicated by the tenderer may have a bearing on the awarding of the contract. However, in no case, the time indicated should exceed the maximum allowable time for the completion of the entire work indicated in the Special conditions of the Tender.

9.0 STOPPAGE OF WORK

In case it becomes necessary for the Owner to temporarily suspend or postpone the work partly or fully due to unforeseen circumstances, Owner shall not be liable for any compensation on account of the resultant delay.

10.0 INSPECTION AND TESTING

10.1 Materials

- i) All materials required for the execution of the work should conform to the standard specification and approved by the owner/Site-In-Charge before actually put to use. Commencement of work without prior approval shall be entirely at the risk and cost of the Contractor. No delay due to non-availability of the materials, tools, equipment, etc will be entertained by the Owner. In case of certain machinery/equipment, the Owner/Site-in-Charge may inspect the item for approval before they are brought to site.
- ii) The Owner/Inspector or any agency authorized by Owner shall be entitled at all times at the risk of the Contractor to inspect and / or test or direct the Contractor to test any item supplied or proposed for supply for incorporation in the works. Necessary assistance for this will be provided by the Contractor and all the expenses incurred in such testing / inspection will be borne by the Contractor.
- iii) The contractor shall on receipt of intimation or any communication from Owner of any inspection or tests required to be carried out by the Owner on his behalf, present himself or his authorized representative at the place of inspection and / or testing to receive an order or instruction consequent thereto as shall be necessary,
- iv) The Contractor shall furnish, to the Owner/site-in-charge for approval when requested or as required by the specification or other contract documents, adequate samples should be submitted before the work is commenced as also permit sufficient time to the Owner for tests, examination (s) thereto by the Owner . All materials finished and incorporated in the works shall conform to the approved sample(s) in all respects.
- v) The Site-in-charge shall be entitled to reject at any time any defective material supplied by the contractor for incorporation in the works notwithstanding previous inspection and / or testing Upon such a rejection, the Contractor shall

either perform such work or improve thereon or inspect thereof as shall be necessary to bring the material to the requisite standard or shall if so required by the Site In charge

10.2 WORKS

- i) The contractor at all time shall ensure highest standard of workmanship, relating to the work to the satisfaction of the Site-in-Charge. The site-in-charge shall have the power to inspect the work in all respect at all times upto the completion of the work as also to test or give instruction to the contractor to test the works or any structure material or component thereto at the risk and cost of the contractor, either by the contractor or by any agency nominated by the Owner/Site-in-charge in this behalf.
- ii) The contractor shall provide all facilities, instruments, materials/labour required for testing the work (including checking set out of work) and shall afford site-in-charge all assistance necessary to conduct the test whenever and wherever required.
- iii) Notwithstanding anything provided in the aforesaid clause hereto, the contractor shall be and remain liable at his own cost and initiate to conduct all tests at all times during supply, erection and installation of any work/structure material or component as shall be required in terms of the contract document or by the Site-in-Charge. Such tests to be conducted through agency(ies) or laboratory(ies) shall be approved by the Site-in-Charge
- iv) The Site-In-Charge on inspection or test be not satisfied with the quality or workmanship of any work, structure, material item or component (decision of the Site-in-charge being final in this behalf), the Contractor shall re-perform, replace, reinstall and /or re-erect as the case may be such work structure, material or component and no such rejected work, structure, material item or component shall be re-used with reference to the work, structure, material item or component shall be re-used with reference to the work accepted with the prior permission of the reference to the work accepted with the prior permission of the Site-in-Charge.
- v) Notwithstanding anything provided in forgoing clause hereto and notwithstanding the Site-in-charge or his representative has inspected, tested and/or approved any particular work, structure, material or component, such inspection, test or approval shall not absolve the Contractor of his full responsibilities under the contract inclusive or relative to the specification, performance guarantee, the said inspection and test procedure being intended basically for satisfaction of the owner prima facie erection and/or material and equipment supplied for incorporation in the work is in order.
- vi) If on any account the Contractor proceeds with the correcting or other work and foundation and superstructure by covering up or otherwise, before necessary inspection entries are filled in the Site inspection Register by the Sit-in-charge or his authorized representative, the same shall be uncovered at the Contractors risk and expense for carrying out the inspection and measurement.

11.0 COMPENSATION FOR DELAY IN COMPLETION

- 11.1 In case of any delay in completion of the work beyond the scheduled completion date, the Owner shall be entitled to be paid Liquidated Damages by the Contractor. The liquidated damages shall be initially at the rate of 0.5% (half percent) of the total contract value for every week of the delay subject to a maximum of 5% of the total contract value. The liquidated damages shall be recovered by the Owner out of the amounts payable to the Contractor or from any Bank Guarantees or Deposits furnished by the Contractor or the Retention Money retained from the Bills of the Contractor, either under this contract or any other contract.
- 11.2 Notwithstanding what is stated in clause 11.1 above, the Owner shall have the right to employ any other agency to complete the remaining work at the risk and cost of the Contractor in the event of his failing to complete the work within the stipulated time.
- 11.3 If in the opinion of the Site-in-Charge the works have been delayed beyond the Day of Completion (a) by Force Majeure or (b) by reasons of the exceptionally in element weather or (c) by reason of proceeding taken or threatened by or dispute with adjoining or neighboring owners of public authorities to the delays of other Contractors of tradesmen engaged or nominated by the Owner or the Site-in-Charge and not referred to in the schedule of Quantities and or specification provided the Contractor shall have given previous written notice thereof to the Site-in-charge or (e) by reason of civil commotion, strikes or lock-out affecting any of the building traders in which case the contractor immediately give written notice thereof to the Site-in-Charge or (f) in consequence of the Contractor for which he shall have specifically applied in writing then site-in-charge for which he shall have specifically applied in writing then Site-in-charge shall in writing make a fair and reasonable extension of time for completion of the works provided further that the Contractor shall constantly use his best endeavor to the satisfaction of the Engineer to proceed with the works. Nothing herein shall prejudice the right of the Owner under the Clause 11.1 and 11.2 herein after

12.0 PERFORMANCE / FAILURE OF CONTRACTOR

- 12.1 If the performance of the successful tenderer is found to be unsatisfactory, the company reserves the right to cancel in part or whole of the contract and gets the work executed through alternate means at the entire risk and cost of the successful tenderer.
- 12.2 The successful tenderer shall not undertake on his own any change in specifications mentioned in the tender documents. In case of doubt he will refer the matter in writing to the Owner/Site-In-Charge and act as per clarifications given by the Owner/Site-in-charge. Any change in the work involving changes in original specifications quantities /additional items of work, should be covered by obtaining suitable variation order (s) from the Owner/site incharge immediately.

12.3 If the contractor after receipt of written notice from the Site-in-charge requiring compliance within 10 days fails to carry out and execute any work in accordance with this contract and or to comply with Site-in-charge's instructions then the Owner with the consent and may employ and pay other persons to execute any such work whatsoever that may be necessary to give effect thereto, and all costs incurred in connection there with shall be recoverable from the Contractor by the Owner as a debit and may at the option of the owner be deducted from any money due to or to become due to the Contractor.

13.0 TERMINATION OF CONTRACT BY THE OWNER

If the Contractor being an individual or a firm commits any "Act of insolvency" or shall be adjusted as insolvent or being in Incorporated Company shall have an order for compulsory winding up made against it, or pass an effective resolution for winding up voluntarily or subject to the supervision of the Court or shall be unable to carry out and fulfill the contract and to give security therefore, if so required by the Site-in-Charge, or if the contractor (whether an individual, firm or Incorporated Company) shall suffer execution to be issued, or shall suffer any payment under this contract to be attached by or on behalf of any other creditors or the contractor or shall assign or charge encumber or sublet this contract without the consent in writing of the Owner first obtained, or shall charge or encumber this contract or any payments due or which may become due to the contractor there under, or if the Site-in-Charge shall certify in writing to the Owner that the Contractor:-

- a) has abandoned the contract or
- b) has failed to commence the works, or has without any lawful excuse under these conditions, suspended the progress of the works for 14 days after receiving from the Site-in-Charge written notice to proceed, or
- c) has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
- d) has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Site-in-charge written notice that the said materials or work were condemned and rejected by the Site-in-charge under these conditions, or
- e) has used sub-standard or inferior material or materials not conforming to the specifications or has employed inferior workmanship in carrying out the works or part thereof or has not exercised due diligence in execution of the said works, or
- f) has neglected or failed persistently to observe and perform all or any of the acts, deed, matters or things by this contract to be observed and performed by the Contractor for three days after written notice shall have been received by the contractor requiring the contractor to observe or perform and same or,
- g) has to detriment of good workmanship or in defiance of the Site-in-charge's instructions to the contrary, sub-contracted any part of the contract, or
- h) has in the opinion of the Site-in-Charge committed any breach of this contract then and in any of the said cases the Owner with the written consent of the Site-

in-Charge may notwithstanding any previous waiver, after given seven days' notice in writing to the Contractor, terminate the contract, but without hereby affecting the right of the Owner or the powers of the Site-in-Charge or the obligations and liabilities of the Contractor in respect for work, the contract shall continue in force as fully as if the contract has not been so terminated and the obligations of the contractor in respect of work subsequently executed has been executed by or on behalf of the Contractor. And further, the Owner by its agents or servants shall be entitled forthwith to enter upon and take possession of the works and all plant, tools, scaffoldings, sheds, machinery, steam and other power implementations, machinery equipments and materials lying upon the site or the adjoining lands or roads and use the same as its own property and to employ the same by means of its own servants and workmen in carrying on and completing the works or by employing any other Contractor and the Contractor shall not in any way interrupt or do any act matter of things to prevent, intimidate or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon as thereafter as convenient, the Site-in-charge shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within the period of 14 days after receipt thereof by him, the owner shall sell the same either by public auction or a private sale and shall give credit to the Contractor for the amount realized. The Site-in-charge shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Owner for the value of the said plant and materials so taken possession of by the Owner, the expenses or loss which the Owner shall have been put to in procuring the works to be completed, and the amount if any, owing to the Contractor and the amount which shall be so certified, shall the reopen he paid by the Owner to the Contractor or by the Contractor to the owner, as the case may be and the certificate of the Site-in-Charge shall be final and conclusive and binding on the parties hereto. In the event of termination under this clause, the Owner shall not be bound by any provision of this contract to make any further payment to the Contractor until the said works are completed.

14.3 Any other Insurance required under Law or regulation by Owner.

Contractor shall also carry and maintain any and all other Insurance, which may be required under any law or regulation from time to time.

14.4 Automobile Liability Insurance

Contractor will carry and maintain automobile Liability Insurance to cover all risk to Owner for each of his vehicles plying on works of this contract and these insurance shall be valid for the total contract period. No extra payment will be made for this insurance. Owner shall not be liable for any damage or loss not made good by the Insurance Company, should such damage or loss result from unauthorized use of the vehicle.

15.0 SITE SUPERVISION/FACILITIES AND WORK AT NIGHT

- 15.1 The entire work will be carried out under the supervision of the authorized representative of the Owner, but this will not absolve the Contractors from his responsibilities for quality/period of execution of the work.
- 15.2 The successful tenderer shall arrange for at least one competent supervisor to be present at site at all times during the progress of the work, who shall be duly authorized to take instructions and execute them on his behalf.
- 15.3 In the event that the Contractor's "Scope of Work" does not include 'erection' the Contractor will be required to provide supervisory services for the satisfactory erection, installation, testing and commissioning of the equipment/materials supplied by him. Contractor's supervisory services shall be requisitioned by the owner as and when required, on "per diem" basis during erection, installation, testing and commissioning. The contractor will be intimated in advance regarding the time and likely duration of the erection. Testing and commissioning of the respective equipment/material(s). it will be the duty of the contractor to depute his competent supervisory staff who will act independently on behalf of the Contractor. The supervision service will be deemed as "part and parcel" of the fabrication and supply contract.
- 15.4 During the contractor's supervision at site necessary tools, tackles, implements, labour etc., will be provided. However, to maintain uninterrupted progress of work, Contractor's supervisor will prepare a Schedule and forward to the Site-in-Charge in writing sufficiently in advance.
- 15.5 The Contractor/Contractor's supervisor at site may be called upon to work on the three shifts basis during erection, installation, testing and commissioning for the overall interest of the Project. However, no extra cost in this regard will be paid by the Owner.

16.0 OBSERVANCE OF RULES AND REGULATIONS IN FORCE.

- 16.1 The contractor and his men shall abide by all security, safety rules/regulations in force at a location and the laws, by-laws and statutes of Government/Semi-Government and other local authorities such as requirements/liability under enactments like the Workmen's Compensation Act, Contract Labour Act., etc and the Owner shall stand indemnified against any claims on these scores. The Contractor and his men shall strictly abide by "no smoking" and other petroleum regulations on the premises.
- 16.2 The Contractor shall conform to the provisions of acts at Parliament or State Legislatures and to say by-laws, rules, orders or notifications of any government Municipal or Local authority for the time being in force affecting the work undertaken by him and will give all necessary notices to and obtain requisite

sanction and permits of and from the Municipal and any other authority in respect of the said work or the materials to be used there at and generally will comply with the building and other regulations of such authorities and will keep the Company indemnified against all claims, penalties and losses that may be incurred by it by reason of any breach by the Contractor of any statutes by-laws, rules, regulations, notifications etc.,

16.3 The contractor' and the sub-Contractor (s) of the Contractor shall obtain authority(ies) designated in this behalf under any applicable law, rule or regulations (including but not limited to the factories act and contract labours (Abolition and regulations) act 1970 (in far as applicable any and all such license (s) consent (s), and/or other authorization (s) as shall from time to time to be or become necessary for or relative to the execution of one work or any part or portion thereof or the storage or supply or any material (s) or otherwise in connection with the performance of the contract, and shall at all times observe and ensure due observance by the sub-contractors, servants and agents of all terms and conditions of the said license (s), consent (s), regulations (s), and other authorization (s) and laws, rules and regulations applicable thereto.

16.4 The contractor undertakes to ensure due and complete compliance with all laws, regulations, rules etc. whether of the central government or the state government or any other competent authority applicable to the workmen employed or whose services are otherwise availed of by the contractor, whether in connection with the construction work at the site or otherwise. The owner shall have been right to inspect the records maintained by the contractor, shall whenever required by the owner produce such records and as and when the owner may all upon the contractor ascertain whether or not the requirements of all such laws, regulations, rules etc. have been complied with by the contractor. In the event of any contravention of such laws, regulations, rules etc, coming to light whether as a results of such inspection or otherwise, the owner shall have the right to make the prejudice to his other rights be entitled to withhold from the amount payable to the workmen under any such laws, regulations or rules and to make payment thereof to the workmen. The owner shall also have in that event the right to terminate the contract with immediate effect and to exercise powers reserved to the owner under the contract as a result of termination.

16.5 The contractor shall be responsible at his own cost in and relative to performance of the work and contract to observe and to ensure observance by his sub-contractors, if any , agents and servants of the provisions of the safety goods, as hereinafter appearing and all fire, safety and security regulations, as may be prescribed by the owner from time to time and such other precautions and measures as shall be necessary and shall employ/deploy all equipment necessary to protect all works, materials, properties, structures, installations, communication facilities, whatsoever from damage, loss or any other hazard (including but not limited to fire and explosion) and shall during construction and other operations minimize the disturbance and inconvenience to the owner, other contractors, the public and the adjoining land, property, crops, trees and

vegetation and shall indemnify and keep indemnified the owner from all losses, damages, costs, charges, expenses, penalties, actions, claims, demand and proceedings whatsoever suffered or incurred by or against the owner, as the case maybe, by virtue of any loss, alternation, displacement, disturbance, destruction or accident to any works, materials, properties, structure, equipment, installations, communication facilities, land property, crops, trees and vegetation as aforesaid with the intent that the contractor shall be exclusively responsible for any accident, loss, damage, alteration, displacement, disturbance or destruction, as aforesaid resulting directly or indirectly from any breach by the contractor of his obligations, aforesaid or upon any operations, act or omission of the contractor, his subcontractor (s), if any, agent (s) or servant (s).

17.0 APPROVALS

It will be the successful tender's responsibility to get the works approved and obtain all certificates for plumbing, electrical, civil works, etc. from local, municipal, governmental or other required authorities, if applicable.

18.0 SAFETY/SECURITY OF EQUIPMENT/PROPERTY

- 18.1 The responsibility for the safety, security of the components, materials, equipment brought or installed by the contractor or handed over to him by the owner for completion of the work will remain with him till acceptance of the work by the owner. Any damage caused to the material/equipment during the execution of the work will be made good by the contractor to have a guarantee /indemnity bond executed for the value of the material supplied to him free of cost as per the terms of agreement.
- 18.2 The contractor should ensure the safety of adjoining property and shall make good any loss to product/ property resulting from his negligence.

19.0 DISMANTLING/DAMAGE TO PROPERTY

- 19.1 During execution of work if it is found necessary to dismantle a portion of existing bund wall, enclosure wall, compound wall, fencing, etc. to facilitate the movement of materials and equipment, the same shall be carried out after obtaining permission in writing from owner's authorized representative and shall also be made good by the contractor at his own cast.
- 19.2 Any material obtained by the contractor consequent upon dismantling of any building, structure or construction whatsoever at the job site other than any building, structure or construction dismantled by the contractor pursuant to the contractor's liabilities for defects as elsewhere herein provided, shall be exclusive property of the owner.
- 19.3 Contractor shall be responsible for making good to the satisfaction of the owner

any loss of and any damage to all structures and properties belonging to the owner any loss of any damage to all structures and properties belonging to the owner or being executed or procured or being procured by the owner or of other agencies within the premises of all the work of the Owner, if such loss or damage is due to fault and/or the negligence or willful acts of omission of the contractor, his employees, agents representative or sub-contractor.

- 19.4 The Contractor shall indemnify and keep the Owner harmless of all claims for damage to property other than Owner's property arising under or by reason of this agreement, if such claims results from the fault and/or negligence or willful acts or omissions of the Contractor, his employees, agents, representative or sub-contractor.

20.0 WORKING CONDITIONS-SAFETY CODE

20.1 General

Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with Owner's safety rules as set forth herein.

20.2 First aid and Industrial Injuries

Contractor shall maintain first aid facilities for its employees and those of its sub contractors.

- a) Contractor shall make outside arrangements for ambulance or suitable service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to Site-in-Charge prior to start of construction, and their telephone numbers shall be prominently posted in Contractor's field Office.
- b) All critical industrial injuries shall be reported promptly to Site-in-Charge, and a copy of Contractor's report covering each personal injury requiring the report covering each personal injury requiring the attention of a physician shall be furnished to Owner.

20.3 General Rules

Carrying/striking of matches, lighters and smokers inside the hazardous area, is strictly prohibited. Violators of the No Smoking Rules shall be discharged immediately. Within the operation area, no hot work shall be permitted without valid gas/safety/fire permits issued by the Owner. The contractor shall be held liable and responsible for all lapses of his sub-contractors employees in this regard.

20.4 Contractors Barricades

- a) Contractor shall erect and maintain barricades required in connection with his operations to guard to protect:

- i) Excavations.
 - ii) Hoisting areas
 - iii) Areas adjusted by contractor's or Owners inspectors
 - iv) Owner's existing property liable to damage by contractor's operations, in the opinion of Owner/site-in-charge.
- b) Contractor's employees and those of his sub-contractors shall become acquired with owner's barricading practice and shall respect the provisions thereof.
 - c) Barricades and hazardous areas adjacent to but not located in normal routes of travel shall not be marked by red flasher lanterns at night.

20.5 Scaffolding

- a) Suitable scaffoldings shall be provided for workmen for all works that cannot safely be done from the ground or from solid constructions except such short period work, as can be done safely from ladders. When a ladder is used, an extra worker shall be engaged for holding the ladder and if the ladder is used for carrying materials as well as suitable foot-holds and hand-holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (a horizontal and 4 vertical).
- b) Scaffolding or staging more than 30cm above the ground or floor swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted braced and otherwise rewarded atleast 1 m high above the floor or platform of scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery materials. Such scaffoldings or staging shall be so fastened, as to prevent it from swaying from the building structure.
- c) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or the gangway or the stairway is more than 30 cm above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described above.
- d) Every opening in the floor of a building or in a working platform be provided with suitable beam to prevent the fall of persons or materials by providing suitable fencing or failing whose minimum height shall be 1 metre.
- e) Safe means of access shall be provided to all working platform and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10 meter in lengths, while the width between the side rails in ring ladder shall in no case be less than 30 cm for ladder upto and including 3 meters in length. For longer ladders this width should be increased by at least 6mm for spacing shall not exceed 15 cm. adequate precautions shall be taken to prevent danger from the electrical equipment. No material on any of the site of work shall be so staked or placed as to cause danger or inconvenience to any person or public. The contractor shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the

expenses of defense of every suit, action or other proceedings, at law that may be brought by any person for injury sustained owing to negligence of the above precautions and to pay damages and costs which may be awarded in any such suit or action or proceedings to any such persons, or which may be with the consent of the contractor be paid to compromises any claim by such person.

20.6 Excavation and Trenching

- a) All trenches 1.3 meter or more in depth shall all times be supplied with at least one ladder for each 33 meter length or fraction thereof
- b) Ladder shall be extended from bottom of the trench to at least 1 meter above the surface of the ground. The sides of the trenches which are 1.5 meter or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated material shall not be placed within 45 cm of the edge of the trench or half of the trench depth whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting be done.

20.7 Demolition

- a) Before any demolition work is commenced and also during the process of the work all roads and open area adjacent to the work site shall either be closed or suitably protected.
- b) No electrical cable or apparatus which is liable to be source of danger over a cable or apparatus used by operator shall remain electrically charged.
- c) All practical steps shall be taken to prevent danger to persons, employees, from risk or fire or explosions or flooding. No floor or other part of the building shall be so overloaded with debris or material to render it unsafe.

20.8 Safety equipment

- a) All necessary personal safety equipment as considered adequately by the Site-in-Charge should be made available for the use to the persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.
- b) Workers engaged in white washing in mixing or stacking of cement bags or any materials which are injurious to the eyes shall be provided with protective goggles.
- c) Those engaged in welding and cutting works shall be provided with protective face and eye-shields, hand gloves etc.
- d) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
- e) Stone breakers shall be provided with protective goggles and protective clothing, and seated at sufficiently safe intervals.
- f) When workers are employed in sewers and manholes, which are in use, the Contractor shall not employ men and women below the age of 18 years and

- women on the work of painting of products containing lead in any form, Whatever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.
- g) No paint containing lead product shall be used, except in the form of paste or ready-made paint.
 - h) Suitable face masks shall be supplied for use by the workers, when paint is applied in the form of spray or a surface having lead paint dry, rubbed and scrapped.
 - i) Suitable face masks shall be supplied for use by the workers, when paint is applied in the form of spray or a surface having lead paint dry, rubbed and scrapped.
 - j) Overall shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during the on cessation of work.
 - k) Hot work should be carried out only in the areas earmarked for the purpose after taking required safety precautions and only after obtaining written permission from the Site-in-Charge. Any provision required to be made e.g wind screens of G.I sheets etc to make the area safe for hot work, will be made by the successful tendered at his own cost.

20.9 Risky Places

When the work is done near any place where there is a risk of drowning all necessary safety equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

20.10 Hoisting Equipment

- a) Use of hoisting machine and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions.
- b) These shall be of good mechanical construction, sound materials, adequate strength free from patent defect and shall be kept in good conditions and in good working order.
- c) Every rope used in hoisting or lowering materials or as a means of suspension shall be durable quality and adequate strength and free from patent defects.
- d) Every crane driver of hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding, winch or give signals to the operator.
- e) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or lowering or as means of suspension the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded

- beyond the safe working load except for the purpose of testing.
- f) In case of departmental machine, the safe working load shall be notified by the Site-in-Charge. As regards, Contractor's machines, the Contractor shall notify the safe working load of the machine to the Site-in-Charge, whenever he brings any machinery to site of work and get it verified by the Site-In-Charge, concerned.

20.11 Electrical Equipment

Motors, gear transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load; adequate precautions shall be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulation mats, wearing apparel, such as gloves and boots as may be necessary shall be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

20.12 Maintenance of Safety devices

All scaffolding, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place or work.

20.13 Display of safety instruction

Safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.

20.14

To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Site-in-Charge.

20.15 No exemption

- a) Notwithstanding the above Clauses 20.1 to 20.14, there is nothing in these to exempt the Contractor from the operations of any ACT or rules in force.
- b) The works throughout including any temporary work shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpaths, at the site or in the vicinity thereto or any existing works, whether on the property of a third party.
- c) No men/material equipment not covered by valid passes shall be permitted within the Project area and no material/equipment shall be permitted to be taken out of

the Project area, unless authorized by the concerned authorities of the Project. The Contractor shall be held fully responsible for any or all delays/looses/damages that may result consequent on any lapse that may occur on the part of his sub-Contractors/employees in this regard.

21.0 MISCONDUCT/MISBEHAVIOUR OF CONTRACTORS EMPLOYEES

21.1 The Contractor is expected to co-operate/co-ordinate with other Contractors carrying out work allocated to them so as to avoid breaking up of work already done by them or causing any hindrance in the progress of their work. In case there is any difficulty/dispute the same should be immediately brought to the notice of the Site-in-Charge.

21.2 If an whenever the Contractors or Sun-Contractors employees, shall in the opinion of the Site-In-Charge be guilty of any misconduct of misbehavior the Contractor if so directed by the Site-in-Charge shall at once, remove such person/persons from the employment.

22.0 PATENTS AND ROYALTIES

22.1 If any requirement, machinery or material to be used or supplied or method of processes to be practices or employed in the performance of the Contractor is/are covered by a patent under which the Contractor is not licensed, the Contractor shall before supplying of using the equipment, machinery, materials, methods, processes, as the case may be, obtain such license (s) and pay such royalty (ies) and license fee (s) as may be necessary in connection with the performance of the contract. In the event that the Contractor fails to pay such royalty or obtain such license, the Contractor will defend at his own expense any suit for infringement of patent, which is brought against the Contractor to the owner, as a result of the failure, and shall pay any damage and costs awarded in such a suit and will keep the Owner indemnified form the against all other consequences thereof.

22.2 The successful tenderer shall not sublet or assign any part of the work to another party without prior written consent of the owner. In any event, the successful tenderer will be solely responsible for the work so sublet or assigned.

22.3 The successful tenderer shall not sublet or assign any part of the work to another party without prior written consent of the owner. In any event, the successful tenderer will be solely responsible for the work so sublet or assigned.

23.0 GURANTEE PERIOD, REPLACEMENT OF DEFECTIVE PARTS

23.1 Performance Guarantee

The Contractor shall guarantee the work done and any fittings designed/manufactured supplied by him against defective materials, poor workmanship, improper design and failure from normal usage, for a period of 12 (twelve) calendar months after being

placed in service/operation or 18 (eighteen) calendar months after final acceptance of the work by the Owner, whichever is earlier.

23.2 WARRANTY

The Contractor will repair and/or replace all defective parts/components/fitting/accessories etc., which shall be notified to him in writing the "Guarantee Period" immediately on notification to the Contractor in writing by the Owner. The Contractor shall provide similar warranty on the parts, components, fittings, accessories etc, so repaired and/or replaced.

24.0 PACKING, MARKING AND DESPATCH INSTRUCTIONS

24.1 Packing & Making

All fragile and all exposed parts shall packed with care and the packages shall bear the works "WITH CARE" both in English and Hindi

All nozzles, pipes and all sheets shall be marked with strips bearing progressive numbers.

All holes /openings and also all delicate surfaces, shall be carefully protected against bad weather.

All threaded fittings shall be greased and provided with plastic caps.

All manufactured surfaces shall be painted with rust proof paint.

All small pieces shall be packed in cases.

The Contractor shall be held liable for all damages or breakages to the goods due to the defective or insufficient packing as well as for corrosion due to insufficient protections.

On three sides of the packages the following marks shall appear clearly visible and in indelible paint at Contractor's care and expenses.

FROM
.....

For M/s Aegis Gas (LPG) Pvt. Ltd

P.O No Item No NET

WT.....GROSSWT.....DIMENSIONS
.....CASE NO.....OF
TOTAL.....CASES

All packages which require special handling and transport should have their centre of Gravity and the points at which they may be slung or gripped clearly indicated and marked 'ATTENTION SPECIAL LOAD HANDLING WITH CARE" both English and Hindi languages.

24.2 Despatch Instructions

Contractor shall exercise due care and ensure that the consignment (s) shall be booked under appropriate railway classification, failing which any additional freight incurred by the Owner due to Contractor's booking the material under a wrong classification shall be to Contractor's account.

25.0 MISCELLANEOUS

25.1 Weight and Measurements

All weight and measurements recorded by Site-In-Charge on receipt of goods at Site will be treated as final.

Contractors dispatch documents and invoices must contain the following data:-

- i. Unit Net Weight
- ii. Unit Gross Weight (Packing Included)
- iii. Dimensions of Packing

25.2 Oil and Lubricants

The first filling of oil and lubricants, if any, required for every equipment shall be included in the price and appropriate products blended or manufactured by BPCL, HPCL., IBP and IOC, Shell, Total etc. shall be used. The Contractor shall also recommend the quality/quantity of oils and lubricants required for one year continuous operation.

25.3 Correspondence.

After award of the Contract, all correspondence should be made in triplicate in the following manner.

- i. For all technical matters, the correspondence shall be addressed to the Owner with a copy forwarded to TPIA and Site-in-Charge.
- ii. For all commercial matters, correspondences shall be addressed to the Owner.

26.0 PROGRESS REPORTS.

The successful tenderer shall submit to the Office which has awarded the contract

periodic progress report of his works, as stipulated in the Special Conditions of the Tender.

27.0 FORMAT FOR BANK GURANTEE

The successful tenderer will have to furnish to the Owner the following Bank Guarantees as applicable in the proforma enclosed in Annexures:

- a) Proforma of Bank Guarantee in lieu of initial Security Deposit
- b) Proforma of Bank Guarantee for Raw Materials/Free issue items
- c) Proforma of Bank Guarantee for advance
- d) Proforma of Bank Guarantee for Performance.

28.0 ARBITRATION

- a) Any dispute or difference of any nature whatsoever any claim, cross claim, counter-claim or set off of the Corporation against the Contractor or regarding any right, liability, act, omission or account of any of the parties hereto arising out of or in relation to this agreement shall be referred to the Sole Arbitration of the CEO, Aegis Gas (LPG) Pvt Ltd., or to an Officer of the Company who may be nominated by the CEO. The Contractor will not be entitled to raise any objection to any such Arbitrator on the ground that the Arbitrator is an Office of the Company or that he has dealt with the matters to which the contract relates or that in the course of his duties as an Officer of the Company he had expressed views on all or any other matters in dispute or difference. In the event of the Arbitrator to whom the matter is originally referred being transferred or vacating his Office or being unable to act for any reason, the CEO as aforesaid at the time of such transfer, vacation of Officer of inability to act may in the discretion of the CEO designate another person to act as Arbitrator in accordance with the terms of the agreement to the end and intent that the original Arbitrator shall entitled to continue the Arbitration proceedings notwithstanding his transfer or vacation of office as an officer of the Corporation if the Vice President LPG does not designate another person to act as Arbitrator on such transfer, vacation of officer or inability of original Arbitrator. Such persons shall be entitled to proceed with the reference from the point at which it was left by his predecessors. It is also a term of this contract that no person other than the CEO or a person nominated by such CEO of the Company as aforesaid shall act as Arbitrator hereunder. The award of the Arbitrator appointed shall be final conclusive and binding on all parties to the agreement subject to the provisions of the Arbitration Act., 1940 or any statutory modification on re-enactment thereof and the rules made there under for the time being in force shall apply to the arbitration proceedings under this clause.
- b) The award shall be in writing and published by the Arbitrator within two years after entering upon the reference of within such extended time not exceeding further twelve months as the Sole Arbitrator shall by writing under his own hands appoint. The parties hereto shall be deemed to have irrevocable given their

- consent to the Arbitrator to make and publish the award within the period referred to hereinabove and shall not be entitled to raise any objection or protest thereto under any circumstances whatsoever.
- c) The Arbitrator shall have power to order and direct either of the parties to abide by, observe and perform all such directions, as the Arbitrator may think fit having regard to the matters in difference i.e dispute before him. The Arbitrator shall have all summary powers and may take such evidence oral and/or documentary, as the Arbitrator in his absolute discretion thinks fit and shall be entitled to exercise all powers under the Indian Arbitration Act 1940 including admission of any affidavit as evidence concerning the matter in difference i.e dispute before him.
 - d) The parties against whom the arbitration proceedings have been initiated, that is to say, the respondents in the proceedings, shall be entitled to prefer a cross-claim, or set off before the Arbitrator in respect of any matter in issue arising out of or in relation to the agreement without seeking a formal reference of arbitration to the CEO for such counter-claim, cross claim or set off and the Arbitrator shall be entitled to consider and deal with the same as if the matters arising there from has been referred to him originally and deemed to form part of the reference made by the CEO.
 - e) The Arbitrator shall be at liberty to appoint, if necessary any accountant or engineering or other technical person to assist him, and to act by the opinion so taken.
 - f) The Arbitration shall have power to make one or more awards whether interim or otherwise in respect of the dispute and difference and in particular will be entitled to make separate awards in respect of claims or cross-claims of the parties.
 - g) The arbitrator shall be entitled to direct any one of the parties to pay the costs of the other party in such manner and to such extent as the Arbitrator may in his discretion determine and shall also be entitled to require one or both the parties to deposit funds in such proportion to meet the Arbitrators expenses whenever called upon to do so.
 - h) The parties agree that the courts in the city of Mumbai alone shall have jurisdiction to entertain any application or other proceedings in respect of anything arising under this agreement and nay award or awards made by the Sole Arbitrator hereunder shall be filed in the concerned courts in the city of Mumbai only.

PROFORMA OF BANK GURANTEE
(Raw Material/Free Issue Materials)
(On Non Judicial Paper For 75% of Value of Free issue Material)

To

M/s Aegis Gas (LPG) Pvt. Ltd
415-416, Shree Nand Dham
Plot No. 59, Sector 11
CBD Belapur, Navi Mumbai -400 614

Dear Sirs,

WHEREAS:

i) Aegis Gas (LPG) Private Limited (hereinafter called “the Owner” which expression shall include its successors and assigns) has awarded to

M/s -----

(name)

(Constitution)

(address)

(hereinafter called “the Contractor” which expression shall include their successors and assigns/executors, administrators, representatives and assigns) on order/Contract for -----on terms and

(Description of Work)

Conditions set out, inter alia, in the Owner’s Purchase Order No./Contract Document no - -----dated-----to the Contractor and the General Conditions of the Owner (hereinafter collectively referred to as :the said Contract” which expression shall include all amendments, modifications and/or variations thereto, in or of).

ii) The Owner has agreed to supply the Contractor raw materials/free issue materials for incorporation in fabrication/execution by the Contractor as aforesaid (The Raw Material/Free Issue Materials to the supplied by the Owner to the Contractor for the said work hereinafter for the sake of brevity referred to as “the said material”) and pending fabrications/execution and delivery at job site of the completed work (s) incorporating the said material shall be under the custody and charge of Contractor and shall be kept, stored, altered/worked upon and/or fabricated/fitted/fitted at the sole risk and expense of the Contractor.

iii) As a pre-condition to the supply of the said material by the Owner to the Contractor, the Owner has required the Contractor to furnish the Owner Security from an approved Bank in the manner and upon terms and conditions hereinafter indicated;

Now, therefore in consideration of the premises aforesaid and at the request of the Contractor, we

(name)

(Constitution)

(Address)

(hereinafter called “the Surety” which expression shall include its successors and assigns) hereby irrevocably and unconditionally undertake to indemnify and keep indemnified the Owner from and against all loss, or damage or destruction to or of the said material or any item or part thereof by theft, fire, flood storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, bending, wrapping, exposure, rusting, faulty workmanship, faulty fabrication or faulty method of technique of fabrication/fitting, riot, civil commotion, or other act of omission or commission whatsoever within or beyond the control of the Contractor, misuse and misappropriation by the Contractor and the Contractor’s servants and/or agents) whatsoever to of or in the said material or any part of item thereof between the date that the same or relative part or time thereof was supplied to the Contractor up to and until the date of return to the Owner of the said material or relative part or item thereof and/or completed work(s) incorporating the said material and undertake to pay the Owner forth with on demand in writing without protest or demur the value of the said material or item or part thereof lost damaged, destroyed, misused and/or misappropriated, as the case may be inclusive of Owner’s cost and expenses (inclusive but not limited to handling transportation, cartage, insurance, freight, packing and against the Surety and the Surety hereby waives all right, if any at any time inconsistent with the terms of this indemnity/Undertaking.

iv) This indemnity/Undertaking shall not be determined or affected by the liquidation or winding up, dissolutions, or change or constitution or insolvency of the Contractor and the obligations of the Surety in terms hereof shall not be anywise affected or suspected by reason of any dispute or disputes having been raised by the Contractor (whether or not pending before any arbitrator, office, Tribunal or Court) or any denial of liability by the Contractor stopping or preventing or purporting to stop or prevent any payment by the Surety to the Owner in terms hereof;

(v) The more statement or allegation made by or on behalf of the Owner in any notice or demand or other writing addressed to the Surety as to any of the said material or item or part thereof supplied to the Contractor having been lost, damaged, destroyed, misused or mis-appropriated while in the custody of the Contractor and or prior to completion of the Completed fabricated work(s) incorporating the said material and delivery to job side shall as between the Surety and the Owner by conclusive of the factum of the said

material or item or part thereof having been supplied to the Contractor and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be while in the custody of the Contractor and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof without necessity on the part of the Owner to produce any documentary proof or other evidence whatsoever in support of this.

iv) The amount stated in any notice of demand address by the Owner to the Surety as to the value of any of the said material lost, damaged, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by the Owner in connection therewith shall be as inspection costs/and or expenses as specified in the said demand upto and aggregate limit of Rs. (Rupees)hereby agrees with the Owner that:

- j) This indemnity /Undertaking shall remain valid and irrevocable until the settlement of all claims of the Owner arising hereunder:-
- k) This Indemnity/Undertaking shall be in addition to any other guarantee or security whatsoever that the Owner may now or at any time anyway have in relation to the Contractor's Obligation/Liabilities under and/or in connection with the said contract inclusive for the said material and Owner shall have full authority to take recourse to or enforce this security in preference to other securities) at its sole discretion, and no failure on the part of the Owner in enforcing or requiring enforcement of any other security shall have the effect of releasing the Surety from its full liability hereunder.
- l) The owner shall be at Liberty without reference to the Surety and without affecting the full liability of the Surety hereunder to take any other surety irrespective of the Contractor's obligation and/or liabilities under of in connection with the said contract inclusive of the said material and to vary the terms vis-à-vis the Contractor of the said contract or to grant time and/or indulgence to the Contractor of to reduce or to increase or otherwise vary the price of the total contract value of the quantity, quality, description or value of the said material or to release of to forebear from enforcement of all or any of the obligations of the Contractor under the said contract (inclusive in respect of the said material) and/or the remedies of the Owner under any other security(ies) now or hereafter held by the Owner and no such dealing(s), variation(s) or reduction(s), increase(2), or other indulgence(s) or arrangement(s) with the Contractor or release or forbearance whatsoever shall have the effect of releasing the surety from its full liability to the Owner hereunder or of any wise prejudicing rights of the Owner between the Surety and the Owner be conclusive of the value of such said material and the said costs and expenses as also of the amount liable to be paid to the Owner in terms and for the purpose of, without necessity for the Owner to produce any voucher, bill or other documentation or evidence whatsoever in support thereof.

Yours faithfully,

Tenderer's Signature

ADVANCES
(On Non-Judicial Paper for appropriate Value)

To,

M/s Aegis Gas (LPG) Pvt.Ltd
415-416, Shree Nand Dham
Plot No. 59, Sector 11
CBD Belapur
Navi Mumbai -400 614

Dear Sirs,

In consideration of the Aegis Gas (LPG) Pvt Ltd (hereinafter called "the Owner") having agreed to grant an advance of Rs (Rupees) to M/s (hereinafter called "The said contractor/Supplier) Under the Terms and Conditions of Purchase Order No. dated made between the Owner and M/s for supply and/or installation of (hereinafter called the said Agreement), on Production of Bank Guarantee for Rs. (Rupees Only) we M/s (hereinafter referred to as "The Bank") do hereby undertake to pay to the Corporation an amount not exceeding rs. (rupees only) against any loss or damage caused to or suffered by the Owner by reason of any breach by the said Contractor/Supplier of the terms & Conditions contained in the said Agreement)

We, do hereby undertake to pay the amounts due and payable under this Guarantee without any demurrals, merely on demand from the Owner stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Owner by reason of any breach by the said Contractor(s)/Supplier(s) of any of the terms and conditions contained in the said agreement or by reason of the Contractor(s)/supplier(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. (Rupees only)

We, further agree that the guarantee herein contained shall remain in force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Owner under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the owner certifies that the terms & conditions of the said Agreement have been fully and properly carried out by the said contractor(s)/supplier(s) and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before we shall be discharged from all liability under this Guarantee thereafter

We, _____ further agree with the Owner shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s)/Supplier(s) from time to time or to postpone by the Owner against the said Contractor(s)/Supplier(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Owner or for any forbearance, act or omission on the part of the Owner or any indulgence by the Owner to the said Contractor(s)/Supplier(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

We, _____ lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Owner in writing. Notwithstanding anything stated above, our liability under this guarantee is restricted to Rs (Rupees _____)

Our Guarantee shall remain in force until _____. Unless a demand in writing for claim under this Guarantee is lodged with us before that date i.e on before _____ all your rights under the said guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

Date

Address

** This date will be six months later than the date of expiry of the Agreement.

PROFORMA OF BANK GURANTEE
(Performance)
(On Non-Judicial For 10% of Contract Value)

To

M/s Aegis Gas (LPG) Pvt.Ltd
415-416, Shree Nand Dham
Plot No. 59, Sector 11
CBD Belapur, Navi Mumbai -400 614

Dear Sir,

In Consideration of the Aegis Gas (LPG) Private Limited (hereinafter called "the Owner" which expression shall include its successors and assigns) having awarded to M/s _____ (name)
_____ (constitution)
_____ (address)

(hereinafter referred to as "the supplier/Contractor" which expression shall wherever the subject or context so permits include its successors and assigns) a supply contract in terms inter-alia, of the Owner's Purchase Order No. _____ dated _____ and the general Purchase Conditions of the Owner and upon the condition of Supplier's furnishing security for the performance of the Supplier's obligations and/or discharge of the Supplier's liability under and/or in connection with the said supply contract upto a sum of Rs. _____ (Rupees _____ only) amounting to 10% (ten percent) of the total contract value.

We,

_____ (name)
_____ (constitution)

(hereinafter called "the Bank which expression shall include its successors and assigns) hereby jointly and severally undertake the guarantee to pay to the Owner in Rupees forthwith on demand in writing and without process or demur of any and all moneys anywise payable by the supplier to the Company under, irrespective of or in connection with the said supply contract inclusive of all the Owner's losses and damages and costs (inclusive between attorney and client). Changes and expenses and other money anywise payable in respect of the above as specifies in any notice of demand made by the Owner to the Bank with reference to this Guarantee upto and aggregate limit of Rs _____ (Rupees _____ only) And the Bank hereby agrees with the Owner.

i) This Guarantee/Undertaking shall be a continuing Guarantee/Undertaking and shall remain valid and irrevocable for all claims of the Owner and liabilities of the Supplier arising upto and until midnight of _____. This date shall be a months from the last date of guarantee period.

ii) This Guarantee/Undertaking shall be addition to any other guarantee or security whatsoever that the Owner may now or at any time anyway have in relating to the Supplier's obligations/liabilities under and/or in connection with the said contract, and the Owner shall have full authority to take recourse to or reinforce this security in preference to the other security(ies) at it sole discretion, and no failure on the part of the Owner in enforcing or requiring enforcement of any other security shall have the effect of releasing the Bank from its full liability hereunder.

iii) The Owner shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other security in respect of the supplier's obligations and/or liabilities under or in connection with the said supply contract and to vary the terms vis-à-vis the supplier of the said supply contract or to grant time and/or indulgence to the supplier of the said supply contract or to grant time and/or indulgence to the supplier of the said supply contract or to grant time and/or indulgence to the supplier or to reduce or to increase or otherwise vary the prices of the total contract value or to release or to forebear from enforcement of all or any of the obligations of the supplier under the said supply contract and/or the remedies of the Owner under and other security(ies) now or here-after held by the Owner and no such dealing(s), variation(s), reduction(s), increase(s) or other indulgence(s), or arrangement(s) with the supplier or release or forbearance whatsoever shall have the effect of releasing the Bank from its full liability to the Owner hereunder or of prejudicing rights of the Owner against the Bank.

iv) This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up, dissolution, or charge of constitution or insolvency of the supplier but shall in all respects and for all purposes be binding and operative until payment of all moneys payable to the Company in terms hereof

v) The bank hereby waives all rights at any time inconsistent with the terms of this Guarantee/Undertaking and obligations of the Bank in terms hereof shall not be anyway affected or suspended by reason of any dispute or disputes having been raised by the supplier (whether or not pending before any Arbitrator, Officer, Tribunal or Court) or any denial or liability by the supplier of any other order or communication whatsoever by the supplier or preventing or purporting to stop or prevent any payment by the bank to the Owner in terms hereof.

vii) The amount stated in any notice of demand addressed by the Owner to the Guarantor as liable to be paid to the Owner by the supplier or as suffered or incurred by the owner on account of any losses or damages of costs, charges and/or expenses shall as between the Bank and the Owner be conclusive of the amount so liable to be paid to the Owner or suffered or incurred by the Owner, as the case may be, and payable by the Guarantor to Owner in terms hereof.

Yours faithfully,

PROFORMA OF BANK GUARANTEE
(In lieu of Initial Security Deposit)
(On non-judicial paper of appropriate Value)

To,

Dear Sirs,

In consideration of Aegis Gas (LPG) Private Limited (hereinafter called “the Owner” which expression shall include its successors and assigns) having awarded certain work for an relative to

to (Name and Address of the Contractor)

upon certain items and conditions interalia mentioned in the Owner’s letter of Intent, (hereinafter collectively called the “the Contractor”, expression shall include any formal contract entered into between the Owner and Contractor in suppression of the said Letter of Intent and all amendments and/or modifications in the Contract) inclusive of the condition that the owner may accept a Bank Guarantee of a Scheduled Bank in India in lieu of Cash Deposit of the Initial Security Deposit as provided for in Clause 2.0 of the General Conditions of Contract:

We, (Name of the Bank)

Having registered and head office at (hereinafter called “the Bank”) at the request of the Contractor and with the intent to bind the Bank and its successors and permitted assigns, do hereby unconditionally and irrevocable guarantee payment to the Owner at Mumbai of the unpaid balance of the initial security deposit upto an aggregate limit of Rs. 40,00,000 (Rupees Fourty Lacs only) AND undertake to pay the Owner on demand and without protect or demur the unpaid balance of said initial security deposit subject to the aggregate limit of aforesaid of Rs (Rupees only).

AND the Bank does hereby further agree as follows:-

- j) The guarantee/undertaking herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and the claims of the Owner relative thereto satisfied and/or discharged and the Owner accordingly discharges this Guarantee/Undertaking subject. However, that the Owner shall have no claim under this Guarantee/undertaking has been served on the Bank before the expiry of the said date, in which event the same shall be enforceable against the Bank notwithstanding that the same is enforced after the expiry of the said date namely

ii) The Owner shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this Guarantee/Undertaking, at any time and/or from time to time to anywise vary the said contract and/or any of the terms and conditions thereof or of or relative to the said initial security deposit or to extend time of performance of the said Contract in whole or part or to postpone for any time and/or from time to time any of obligations of the Contract and/or power exercisable by the Owner against the Contractor the Contractor and either to enforce or for bear from enforcing any of the terms and conditions of or covering the said Contract or the said initial security deposit or the securities available to the Owner or any of them and the Bank shall not be released from its liability under these presents and the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the Owner of the liberty with reference to any or all the matters aforesaid or the reason of time being give to the Contractor or any other forbearance, act or omission on the part of the Owner or any indulgence by the Owner to the Contractor or of any other act, matter of thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of releasing the bank from its liability hereunder of any part.

iii) It shall not be necessary for the Owner to proceed against the Contractor before proceeding against the Bank and the Guarantee/Undertaking herein contained shall be enforceable against the bank notwithstanding the existence of any other security for any indebtedness of the Contractor to the Owner (including relative to the said initial security deposit) and notwithstanding any such security deposit) and notwithstanding any such security shall at the time when claim is made against the Bank or proceedings taken against the Bank hereunder, the outstanding or unrealized

iv) The amount stated by the Owner in any demand, claim or notice as the unpaid balance of the said initial security deposit for the time being shall as between the Bank and the Owner for the purpose of these presents be conclusive of the said balance.

v) The liability of the bank to the Owner under this Guarantee/undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the Contractor and the Bank/and or the Bank and the Owner, or otherwise howsoever touching or effecting these present or the liability of the Contractor to the Owner and notwithstanding the existence of any instructions or purported instructions by the Contractor or any other person to the Bank not to pay or for any cause withhold or defer payment to the Owner under these presents with the intent that notwithstanding the existence of such difference, dispute or instruction , the Bank shall be and remain liable to make payment to the Owner in terms hereof.

vi) The bank shall not revoke this Guarantee/undertaking during its currency except with the previous consent of the Owner in writing and also agree that any change in the constitution of the Contractor or the Bank or Owner shall not discharge the Bank's liability hereunder.

-----who is-----
----is (on behalf of the Bank) (his
designation) authorized to sign this Guarantee/undertaking on
Behalf of the bank and to bind the Bank thereby.

Date this _____ day of _____ 20____

Yours faithfully,

For
Signature
Name & Designation
Name of the Branch.

SECTION B

SPECIAL CONDITIONS OF CONTRACT

AEGIS GAS (LPG) PVT LTD SPECIAL CONDITIONS OF THE TENDER

1.0 SCOPE OF WORK

The broad scope of work shall be as under:

- 1.1 Soil investigation and determination of soil bearing capacity.
- 1.2 Design LPG Horton Spheres/ Foundation including determination of all data required for design and obtaining the approval of the same from Inspector/owner.
- 1.3 Detailed design calculations preparation of fabrication, drawings and obtaining necessary approvals from 'Inspectors', Owner and Chief Controller of Explosives.
- 1.4 Identification of the steel plates procured by Contractor by the Inspector
- 1.5 Fabrication of Sphere petals out of the B.Q.plates at Contractors Shop.
- 1.6 Trial Assembly at contractors Shop.
- 1.7 Transportation of pre – fabricated sphere components to the site.
- 1.8 Construction of foundation at site.
- 1.9 Construction of approved Fire/Safety Barriers/Shields to protect the existing Tanks.
- 1.10 Erection of the sphere on the foundation and welding of the sphere at site with 100% radiography.
- 1.11 Post weld heat treatment as per code requirement.
- 1.12 Fabrication and erection of staircase platform monorail structure.
- 1.13 Hydraulic testing of sphere.
- 1.14 Primer Coating and Final painting of Exterior surface and structural as painting specifications enclosed.
- 1.15 Thorough cleaning of the internal surface by wire brushing.
- 1.16 Getting Sphere stage inspected and approved by the Inspectors (including statutory approvals for meeting code requirements.)
- 1.17 Supply of studs/ bolts, nuts, gaskets, flanges, foundation bolts, dip pipes, drain pipes, cleats etc. required for sphere.

2.0 LOCATION

Please refer to the covering letter.

3.0 SITE OFFICE/STORES

The Owner will provide limited open space within the plant premises for the Contractor to construct his temporary structure for the purpose of Site Office/Stores will be dismantled by Contractor immediately on completion of the site work and site work and site cleared of all debris/materials at his own cost.

4.0 POWER AND WATER

4.1 AGPL will provide the Power and Water as a free issue at Construction site. The power will be provided at one location and the contractor has to make his own arrangement for further distribution. All arrangement made by contractor shall be as per state electricity board / IES regulations. The contractor shall provided necessary fuses / switches and energy meter on his temporary line.

The water for hydro testing purpose shall be supplied free of cost at one location and contractor has to make further arrangement including of suitable transfer pump, hoses etc for hydro testing of tank.

The contractor will have to provide estimates for the requirement in un-priced bid.

5.0 DESIGN

5.1 There sphere shall be designed based on the design parameters given in the specifications enclosed. The design should conform Class 1 category: latest amendments, BS5500 & SMPV (U) Rules

5.2 Based on the above design, detailed fabrication drawings and design calculations Should be submitted to the Owner and to the Inspector as follows:

5.2.1 Within 2 weeks of placement of order, the successful tenderer/contractor will submit 4 sets of detailed fabrication drawings and Design calculation for comments to the owner. One set of the Drawings will be returned to the Contractor with the Owner's Comment. After incorporating the comments, the contractor will furnish & sets of the design calculations and fabrication drawings to the Inspectors for their comments and subsequent approval. After obtaining approval from Inspector 2 sets of the approved design calculation and drawings will be forwarded to the owner. The Contractor will also get the approval

of the design drawings approved from PESO (CCOE) prior to the Commencement of the work. The contractor will furnish necessary prints of fabrication drawings to the Owner as and when required for submission for statutory approvals from time to time.

- 5.2.2 On completion of work, the Contractor will furnish 6 prints of 'As Built' drawings and one producible duly signed and stamped by Inspector for Owner's record.
- 5.2.3 The Contractor will maintain complete record duly attested by the Owner / Inspectors of material test certificates, records of radiography, heat treatments charts, hydrostatic test certificates etc. and submit 6 sets for Owners record on completion of work.
- 5.2.4 Contractor's obligations under the tender will not be deemed to be completed until all the documentation is handed over to the Owner.
- 5.2.5 The Contractor will also furnish all the documents, catalogues, test certificates, guarantee certificates, service manuals etc. for the fittings under the scope of supply of Contractor.

6.0 CIVIL FOUNDATION DATA

6.1 The Contractor shall provide the following data and drawings to the Owner along with the design calculation of foundation.

- a. Load bearing capacity of the soil supported by the relevant test certificates. The test to be carried by a recognized institution and the complete test report to be submitted by Owner.
- b. Type of foundation and type of number of piles if required for improving the soil bearing capacity.
- c. Number of columns and mode of fixing to the concrete pad.
- d. Vertical and horizontal loads and their eccentricity, line of action, bending moments and any other loads taken into consideration for proper designing of the foundations.
- e. Limiting settlement allowed as per IS Code.
- f. Any other relevant information and all necessary drawings.

7.0 SUPPLY OF MATERIAL BY OWNER/CONTRACTOR

7.1 B.Q. Steel Plates

- 7.1.1 The tenderer will indicate the minimum requirement of B.Q. Steel Plates for shell and reinforcement pads taking into consideration normal wastage etc. Due weightage will be given for this steel requirement i.e. the tenderer requiring more steel plates will be given proportionate discredit during price comparison. The tenderer will not be required to submit detailed plate cutting diagram along with the tender. The tenderer will not be required to return the scrap material after the fabrication is completed. However the rebate offered for retention of scrap will have to be indicated by the tenderer in price bid.
- 7.1.2 In case of supply of BQ plates by the Contractor. The cost of B.Q.Plates to be procured by the contractor per metric tonne ex-their works will have to be indicated in the priced format.
- 7.1.3 The tenderer has to submit their price bid in the alternatives i.e.
- i) Full requirement of B.Q. Plates to be supplied by Contractor
 - ii) Full requirement of B.Q. Plates to be supplied by Owner (Please refer covering letter for details).
- 7.1.4 The contractor will not be entitled to claim any labour charges for the steel plates if they are rejected during the course of fabrication. The Contractor will have to make good such plates at his own cost. No extension of time limit for completion of work will be granted because of defective fabrication work, rejected by the Inspectors.

8.0 CEMENT, STEEL AND OTHER MATERIALS

- 8.1** Cement and steel are required for sphere foundation, fire proofing of legs, etc. shall be supplied by Contractor at their own cost. However the cost of Steel and cement assumed shall be indicated by the contractor.
- 8.2** The Contractor shall supply all the accessories such as flanges, nozzles, studs/nut, bolts, cleats, foundation bolts, manhole cover, structural steel for monorail structure and platform, ladders catwalk, etc. at his own cost and shall be clearly listed in the offer. These accessories would have approved of Inspector's prior to fitment. Any other item / accessory that is not covered in the offer which is essential for the operation of the sphere and should be provided by the owner's shall also be separately enumerated.

8.3 FITTINGS & MOUNTINGS

8.3.1 The contractor shall furnish detailed list of the fittings and mounting that are required for LPG Spheres as per the design code to the owner.

8.3.2 The Contractor shall supply the fittings & Mountings of the Spheres' at his own cost.

8.3.3 The owner reserves the right to procure these fittings directly as a complete package from other sources and exclude these from the Contractor's scope of supply. However, the Contractor shall be responsible for interacting with the Owner's fittings, supplier for proper nozzles sizing and orientation.

9.0 MANUFACTURE

9.1 The spheres will be manufactured as per design codes BS5500, clause 1 with latest amendments.

9.2 The petals will be cold/hot formed and edges will be checked by dye penetration test.

9.3 The trial assembly of the sphere will be done at the shop of the Contractor.

9.4 The pre-fabricated sphere components will be transported to site and erected on the foundations and thereafter welding will be carried out. The weld seams shall be subjected to 100% radiography as per code requirement.

9.5 Post weld heat treatment will be carried out as specified by code.

10.0 INSPECTION

10.1 The scope of inspection by the Inspectors is enumerated elsewhere.

10.2 The sphere will be fabricated under stage inspection of the Inspector.

10.3 The Contractor shall appoint a reputed agency M/s. Lloyds as Inspectors and appointment shall have the concurrence of owner. The charges payable to Inspector (M/s. Lloyds) against this contract shall be included in the fabrication cost and will be paid directly by the Contractor to the Inspector.

10.4 All facilities necessary for inspection shall be extended by the Contractor to the Inspector/owner and the representative of Inspector/owner shall have free access to the works of the Contractor and /or his sub-contractors at all times to monitor and expedite delivery of equipment.

10.5 The Contractor shall also provide necessary facilities for inspection of fittings to be supplies by Contractor at any stage of manufacture or erection.

11.0 HYDRAULIC TESTING

11.1 Hydraulic testing of the spheres shall be carried out by the Contractor in the presence of the Owner and Inspector as per code requirement.

12.0 PAINTING

12.1 After successful hydraulic testing and obtaining approval by Inspectors, application of red oxide zinc chromate primer and final painting on the sphere and structural will be done as per the painting specifications enclosed.

12.2 The Contractor shall have to paint the owner's logo and lettering on the sphere as specified in the painting specification. The size of logo and letters and the colour of paint to be shall be provided by Owner's / Site – in-Charge approval.

13.0 BASIS OF OFFER

13.1 The offer shall be valid for a minimum period of 3 months (90 days) from the due date of the tender. Validity of the offer shall be indicated by the tenderer in his offer.

13.2 The prices quoted shall remain firm without any escalation till the completion of contract.

13.3 If the items need to be procured internationally involving foreign Exchange the contractor shall indicate the exchange value considered for the imports.

14.0 PROGRESS REPORTING.

14.1 The Contractor has to submit progress reports and inspection report of their work fortnightly and on critical items weekly to the Owner The Contractor will also submit PERT/Bar Charts indicating the time period for various phase of work within 2 weeks of placement of order. The progress report will conform to format prescribed by Owner.

15.0 GUARANTEES

15.1 The equipment shall be guaranteed for a period of 12 months from the date of commissioning or 18 months from the date of handing over after the final acceptance whichever is earlier for faulty design, workmanship, and material supplied by Contractor.

15.2 In case of bought out items by Contractor, Contractor will provide supplier's guarantee for a period of 12 months from the date of commissioning equipment or 18 months from the date of erection whichever is earlier for faulty design, workmanship, and material.

15.3 The above guarantees shall be supported by a performance Bank Guarantee (Performa attached) for 10% of the value of the order.

16.0 DELIVERY SCHEDULE

- 16.1 The latest delivery scheduled Project will be (including erection and hydro testing) 15 months.
- 16.2 The delivery period quoted shall be firm and guaranteed. It shall be counted from the date of letter / telegram/telex/fax/e-mail of intent.
- 16.3 The Contractor shall also indicate along with the quotation, the time schedule for various stages of work by way of Bar Chart.
- 16.4 In case of any delay in completion of the work beyond the scheduled completion date, the Owner shall be entitled to be paid Liquidated Damages by the Contractor. The liquidated damages shall be initially at the rate of 0.5% (half percent) of the total contract value for every week of the delay subject to a maximum of 5% of the total contract value. The liquidated damages shall be recovered by the Owner out of the amounts payable to the Contractor or from any Bank Guarantees or Deposits furnished by the Contractor or the Retention Money retained from the Bills of the Contractor, either under this contract or any other contract.
- 16.5 In case the contractor is instructed by the owner to delay mobilization to site, the delivery period will be adjusted accordingly. However, no compensation will be payable on this account to the contractor.
- 16.6 In case the B.Q. Plates are procured by contractor then Delay in procurement of the B.Q.Plates by the Contractor will not be considered as a reason for extension of delivery period.
- 16.7 Tenderer may improve upon the delivery schedule and indicate the same.

17.0 EARNEST MONEY DEPOSIT

17.1 The tenderers are required to pay Earnest Money Deposit of Rs. 20,00,000/- (Rupees twenty Lacs only) by Demand Draft drawn in favour of Aegis Gas (LPG) Private Limited Payable at Mumbai

18.0 SECURITY DEPOSIT

18.1 In case of successful tenderer, the Earnest Money Deposit will be adjusted towards the security deposit. The Contractor shall offer security deposit of Rs. 40 Lacs in the form of Bank Guarantee in the proforma attached. The security deposit shall be released to the Contractor after completion of the entire work, covered under the contract to the satisfaction of the Owner. The validity of the same shall be till the completion of the job.

19.0 TERMS OF PAYMENT

The terms of payment shall be follows

19.1 10% of the total contract value as mobilisation advance against bank guarantee for equivalent amount.

19.2 5% of total contract value on design detailing and approval of drawing from TPIA/CCOE/Owner.

20.0 CIVIL

All Civil Works bills shall be paid against RA bill duly certified by Project Engineer.

21.0 FABRICATION AND ERECTION

21.1 20% cost of Fabrication And Erection (Item2 of price schedule) on receipt of fabricated petals etc. At site prorata on weight basis.

21.2 40% of Cost of Fabrication And Erection (Item2 of price schedule) on site fabrication Erection of the fabricated petals etc on prorata weight basis.

21.3 20% of total cost for Fabrication And Erection (Item2 of schedule of price) on completion of welding, radiography.

21.4 10% total cost of Fabrication And Erection (Item2 of schedule of price) on completion of PWHT and hydro testing.

21.5 10% total cost of Fabrication And Erection against final commissioning and handing over documents to the owner. (Item2 of schedule price).

22.0 SUPPLY OF B.Q. PLATES

75% of total cost of B.Q.Plates to be procured by contractor (Item3 of price schedule). This payment shall be released against submission of bank guarantee for 10% value of the cost of B.Q.Plates and Indemnity Bond for 90% value of the cost of B.Q.Plates, both valid for the period till the fabricated petals are received at site.

22.0 SUPPLY OF FITTINGS

Balance 10% of total contract value after completion of the job, handing over of spheres and accessories to the Owner against submission of performance bank guarantee for 10% order value valid from guarantee period i.e. 12 months from date of commissioning or 18 months from date of handing over whichever is earlier.

23.0 TAXES, EXCISE DUTY AND LEVIES

20.1 The contractor will quote separately the excise duty and any other statutory levies as applicable on the date of tendering. Any change in levies/excise duty/ other statutory levies after the due date of tender will be paid /reimbursed separately on production of documentary evidence. Sales tax on works contract, if applicable, will be reimbursed at actual on production of valid documents.

21.0 INFORMATION TO BE FURNISHED BY THE TENDERER

The tenderer is required to enclose the following documents as part of his tender:-

- a) Power of attorney of the signatory to the tender.
- b) Details of equipment, tools and tackles proposed to be deployed at site in the proforma form A'
- c) Site organization proposed to be set up by the tenderer including biodata of site –in-charge and key personnel in the proforma form 'B'.
- d) Exception and deviation, if any as a separate Annexure.
- e) Additional and necessary informational elaborated write-up etc. (except price figures) in regard to their offer/tender in Annexure.
- f) Schedule of labour rates in proforma 'C'.
- g) Details of similar work done during past five years in proforma 'D'.
- h) Concurrent commitments of the tenderer in proforma 'E'.
- i) Latest Income tax clearance certificate & Solvency Certificate from a Nationalized/ RBI approved Foreign bank, certifying Contractors capability to undertake the jobs costing Rs. 10 crores and above.

FORM 'A'

AEGIS GAS (LPG) PRIVATE LIMITED

NAME OF WORK: FABRICATION AND ERECTION OF LPG HORTON SPHERES

NAME OF TENDERER:

DETAILS OF EQUIPMENT, TOOLS, TACKLES ETC (FORM-C)

Tenderer shall submit herein details of equipment, tools, tackles etc required to perform the work and shall note in each case whether the same is (a) already owned by tenderer and available for use on his contract,(b) anticipated to be hired by contractor or (c) anticipated to be purchased by contractor. In case of (a), present location shall be stated. In case of (b) and (c), location of hirer or supplier shall be stated.

No. of items	Description & Capacity	Make, Model	Year of manufacture	Category (a) or (b) or (c) above	Location	Remarks if any

1. Contractor agrees to augment the above chart with additional number /categories of equipment, if required to complete the work within the agreed time schedule of completion as directed by the Site – In – Charge.

FORM B

AEGIS GAS (LPG) PRIVATE LIMITED

NAME OF WORK: FABRICATION AND ERECTION OF LPG HORTON SPHERES

NAME OF TENDERER:

PROPOSED SITE ORGANISATION

The tenderer is to indicate here the proposed site organization he proposes to set up at each site for execution of the work. It is understood that this will be augmented from time to time depending on the requirements for timely completion of work, as directed by site in charge.

Note:

Bio-data of Site –In-Charge and key personnel proposed to be posted for this job should be attached.

A Planning Engineer for scheduling card monitoring of the work, of the tenderer will be associated full time for the entire duration of the work.

(FORM-C)

SCHEDULE OF LABOUR RATES

NOTES:-

The bidder shall quote rates, which should be inclusive of pay roll cost and allowances, taxes, fringe benefits, overheads supervision and profits for categories listed below on daily basis to be employed for execution of work, which may be considered extra items of work not defined in the bid contract document. These rates will be utilized for computing rates for such extra items in accordance with the provisions of the general conditions of contract

The rates at 'A' below shall be inclusive of hand tools, contractor's supervision, overheads & profits.

The rates at 'B' below shall be inclusive of hand tools and all equipments and machinery (but excluding cranes, tractors, trailers, trucks) and consumables, contractor's supervision, overheads & profits.

Payment for part of the day shall be made on prorata basis.

----- rate per day of 8hours-----
---- Standard time ----- Overtime Sundays & Holidays ---

Sr.No	Category	A	B	A	B
1	ARC WELDER				
2	ARC WELDER-SS				
3	ARC WELDER ALLOY STEEL				
4	TIG WELDER-SS				
5	TIG WELDER ALLOY STEEL				
6	GAS CUTTER				
7	GAS WELDER				
8	GRINDER				
9	MILL WRIGHT FITTER				
10	PIPE FITTER				
11	FITTER				
12	RIGGER				
13	PAINTER				
14	MASON				
17	PLUMBER				
18	HELPER (KHALASI)				
19	MAZDOOR (ORDINARY)				
20	ELECTRICIAN/WIREMAN				
21	CABLE JOINER				
22	INSRUMENT TECH				

FORM -D

NAME OF WORK : **FABRICATION AND
ERECTION OF LPG HORTON
SPHERE**

NAME OF BIDDER

Details of Similar Works done during past Five Years

Sr.No	Full Postal address of the Client & Name of Officer-incharge	Description of the Work	Value of the Contract	Date of commencement of Work	Actual completion time	Year of completion	Remarks
1	2	3	4	5	6	7	8

Signature of Tenderer

FORM-E

**NAME OF WORK : FABRICATION AND ERECTION OF
LPG HORTON SPHERE.**

NAME OF BIDDER :

Concurrent Commitments of the Tenderer

Sr.No	Full Postal address of the Client & Name of Officer-incharge	Description of the Work	Value of the Contract	Date of commencement of Work	Scheduled completion time	% of completion	Expected date of completion
1	2	3	4	5	6	7	8

SECTION C

TECHNICAL SPECIFICATION

AEGIS GAS (LPG) PRIVATE LIMITED

TECHNICAL SPECIFICATIONS

GENERAL

- 8.1 The sphere will be designed as per BS 5500, Class I Category, latest amendments. The Horton spheres for storage of LPG shall also meet the requirements of local rules and regulations and /or shall be fully accepted by relevant statutory authorities such as CCOE.
- 8.2 The requirements laid down in these specifications shall apply in addition to the requirements laid down in the applicable design codes. In case of any approach the owner for clarifications and ruling before proceeding with the actual work. Such changes in instructions shall be obtained in writing before its implementation.

2.0 DESIGN DATA

- 2.1 Design pressure temperature, specific gravity of the LPG and corrosion allowance to be taken as per the standard design requirements.
- 2.2 The earthquake effects and wind pressure shall be taken into account while designing the Horton spheres.

3.0 MATERIALS

- 3.1 Materials for shell, reinforcement pads manhole neck etc., shall be as per the applicable Code.
- 3.2 Dip pipes, flanges, nozzle connection, and attachments should be of the materials as per the applicable code.

3.3 GASKETS

3.3.1 Internal/External joints

For flanged connection, Asbestos free metallic gaskets shall be used.

3.4 SUPPORTS

- 3.4.1 Normally spheres will be supported on circular columns and will be suitably reinforced at the area where the columns are welded to the shell.

4.0 FORGINGS AND FORGED NOZZLE CONNECTIONS

- 4.1 The forging manufacturers shall choose the method of working which will produce forgings meeting the specified properties that will minimize directionality as evidenced by micro – etching or as evidenced by mechanical properties.
- 4.2 All forgings shall be counter forged i.e. the material will be brought to the finished shape by hot forging as far as practicable. The production of forged parts by cutting from longitudinally forged billet or bar is not acceptable. The forge manufacturer shall report the size of billet (ingot) multiple used for each part, the final reduction in multiple used for each part, the final reduction in cross sectional area and amount of upsetting with respect to the billet (or ingot) and complete heat treating procedure, This information shall be submitted at the time of this quotation as well as with the final data required for order.
- 4.3 The forging temperatures and reductions used shall be consist for forgings of like size. Post forging practice shall be such as to prevent surface cracking or thermal flanking.
- 4.4 All forging shall be heat treated to meet the physical properties specified for plates. Test coupons shall be removed after controlled cooling and tempering and shall be subjected to stimulated post weld heat treatment as specified for the plate material. The forging manufacturer shall be responsible for all heat treating procedures. The object of the post forging heat treatment is to achieve a uniform grain size and well transformed structure that will exhibit the strength, ductility and notch toughness requirements as specified in relevant standards. After forging operations are completed, the final heat treatment of normalizing shall be given.
- 4.5 The forging manufacturer shall report all heat treating cycles giving temperature and cooling practice for each furnace charge of forgings, including the piece numbers involved.
- 4.6 All forging except those produced in standard dies, shall be machined after heat treatment and prior to final magnetic particle/ florescent penetrate inspection/ultrasonic examination. The finish shall be 250 micro inches or smoother.

5.1 SPHERE SUPPORTS, ACCESSORIES AND APPURTENANCES.

Nozzles and Reinforcing.

- 5.1.1 Nozzles shall be fitted with appropriately rated flanges.
- 5.1.2 Flange faces shall have concentric serrations. Forged mono blocks or long weld neck flanges shall be used wherever required.

- 5.1.3 All nozzles more than 2" diameter shall be provided with reinforcing plates. Reinforcing plates shall be designed and fabricated in accordance with design code.
- 5.1.4 Nozzles and their reinforcing plates shall not restrict the permissible maximum pressure or test pressure of the sphere, nor shall they shorten the service life of the sphere.
- 5.1.5 Nozzles and their reinforcing plates shall not straddle shell welds. All welded accessories shall be at an adequate distance away from shell welds.
- 5.1.6 Welding of nozzles to the plate shall be of same quality welds as the shell welding.
- 5.1.7 Reinforcing plates shall be provided with a ½" NPT tapped test hole. This hole should be left open after testing of reinforcing pad.

5.2 Sphere Supports

- 5.2.1 Supporting columns shall be adequate size for the stability of the unit.
- 5.2.2 Column attachment at sphere diameter area shall be by means of reinforcing pads of suitable size so that the loads are distributed.
- 5.2.3 A sliding plate shall be provided by the contractor at the base of each column. Size shall be determined by the contractor and to be approved by Inspector.
- 5.2.4 If the heat treatment is required as per codes, sufficient clearance shall be provided in the holes in footings for anchor bolts to allow for the expansion of the sphere during heat treatment.

5.3 Appurtenance

- 5.3.1 The contractor shall provide manhole as specified in data sheets.
- 5.3.2 Inside edge of the manhole shall be smooth with no sharp edges test.
- 5.3.3 Access to the top of the sphere shall be means of a circular spiral stairway, minimum width 30" (800 mm) with intermediate landing. Stairway will end at a circular platform about 4000 mm diameter installed at top of sphere. Suitable hand railing shall be provided for the stairway and platform.
- 5.3.4 Stairway and platform shall be supported from gussets attached to the sphere shell. Straight part of stairway shall be supported from grade.

- 5.3.5 Stair treads shall be preferably of suitable grating or chequered plates. They shall be non-slip type. If chequered plates are provided suitable arrangements for draining shall be made.
- 5.3.6 Stairway angle shall not be more than 45 degrees.
- 5.3.7 All the permanent instruments and accessories as required as per design code shall be installed by the contractor as per specifications and instructions of the owner.
- 5.3.8 All piping support paddings, if required, shall be provided by the contractor at no extra cost.
- 5.3.9 A suitable monorail structure at the top of the sphere to be provided.

5.0 INSPECTION

- 5.1 All inspection shall be made in accordance with the code followed by and as per the scope given.
- 5.2 The owner, and inspectors shall have free access to all workshops of the contractor at all stages of manufacture. They shall place at the disposal of the Inspector for the proper execution of their inspections. All means and facilities should be safe and adequate.

6.0 PAINTING

- 6.1 The painting specifications attached herewith shall be followed.
- 6.2 Surface preparation will be done at site as per the specifications.
- 6.3 No primer coating shall be done at the contractor's shop. Two coats of Red Oxide Zinc Chromate Primer as per IS 2074 will be applied only at the site after post weld heat treatment and hydraulic testing as per the specifications.
- 6.4 Final painting will be done as per Specifications.

7.0 SHIPMENT

- 7.1 All items shall be carefully packed so as not to be damaged in any way during transit.
- 7.2 All structural shapes such as structural members, hand rails and their pads shall be grouped together and secured by wire or metal strips.
- 7.3 Manholes and nozzles shall be packed carefully. Manhole covers shall be bolted in place with their gaskets. Nozzle flanges shall be bolted in place

with their gaskets. Nozzle flanges shall be suitable protected to prevent damage during transport.

Machined face of flanges shall be coated with varnish and protected securely with water proof cover. The flanges protection shall be retained until piping is connected. Vents, gauges, Valves opening and similar accessories shall be packed with their gaskets etc. in strong wooden crates and secured so as to prevent damage during transport. Crates shall be reinforced and bound with steel strips and their weight should not exceed ½ ton.

- 7.4 All items shall be marked as indicated in the above paragraphs. The identification number of the tanks and every item shall be as shown in the erection drawings.
- 7.5 All items shall be transported duly insured and all expenses shall be borne by contractor.

8.0 DRAWINGS AND DOCUMENTS

- 8.1 Contractor shall be submit preliminary drawing showing general arrangement of plating and fixed accessories (stairways, landings, platform, number of columns, etc.).
- 8.2 The number of drawings/documents to be submitted by the contractor to the Owner and inspector shall be as specified in clause of special Conditions of this Tender.
- 8.3 Owners approval of contractor's drawing shall not relieve him of his guarantee for the safe and proper operation of the equipment in the conditions indicated in the design data.
- 8.4 The documents to be provided by the contractor inter – alia shall comprise the following:
 - a) Design calculations
 - b) Data sheets
 - c) Fabrication drawings (along with reproducible)
 - d) Hydraulic test report
 - e) Fabricators certified “as built” drawing with description of equipment (with reproducible)
 - f) Monthly inspection reports by Inspection Agency.
 - g) Test certificates for the purpose of storage license from Explosives Department.

8.5 Additional documents to be submitted by the contractor interalia shall comprise

- a) Fabrication's certificates for spheres
- b) Sketch of the vessel on which the plates used are identified by their test and heat number.
- c) Materials test and analysis certificate at workshop, from the mill as well as contractor's workshop during fabrication as required by the Inspectors and the owner/consultant at no extra cost.
- d) Welding procedure qualification report.
- e) Welder's qualification report.
- f) Heat treatment diagrams, if heat treatment is required and radiographic results with films in duplicate.
- g) Owner/Inspectors and or any agency designated by the owner shall be informed at least two weeks in advance when heat treatment operation and radiography of welds, are schedules. Reports of these operations and their results shall be these operations and their results shall be certified by Owner and Inspectors.
- h) Ultrasonic test reports / X-ray as per code requirements
- i) Any other documents as required by the Owner at no extra cost.

9.6 All the above documents as required by the Owner at no extra cost.

10.0 FABRICATION

10.1 Plate Cutting, Forming & Assembly.

10.1.1 The contractor shall take all precautions to minimize plate damage/wastage during fabrication. Any such damage may be repaired only after prior approval from the inspectors.

10.1.2 Plates are to be cut to size and shape by machine flame cutting and / or machining. Where the plate thickness does not exceed 25mm cold shearing may be used provided that the sheared edge is cut back by machining or chipping for a distance of $\frac{1}{4}$ of plate thickness but in no case less than 3mm.

All the plates' edges after cutting and before carrying out further work upon them shall be machined or ground whenever necessary to remove the effect of previous shearing, chipping or flame cutting. When flame cutting is carried out the cut edges shall be ground to a distance of minimum 3mm.

10.1.3 All welding shall be done by metal arc process using a low hydrogen type of coated electrodes. Automatic welding process

may be only be used with prior approval of the Inspectors. While welding the following requirements shall be met:-

- a) All surfaces to be welded are to be thoroughly cleaned of scale, rust, oil or other foreign matter down to clean surface for a distance of at least 12.5 mm from the welding edge.
- b) All shell welds shall be butt welds with full penetration and minimum of double inside and outside heads. Single pass welds are not permitted. Undercutting, overlapping at the at the toe, or a bad profile shall be avoided while welding the metal at the bottom of the first side is to be removed by grinding, chipping, machining or other approved methods so as to provide clean sound metal on which to deposit the subsequent welds.
- c) Each run to weld metal is to be thoroughly cleaned and all slag removed before the next run is deposited.
- d) After welding has been stopped for any reason, care is to be taken in restarting to ensure that the previously deposited weld metal is thoroughly clean and free from slag, and that there is proper penetration into the plates and the previously deposited weld metal.
- e) Fillet welds are to be made to ensure proper fusion and penetration of the weld at the root of the fillet.
- f) Pre heating is to be done wherever necessary

10.1.4 As the tensile strength and notch ductility of a weld deposit depends, to a great extent, upon the technique used, it is essential that the procedure employed in conducting welding procedure tests is duplicated during production welding. Not only must the current and voltage settings be the same, but also the manipulation techniques, i.e. heads laying waving and speed of travel.

10.1.5 Care shall be taken that electrodes are stuck either in the weld groove or on a dummy material outside the proper material to be welded. I necessary, areas liable to receive are strikes shall be masked to prevent this. If any are strikes nevertheless occur, the same shall be ground and subjected to dye penetrate/magnetic particle inspection for detection of cracks.

10.1.6 No Welding shall be done after final treatment.

10.1.7 The qualifications of welding procedures, welders and welding operators shall be carried out as per the rules specified in BS 5500 Code (latest edition).

10.1.8 Welding procedure shall be submitted for approval of Inspectors. It shall include but not limited to a description of the following:

- a) Nature of the base metal
- b) Definition of proposed welding methods
- c) Nature of filler material(indicating the mechanical and chemical properties of electrodes, flux etc.)
- d) Preparation of plate edges (Bevel angle, root flat face, spacing).
- e) Sequence of welding of plates to avoid differential thermal stress and distortion
- f) Order of execution of passes, weld rod diameter, voltage and amperage to be used, type of welding unit.
- g) Welding with or without moving the work piece.
- h) Description of proposed inspection methods.
- i) Conditions for radiography examinations.

10.2 Base metal welding procedure qualification and welders' performance qualifications.

10.2.1 Tests shall be for welding procedure and welders' performance qualification tests shall be of same material and thickness as vessel base metal and be in the same heat treated conditions. The test plates shall be tested in accordance with the application code as well as with the requirements of this specification code as well with the requirements of this specification. The contractor will arrange required number of test pieces and get the tests conducted as directed by the inspectors for the welding procedure and welder' performance qualifications. All costs shall be borne by the contractor.

10.2.2 Physical properties, i.e. ultimate tensile strength yield strength, elongation and impact test value deposited automatic and manual weld metal shall not be less than the guaranteed physical properties of the base metal. All tests are to be made on specimens removed from the test plates which has received all post weld heat treatment envisaged for the vessel parts and completed vessel. Impact of tests shall be carried out for all qualifications irrespective of the operating conditions of the sphere. Impact test shall be executed with the notch in the center of the weld. The notches shall perpendicular to the plate surface. The minimum result obtained from the impact will not be less than that for base metal at the minimum tests temperature specified in ASTM A 20.

10.2.3 Welding and Radiographic Inspection

10.2.4 Welds shall be radiographed as per requirement of code.

10.2.5 Destructive tests are not permitted.

10.2.6 Name and category of each welder having participated in welding operations shall be mentioned in the fabrication report. All welds shall be highly stamped by round bottom tools with welder's identification stamps on the outside surface about 15 mm from the edges of the welds.

10.2.7 Welds radiographs, any repairs to welds deemed unacceptable by the inspecting agency and any radiography which may be required after repairing shall be carried out by the contractor at his own expenses.

10.2.8 Radiographs of welds shall be taken as soon as the items are welded. If repairs are required, they shall be carried out by the contractor at his own expenses.

10.2.9 Radiographic results will be interpreted on the basis of design code.

10.3 Fabrication Tolerances.

All tolerances shall be in accordance with the requirements of the applicable design code, except as modified below:-

10.3.1 Tolerances for out-roundness for shell be in accordance with code requirements.

10.3.2 Misalignment measure at the surface of the shell plates before welding shall not exceed 5% of the plate thickness + 1mm and shall be limited to maximum of 3 mm

10.3.3 Over all tolerances shall be as per code requirement. Wherever there is a variation in the specifications covered herein and BS 5500 code, then the contractors shall follow the more stringent specification.

11.0 PRODUCTION TESTS AND NON-DESTRUCTIVE TESTING

11.1 Mechanical testing of material and welds.

Plate material properties shall be checked after forming of vessel component to ensure the following mechanical properties and grain size. These procedure tests shall be conducted once for each batch of plates bearing the same heat mark and for each thickness.

- 1) U.T.S
- 2) Minimum Yield Strength
- 3) Elongation
- 4) Impact test Value

11.2 Radiographic Examination

11.2.1 All finished welds shall be radiographed as specific on respective data sheets before final heat treatment

11.2.2 Radiographic examination shall be in accordance with BS 5500 code, latest edition.

11.2.3 Fine grain, high definition, high contrast film (Kodak type A or type M or equivalent hands and types) shall be used in conjunction with lead screens. Double film technique shall be used, and each film shall have a density within the range of 2.0 to 2.5.

11.2.4 Ultrasonic Examination

Any nozzle or attachment welds which cannot be properly radiographed shall be subjected to ultrasonic examination.

12.0 POST WELD HEAT TREATMENT

12.1 Horton spheres fabricated shall be subjected to post weld heat treatment in accordance with the relevant code requirements.

12.2 Procedure for heat treatment shall be prepared furnishing details of rate of temperature rise /drop during heating and cycles, and time provided for soaking and submitted for the approval of the owner /inspector.

12.3 During heat treatment, care shall be taken to avoid excessive oxidation of the surface of the vessel and during heating utmost care shall be taken to have uniform temperature throughout the portion of vessel and variation shall not exceed beyond the limits specified by the code.

12.4 When vessel is subjected to post weld heat treatment part by part sufficient overlap shall be considered as specified and meeting the code requirements.

12.5 No further welding and other major fabrication work shall be carried out once a vessel is subjected and approved after heat treatment.

13.0 HYDROSTATIC TESTING

13.1 Spheres shall be hydrostatically tested in accordance with BS 5500 codes

13.2 The metal temperature during hydraulic testing shall not exceed 55 c.

13.3 All hydrostatic tests shall be made in the presence of owner/inspectors and with his approval. The test certificate shall be submitted to owner and inspectors for their records and duly certified inspectors.

13.4 No preliminary hydrostatic test, regardless of pressure shall be made on any vessel or part thereof prior to any required stress relieving operation.

13.5 Prior to final inspection and hydrostatic testing, the inside and outside of the spheres shall be thoroughly cleaned and shall be free of all slag, dirt, scale, weld spatter, piece of metal, paint oil, etc.

13.6 The set of gaskets and bolts and nuts used for blanking off nozzles and manholes during hydrostatic testing will be replaced with new sets.

13.7 All the materials including the blind flanges, gaskets, bolting nipples, plugs and all other items required during hydrostatic testing shall be arranged by the contractor, at his own cost.

14.0 FINAL PAINTING

After successful hydrostatic testing and approval by inspectors primer coating and final painting will be done as per specification enclosed.

15.0 MARKING

Marking on pressure vessels – Every vessel shall have a metal plate permanently fixed to it showing the following particulars which shall be visible from the ground level namely:

15.1 Manufacturers name and identification mark.

15.2 The standard or code to which the vessel is constructed.

15.3 Official stamp of the Inspector.

15.4 Design pressure in Kg/cm²

15.5 Date of initial hydrostatic test and the subsequent test.

15.6 Hydrostatic test pressure in Kg/cm²

15.7 Water Capacity in litres.

15.8 Gas capacity if filled with gas in metric tones.

15.9 Name of chemical symbol of the gas for which the vessel is to be used.

15.10 Owner's emblem and logo

SCOPE OF SOIL INVESTIGATION AND FOUNDATION

1.0 SOIL INVESTIGATION

1.1 The successful tenderer shall carryout the soil test as per the relevant code to determine the bearing capacity of soil for designing of the foundation. The test shall be carried out by a recognized institution in the presence of the third party inspection agency and the representative of the owner and the test results will be submitted to Owner after due certification by TPIA.

2.0 FOUNDATION

- 2.1** The scope of providing RCC Foundations includes design, preparing detailed drawings and providing RCC Foundation including excavation of soil, removal of surplus earth etc. as required for erection of the sphere. The design, drawing should have the approval from TPIA and also from Owner /Owners designated consultant before it is taken up for construction.
- 2.2** The tentative soil bearing capacities of the locations where the spheres are proposed to be set up shall be given with LOI. This data can be considered for quoting purpose only and will not be taken for designing of the foundation. The successful tenderer shall give separately details of the items and quantity of each item involved in the design and construction of foundation based on which he has quoted the prices for civil foundation work (i.e. break – up of prices for item No. 1 of price schedule.)

SUB SECTION – C

PAINTING WORK AND SPECIFICATIONS

1.0 SCOPE OFWORK

The scope of work involved would be in general as follows:

- 1.1 Surface preparation where required and painting of
- a) LPG Spheres (Exterior surfaces)
 - b) All the structures, equipment supports, platforms, ladders, hand rails, monorails structure etc.
 - c) Owner’s emblem and logo on the sphere.
- 1.2 Supply of all primers, paints and all other materials required for painting.
- 1.3 Besides the labour and supervision required for painting, the contractor shall also be responsible for providing the following :
- a) All types of equipment, tools and tackles necessary to perform the work in a workman-like and efficient manner and to complete the work as per time schedule.
 - b) All scaffolding required for carrying out the work.
 - c) Supply of all materials and consumables required for performing the work.
 - d) Storage of paints, consumables and all the equipment and materials brought to the site.
 - e) Special protection, if any, required for performing work during adverse weather conditions as well as for avoiding deterioration/damage of the coated surfaces until dry and ready to use, protection of surrounding equipment structures etc during the course of work and any other precautions as may be directed by the Site-In-Charge.

- f) Cleaning up the working area regularly during the course of work for the purpose of good housekeeping as well as cleaning up site on completion of works as directed by Site-In-Charge.

1.4 Painting of the emblem, logo as per specifications to be given by Engineer-In-Charge.

2.0 INSPECTION AND TESTING

2.1 The contractor shall ensure perfectness of work at each of the following stages of work before proceeding further. The Owner/Site In-Charge/Inspector at their discretion, may inspect the work at any time and any stage of the progress, given below:

- a) Surface preparation for painting
- b) Primer application
- c) Each coat of paint

Any defect noticed during the various stages of inspection shall be made good by the CONTRACTOR to the entire satisfaction of the Site-In-Charge before proceeding further. Irrespective of the inspection, repair and approval of intermediate stages of work, Contractor shall be responsible for making good of the defects found during final inspection.

2.2 The contractor shall provide for the purpose of Personnel and any other necessary items at his cost.

3.0 SPECIFICATIONS

3.1 This specification covers the materials, tools, facilities and quality requirement for the surface preparation and painting work. The items to be painted include LPG spheres, all steel work, supports, platforms, ladders, hand-rails, monorails, etc and making on the spheres.

3.2 Painting shall provide a continuous adherent film on the surface being treated and protect it from attack by atmospheric and environmental corrosion. The work shall consist of preparation and application of primer and finish coats of paint as per specifications for paints given in Para 5 and 6.

4.0 CODES AND STANDARDS

All codes, standards and specifications referred herein are as under:

b) IS : 101	Methods for test for ready mixed paints and enamel.
c) IS : 1477	Code of practice for painting
d) IS : 2074	Specifications for ready mixed paints, red

	oxide zinc chromate priming.
e) IS : 2932	Specifications for enamel synthetic exterior, type 1, a) undercoating b) finishing, colour as required.
f) IS : 3631	Ready mixed paint, exterior, general purposes.

MATERIALS FOR PAINTING WORK

- 4.1 Primers and paints shall conform to the specifications given by owner. Paints/Primers of make approved by Owner/Site-In-Charge shall only be used.
- 4.2 All paints and painting material shall be stored only in such rooms assigned for this purpose. All necessary precautions shall be taken to prevent fire. A sign board bearing the words “PAINT STORAGE – NO NAKED LIGHT” shall be clearly displayed outside.

5.0 SURFACE PREPARATION AND PAINTING

5.1 General

- 5.1.1 Any surface to be painted shall be dry and clean .It shall be free from rust, scale, sharp points, weld spatter, flux, dust greases, oil and other foreign materials before paint is applied. All steel surfaces shall free from all loose mill scale and rust. Where heat resistant paint is to be applied, any previously applied non-heat resistant type of paint/ premier should be completely removed.
- 5.1.2 Solvent cleaning shall be adopted only in extreme cases, with the approval of the Site-In-Charge.
- 5.1.3 Surface treatment shall not be done under humid conditions without appropriate precautions and prior approval of the Site-In-Charge.
- 5.1.4 All surface which show traces of oxidation after cleaning and before applying paint shall be cleaned again.
- 5.1.5 No sharp scratches or cuts shall be made on the surfaces during cleaning operations.
- 5.1.6 All paints shall be applied in accordance with manufacturer’s recommendations and this specification. The work shall generally follow IS: 1477 (Part II)
- 5.1.7 Paint shall generally be applied by brushing/spraying.
- 5.1.8 Paint shall generally not be applied when the ambient temperature is 5 °C and below. For paints which dry by chemical reaction, the temperature requirements specified by the manufacturer shall be met with. Paint shall not be applied in rain, wind, for or at R.H. of 80% or above or when the surface temperature is below dew point resulting in condensation of moisture. Any wet paint exposed to

damaging weather conditions shall be inspected after drying and damaged area repainted after removal of the paint.

- 5.1.9 Each coat of paint shall be continuous, free of pores and even thickness without thin spots. The film thickness shall not be so great as to affect detrimentally to either the appearance or the service life of the paint. Each coat of paint shall be allowed to dry sufficiently before application of the next coat to avoid damages as lifting or loss of adhesion, undercoats having gloss surfaces shall be roughened by mild sand papering to improve adhesion of subsequent coats.

5.2 Surface Preparation

The following surface preparation method shall be adopted.

A. Sand Basting

As per relevant codes and practices

B. Hand Cleaning

- i) Hand scaling and/or hammering
- ii) Hand scrapping
- iii) Hand wire brushing
- iv) Other systems with manual striking tools

- 5.2.1 The total sphere surface shall be cleaned by sand blasting prior to application of paint.

6. SURFACE PREPARATION AND PAINTING

- 6.1.1. Any surface to be painted shall be dry and clean. It shall be free from rust, scale, sharp points, weld spatter, flux, dust greases, oil and other foreign materials before paint is applied. All steel surface shall free from all loose mill scale and rust. Where heat resistant paint is to be applied, any previously applied non-heat resistant type of paint/premier should be completely removed.
- 6.1.2. Solvent cleaning shall be adopted only in extreme cases, with the approval of the Site-in-Charge.
- 6.1.3. Surface treatment shall not be done under humid conditions without appropriate precautions and prior approval of the Site-In-Charge.
- 6.1.1 All surface which show traces of oxidation after cleaning and before applying paint shall be cleaned again.
- 6.1.2 No sharp scratches or cuts shall be made on the surfaces during cleaning operations.

- 6.1.3 All paints shall be applied in accordance with manufacturer's recommendations and this specification. The work shall generally follow IS: 1477(Part II).
- 6.1.4 Paint shall generally be applied by brushing /spraying.
- 6.1.5 Paint shall generally be applied when the ambient temperature is 5c and below. For paints, which dry by chemical reaction, the temperature requirements specified by the manufacture shall be met with. Paint shall not be applied in rain, wind, for or at R.H. of 80% or above or when the surface temperature is below dew point resulting in condensation of moisture. Any wet paint exposed to damaging weather conditions shall be inspected after drying and damaged area repainted after removal of the paint.
- 6.1.6 Each coat of paint shall be continuous, free of pores and even thickness without thin spots. The film thickness shall not be so great as to affect detrimentally to either the appearance or the service life of the next coat avoid damages as lifting or loss of adhesion. Undercoats having gloss surfaces shall be roughened by mild sand papering to improve adhesion of subsequent coats.

6.2 SURFACE PREPARATION

The following surface preparation method shall be adopted.

6.2.1 A. SAND BLASTING

As per relevant codes and practices.

B HAND CLEANING

1. Hand scaling and /or hammering
2. Hand scrapping
3. Hand wires brushing
4. Other systems with manual striking tools.

6.2.2 The total sphere surface shall be cleaned by sand blasting prior to application of paint.

6.2.3 Wherever sand blasting is not possible the rust, mill scale and other foreign matter classified as loose, shall be removed by hammering, scaling or by any other hand striking tools or by a combination of the above methods. The impurities still left over after the above mentioned operation has been done, shall be removed by emery scrapping and steel wire brushing. As completion of the hand cleaning process dust and other impurities shall be removed from the surface by clean rags.

6.2.4 MECHANICAL / ELECTRICAL TOOL CLEANING

- a) Mechanical / Electrical tool cleaning is resorted to when large surface areas are involved. Mechanical / Electrical tool cleaning shall be done by mechanical striking tools, knurled grinding wheels, abrasive wheels or rotation steel wire, brushes.

- b) All the rust and mill scale left over even after hand cleaning shall be removed by rotating abrasive wheels of such size that it can clean the surface effectively. All weld spatters shall be removed. As a completion of the mechanical tool cleaning process impurities left over shall be removed by clean rags.
- c) Paints shall be applied in short strikes, depositing uniform amount of paint in each stroke followed by brushing the paint into all surface irregularities, crevices and corners and finally smoothing or leveling the paint with long and light strokes at about right angles to the first short strokes. All runs and sags shall be brushed out. The brush marks left in the applied paints shall be as low as practicable.

6.3 SPRAY APPLICATION

The spraying equipment shall be compatible with the paint material and provided with necessary gauges and controls. The equipment shall be cleaned of dirt, dried paint, foreign matter and solvent before used. The paint shall be applied by holding the gun perpendicular to the surface, at a suitable distance and moved in a pattern so as to ensure deposition of a uniform wet layer of paint. All runs and sags shall be brushed out immediately. Areas not accessible to spray shall be painted by brush.

7.0 FINAL PAINTING

Type of paints, primer and number of coats/thickness to be applied to various items are detailed in table II.

8.0 Obligations of Contractor

All the paints, primer, etc. shall be stored in air tight containers; Precautions shall be taken against any possible fire hazards. Contractor shall also be responsible for compliance with statutory regulations having purview over such storage's. The contractor shall take care that whenever a paint container is opened, the entire quantity is utilized for the day's work. The contractor shall not be allowed to bring to the site those containers of paints which are not sealed by the paint manufacturer of where manufacturer's seal is broken.

9.0 Marking on Equipment

On all equipment, identification marks and other details as specified in technical specifications shall be stenciled / written / painted by the contractor as part of the work is required by the owner. No separate payment will be made for such identification marks.

SCOPE OF INSPECTION BY AUTHORISED AGENCY APPOINTED BY CONTRACTOR FOR INSPECTION OF HORTON SPHERES.

We give below the list of items which will be covered under the scope of inspection by Inspection Agency and should inter-alia conduct the following.

A. MECHANICAL

1. Examination and approval of manufacturer's design calculations and fabrication drawings.
2. Approval of all welding procedures to be employed as well as witnessing welder's procedures and performance qualification tests.
3. Inspection and approval of welding electrodes and equipments.
4. Observe welders qualification tests and certify their qualifications.
5. Inspection of B.Q.Steel Plates at Contractor's works for assessing the suitability of the plates for the sphere fabrication and confirmation to specification.
6. Inspection of other materials, verification of their certificates and where necessary, attendance to tests on materials.
7. Checking of forming of petals, edge preparation and mock assemblies.
8. Approval of all weld set ups and back chipping.
9. Supervision and inspection during execution of work.
10. Inspection of radiography for the weld joints 100% before PWHT.
11. Selection / Inspection of weld joints (10%) for radiography after PWHT.
12. Examination of radiographs made by the fabricator and supervision of repairs wherever necessary.
13. Attendance to other non destructive tests such as hardness measurements, D.P.Check, MP, test and ultrasonic tests where specified.
14. Attendance to tests on weld coupon samples where necessary.
15. Dimensional check of components as well as the vessel and attachments of completion.
16. Approval of heat treatment procedures and verification of charts. Attendance and approval of hydrostatic tests.
17. Inspection of cleaning, painting and fire proof coating.

18. Final inspection, stamping and issue of certificates of completion as per BS 5500 Code (latest edition) requirements, and static and mobile pressure vessel (unfired) Rule 1981 of Government of India.
19. Inspection of complete procedure of painting including sand blasting, application of primer coats and final fireproof coating at various stages as per the requirement.
20. Inspection of any other item/tests not covered above but required as per inspection Agency/Design Code/Statutory requirement/Safety requirements shall also form part of this scope of work.
21. Inspection of any other item/tests not covered above but required as per inspection Agency/Design Code/Statutory requirement/Safety requirements shall also form part of this scope of work.
22. Copies of all approvals /certifications for above to be submitted to owner as directed.
23. Certification of calibration chart.

B. BOUGHT OUT

1. Witness and approval of forgings of various parts required for assembly of sphere at sub vendor's/vendors work.
2. Issue of fortnightly inspection reports to owner with required particulars.

C. ELECTRICAL

1. Certification of Electrical Work/instruments and connections including cables/joints/fittings, for confirmation to flame proof as per I.S 2148 group HA-HB and owners design specification/code requirements.

D. CIVIL FOUNDATION

1.0 The inspection procedure is enumerated taking into consideration the following:-

- a. The main contractor will ensure the performance of the sub contractors appointed by them for carrying but the soil testing, designing of foundation and construction of foundation in regard to the quality/technically and other requirements. The main contractor will be fully responsible for the job carried out by the sub contractor.
- b. The inspection agency will be advised by the fabricator about the soundness of supplies of the raw materials such as cement, steel, sand, aggregate etc. to ensure their quality conform to the code requirement. It is better that the above items except cement, it should

be directly purchased from the manufacturers. Before use, the quality of cement should be got checked.

- c. The responsibility of day to day supervision and quality control will lie with the main contractor and hence it is imperative that main contractor should appoint qualified and experienced personnel for the entire period of foundation work.
- d. The foundation casting process requires continuity when once started. Hence preplanning of the foundation work is a must, so that timely visits of the surveyors.
- e. A foundation consists of distinct parts. For example, in case of pile foundation they are the piles, pile cap and pedestal. Hence during the casting process unless the first part is satisfactory, accepted and cleared, the next part should not be cast unless permitted.
- f. If a cube strength is to represent the foundation, the number of cubes selected should adequately represent various portions of the same part and should be cast just before casting that portion. Considering the size of the foundation, and the time involved in casting, the number of cubes should be selected and that number need not be minimum as laid down in a specification.
- g. Many times, the testing of cubes at site may not be feasible due to non availability of testing facilities or personnel. Hence planning of the testing is required to be done in advance so as the inspection agency can make arrangements to witness the tests at right time.

2.0 SOIL TESTING AND FOUNDATION DESIGN:

2.1 Witnessing / certification of existing G.L and soil testing as per procedure.

2.2 Certification of soil testing results and release of the same for foundation design.

2.3 Certification of foundation design, as per codes.

2.4 Certification of foundation drawings for confirmation to design/Engineering procedures.

3.0 INSPECTION PROCEDURE FOR FOUNDATION CASTING

- 3.1 The drawing available at site should be checked for (a) seal of approval and (b) date of approval. The date of approval should normally indicate whether the drawing referred is the last revision approved. This should also be verified by reference to Head Office as early as possible. In addition, the availability of

adequate equipment like mixer, vibrator etc., quality of raw material should be checked before allowing the concreting job.

3.2 The position marked for drilling shall be checked with reference to the B M and relative positions of pile in a group. In addition to the above, the finished ground level and existing ground level should also be checked with respect to the indication made in the drawing. In case of any variation, the same shall be mark to check actual height of the foundation and the height of the pedestal above the finished ground level.

3.3 The reinforcement as placed shall be checked for diameter spacing and number. The length of the case is also required to be checked. In addition, check for alignment of the piles should be done.

3.4 The form structure is to be checked in case of raft foundation and pile caps and pedestals for dimensions and adequate supporting.

3.5 Number of cubes shall be decided as follows:-

Piles	: Two Pile
Pile cap	: Two Per Pile Cap
Pedestal	: No. of column divided by three

- (i) Same number of cubes should be selected for seven days test and twenty eight days test.
- (ii) In case of fraction use the next integer
- (iii) In no case the number of cubes shall be less that specified in applicable specification.
- (iv) Additional cubes may be cast for retests if required.

3.6 Cube shall be identified so that the test result can be correlated with that portion of the foundation. A record shall be kept indicating the identification mark and the date of casting.

3.7 Testing of cubes shall be witnessed except when they are tested by an independent and approved agency. In case of filler, additional cubes shall be tested at the time and all results shall be recorded including those failed.

3.8 Evaluation of seven days test results should be completed before permitting the casting of next stage. In case of failure, the foundation work should be stopped forthwith and investigation to be carried out for the reasons of such failures and corrective action should be proposed by the main contractor. This corrective action shall be studied and approved by inspection agency before proceeding with the work. The clearance for mechanical erection work should be given only if the satisfactory test results of 28 days are obtained of the ring beam. Tie beam, columns etc. Also maximum fifteen days during period should be given before commencing mechanical erection job.

- 3.9 After cutting period is over, the surface shall be examined Minor shrinkage cracks appearing on the surface shall be allowed for repairs after adequate surface preparation. Unacceptable surface defects believed to be deep, should be submitted by the main contractor to the inspection agency. Only after approved of such procedure require work should be undertaken.
- 3.10 Complete dimensional check should be undertaken with reference to approved drawings. Any deviations found are to be reported for necessary action. In no case the foundation should be covered before obtaining clearance from the inspection agency.
- 3.11 All reports of inspection, suggestion, if any, shall be maintained Copies of the same shall be forwarded/handed over to owner as under:
- On copy to the Site –In- Charge and one copy to this office.
 - Any additional copy for contractor may be obtained
- 3.12 In case of pile foundation, a load test shall be conducted on test pile before proceeding with actual foundation. This will determine the adequacy of design. After all the piles are cast, one pile at random will be selected and load tested to ensure good quality of concreting work. In case these test results fail. It would mean that the quality of concreting used during piling is not good quality and will be rejected.
- 3.13 After clearance of the foundation, the back filling should be started and completed. The final clearance note should be obtained after completing of the back filling portion .Back filling to be done up to finished G.L even by import of earth if required up to meter height from the existing ground level.
- 3.14 Inspection of grouting of foundation bolts and release of final release note.
- 3.15 Issue of release note for mechanical erection.

E. FIRE PROOF COATING

Inspection of fire proofing of support columns will be done in line with the code specification. The inspection will broadly cover the following aspects:

- (i) Preparation of the surface for application of fire proofing coating.
- (ii) Encarving 50 mm thick R.C.C on the support columns.

SUB SECTION D

SPECIFICATION FOR BOILER QUALITY STEEL PLATES CONFORMING TO ASTM-A-537 CLASS-I

NOTE: Tender shall consider 7.85 MT / Cu. M as the specific gravity of B.Q. Plates.

- (i) **Chemical Composition :**
- (ii) **Chemical Requirements**

Element	Percentage
Carbon Max	0.24

Over 38 mm thickness:

Heat analysis	1.00 – 1.60
Product analysis	0.91 – 1.72
Phosphorus, max.	0.035
Sulphur, max	0.040

Silicon :

Heat analysis	0.15 – 0.50
Product analysis	0.13 – 0.55

Small amount of alloying elements may be present but shall not exceed the following amount.

Copper	0.35
Nickel	0.25
Chromium	0.25
Molybdenum	0.08

*38mm and below 38 mm thickness (for Manganese content)

Heat analysis	0.70 – 1.35
Product analysis	0.61 -1.46

H. Physical Properties:-

Tensile Strength	70-0 – 90.0
Field Strength	50 KSI
Elongation in 50 mm min	20.0%
Elongation in 8 in or 200 mm min	18.0%

III. Impact Testing: As per ASTM A- 20

IV. Ultrasonic Testing: As per ASTM A- 435

V. Heat Treatment: Normalized

VI. The steel shall be made to fine grain practice

VII. Supplementary Requirement:

- a) The plates shall be free of scales and rolled in the direction of length specified and shall be supplied in the normalized condition. Accelerated cooling by liquid quenching or other means is not permitted.
- b) The plates shall supplied with gas/shared edges with tolerances as per SA 20 latest. Manual gas cutting is not acceptable.

Simulation post welds treatment test coupons shall be as follows:-

- a) All the plates shall be supplied in normalized condition.
- b) The test coupons cut from the normalized place are further simulation heat treated as per following cycles and they should meet the mechanical properties including impact. All the physical properties shall be as per specification and impacts specified.

Simulation post weld treatment test coupons shall be as follows:-

Conditions of Test Coupon:-

1. Renormalising and P.H.T (once) and
 2. Renormalising and P.H.T (Twice)
- Renormalising and P.W.H.T cycles:-

Loading Temperature	200 and under
Rate of Heating	200 per Hr. max
Holding Temperature	930 C min. 960 max
Soaking time	2 hrs
Cooling method	In still air

9. P.W.H.T

	1 st Sr. Loading Temp. 300C	2 nd Sr. Loading Temp. 300 C
Rate of Heating	80 to 100 C/Hr.	30 C/Hr from 300 C
Holding Temp.	610 +/- 10C	610 +/- 10C
Soaking Time	2 Hrs.	2 Hrs.
Rate of Cooling	100 to 120 C/hr	30 C/hr. Max upto 300 C
(furnace Cooling)	Upto 300 C	

The plates shall be free from injurious defects and shall have workman like finish. Reconditioning/repair of plates by welding is not permitted.

One product analysis of each heat shall be done as per ASTM a 435 on the entire surface of the plate with a square grid of 200 mm. U.S.T shall be done after heat treatment and results reported in the test certificates.

All plates shall be charpy “V” Notch impact tested as per SA 20 latest. The energy value shall be 40 Joules average minimum of 3 specimens and the test temp. – 30 C

Marking – As per specification. Additionally purchase order No. Shall be stenciled and inspector symbol shall be die stamped.

VIII. Other Requirement

1. Test should be carried out in the presence of Lloyds Register’s be certified and Stamped on each plate.

2. Marketing: The plates shall be marked with the No. of American Standard and / Approximate Grade No.

10. Test Certificates – The Material shall be duly certified by Lloyds and furnished with manufactures’ test certificates, covering details given below:

- a. Heat and plate Number
- b. Chemical composition cast and product analysis
- c. Heat treatment cycles.
- d. Mechanical properties viz, Tensile, yield, Elongation Impact
- e. Ultrasonic test results.
- f. Results of simulation P.W.H.T of mechanical test coupons in two conditions in addition to the test results in as supplied condition of plates.

SECTION D PRICE SCHEDULE

SCHEDULE OF PRICES

Note

1. The schedule of prices should be quoted in the forms prescribed in the Appendix – I to VI separately.
2. The schedule of prices should be read with all other section of this tender.
3. The Tender shall be deemed to have studied the specifications and details of work to be done within the time schedule attached and have acquired himself of the conditions prevailing at site.
11. The Owner reserves the right to cancel the order for whole/part of work or split the work between two or more contractors, if necessary.
12. The work mentioned in schedule of prices and covered by this contract shall be carried out as per the drawings, specifications and direction of Owner/Site-In-charge and shall include all labour, materials, tools, tackles and plants, testing with contractor's appliances., etc., required to complete the work in all respects and handing over the work to owner.
13. The tenderer shall fill up requirement of B.Q Steel plates.
14. The Owner will award the work to contractor with Alternative I (item No. 3 of Price schedule) i.e total quantity of B.Q Plates to be supplied as free issue by Contractor. The Owner may also award the work with the appropriate combination of Alternative I & II (Item No. 3 of price schedule) based on the availability of B.Q Plates with Owner. In such case, the unit rate indicated by the Contractor (Item No. 3A, i,ii, B, i,ii) will form the basic for computing the total cost.
15. The tenderer should indicate separately the Excise duty and Octroi charges if applicable, at present rate. However, this will be reimbursed at actual at the prevailing rate on production of documentary evidence only.
16. If applicable, present rates of excise duty/sales tax shall be indicated by the contractor.
17. The insurance charges quoted by the contractor should cover transit as well as erection risk for sphere/allied accessories and the same shall be included in the basic cost quoted.
18. This being the fabrication contract, no turnover/work contract will be applicable. In case contractor considers that this tax will be applicable, he may give sufficient reasons along with the present rate of tax.
19. This is a lump sum contract. However, the break-up of the prices asked for in Schedules I to VII are for evaluation purpose and effecting the payment as per terms given elsewhere.

PRICE SCHEUDLE**2 Nos. 18 m dia sphere for LPG**

Sr.No	Decription	Unit Rate	Amount
1.	CIVIL WORK Charges for soil investigation, design and construction of foundation of sphere inclusive of necessary inspection by TPIA (Details of price breakup for all the items involved to be given separately)		
2	FABRICATION & ERECTION Charges for design, engineering, transportation of petals/plates from contractors works to site, fabrication, erection of spheres including monorail top platform, staircase, testing, fire proofing of support, columns sand blasting, painting, mounting and fixing the nozzles, completing all the works in all respects as indicated in "scope of work" including supply of all the materials and fire screen/heat shielding. Freight, transportation, obtaining CCOE approval for fabrication/erection etc and guarantee the performance of Horton Sphere for LPG storage. The above is inclusive of necessary inspection of TPIA		
3	<u>SUPPLY OF BQ PLATES</u> A. ALTERNATIVE 1- SUPPLY OF BQ PLATES FREE OF COST BY OWNER		
		MT/Unit	Total
	i)MT (Total qty. will be as per the total requirement to BQ plates quoted by contractor)		
	ii) Rebate on account of keeping scrap wastage from BQ Plate. Tenderer to indicate total wastage/scrap to be generated. MT Rate offered for keeping wastage/scrap Rs. Per MT		

Sr.No	Description	Unit Rate	Amount
B	ALTERNATIVE II- SUPPLY OF BQ PLATE BY CONTRACTOR		
i)	Cost of BQ Plate (i.e landed cost of BQ Plates at Contractor's work inclusive of all taxes, custom duties and other Government levies)@ Rs ----- per MT. Total Qty to be supplied -----MT. (Total Qty will be as per the total requirement of BQ plates quoted by Contractor		
ii)	Rebate on account of keeping scrap/wastage from BQ Plate. Tender to indicate total wastage/scrap to be generated ----- MT Rate offered per MT		
	Total		
	Rupees		

NAME OF WORK : FABRICATION OF LPG HORTON SPHERES

NAME OF TENDERER :

SUMMARY OF TENDERER'S PRICES

<u>1</u>	Total Price indicated in the Schedule	In fig.) Rs:
		(in Words) Rupees
<u>2</u>	Rebate Offered (if any) On Total Contract Value	(In fig) Rs.
		(in Words) Rupees
<u>3</u>	Total Prices applying Rebate (if any)	(In fig) Rs.
		(in Words) Rupees

The amount involving the foreign exchange : Rs _____

The foreign exchange rate considered at time of tender : Rs _____ per _____

(SIGNATURE OF TENDERER)

**ESTIMATED QUANTITY AND UNIT RATE
FOR CIVIL WORK
PIPAVAV SITE**

(For I (One) Sphere)

S.No	Description	Qty	Unit	Unit Rate (Rs)	Amount
1	Soil Investigation, Soil Testing				
2	Excavation				
3	Boring for Piles				
4	PCC 1:3:6				
5	PCC 1:4:8				
6	M20 Concrete for piles				
7	M20 Concrete for pile cap & Pedestal				
8	Tor steel reinforcement				
9	Shuttering				
10	Plastering in Pedestals				
11	Pockets for Anchor Bolts				
12	Grounding of pockets				
13	Back filling				
14	Staircase foundation				
15	Test for piles				
16	Fire Proofing of Columns				

TOTAL FOR CIVIL WORKS FOR ONE SPHERE

SECTION E

GA DRAWING/DATA SHEET

TENTATIVE SOIL PROPERTIES AT THE LOCATION

PIPAVAV

STRATA. NO	DESCRIPTION OF LAYER	DEPTH
I	Murrum	0.5m
2	Sandy Clay	5-10 m
3	Shift Clay	10-18 m
4	Soft Rock	18-21 m
5	Hard Rock	> 21 m

NOZZLE SCHEDULE FOR 18 M DIA (1350 MT) LPG RATED HORTON SPHERES

QTY	Size	Rating LBS	Type	Sch/Thk	Service
1	300	ANSI B 16.5 300 LB	WNRF	Vendor to Furnish	INLET/OUTLET
1	150/200	“	“	“	VAPOUR RETURN WITH DIP PIPE
1	150/200	“	“	“	VAPOUR OUTLET
1	150	“	“	“	RELIEF VALUE
2	50	“	“	“	DEEP PRESSURE NOZZLE
1	50	“	“	“	DP TRANSMITOR (LP)
1	50	“	“	“	PRESSURE GAUGE
1	100	“	“	“	HIGH LEVEL ALRM
1	150	“	“	“	LEVEL GUAGE WITH DIP PIPE
1	80	“	“	“	DP TRANSMITTER (HP)
1	40	“	“	“	TEMPERATURE INDICATOR
1	500	“	“	“	MAN HOLE WITH COVER

TYPICAL DESIGN DATA FOR 18 Mtr. Dia. LPG SPHERE

1	Design/Fabrication Code	BS 5500 class-I category; latest amendments
2	Design Pressure	Internal-15.47 KG/Cm ² g at top and 16.37 Kg/Cm ² g at bottom
3	Design Temperature	55 ⁰ C (max) and -6 ⁰ C (min)
4	Operating Pressure	Internal-2 Kg/Cm ² g TO 14 Kg/Cm ² g
5	Operating Temperature	AMB
6	Test Pressure Hydro	20.2 Kg/ Cm ² g at top
7	Type of Vessel	Sphere
8	Corrosion Allowance	1.5 mm
9	Joint Efficiency	1.0
10	Radiography	Full
11	Process Fluid	LPG
12	Post Weld Heat Treatment	At Site complete sphere to be stress relieved
13	SP Gravity	0.5 at 55°C
14	Capacity	3000 CUM Water Capacity
15	Wind Pressure	IS:875
16	Weight (approx)	Erection-500 Tons (Earth Quake specification IS:1893. Test (hydro) 3600 Tons, Operating 2200 Tons
17	Inspection	By Lloyds
18	Fire Proofing	YES Column Only. Column – 50 mm
19	Welding SA 537-CL 1 to SA537 CL 1 or SA 333 Gr.6 Or SA 350 Gr.LF2 IS 226 to IS 2062 (for columns/Structural	Shielded metal Arc Welding-AWS-A 5.5 Class E-7018, Gas, Tungston Arc., Welding-Filler Wire, AWS-A-3-18-CLER705 for root pass only AWS-A5-I Class E6013/E7016/E7018
20	All welding surface to be thoroughly cleaned off scale, Rust Oil or foreign bodies before welding	
21	All external welds to be left ungrounded but in decaled condition.	
22	All welds accessible from second side shall be chipped/ground back to sound metal before welding from second side	
23	Wherever back chipping is not possible root run to be carried out by tig welding	
24	All bolt holes should straddle to normal vessel center line	
25	Orientation view decides the correct position of all the nozzles connection and fittings	
26	Earthing boss not to be galvanized or to be painted	
27	Bill of material shows finished sizes, necessary machining allowance to be added as per shop practice	
28	Reinforcing pad to be tested pneumatically to 1.5 kg/cm ² g.	
29	The gasket seating surface should have 125 RMS finish	
30	All sharp corners inside the sphere of any part shall be rounded off	
31	Tolerance on root gap & toe of weld shall be 0.5 mm and on angle +/0.5 ⁰ unless otherwise specified	

32	All nozzle connections shall be flush with the inside of the sphere unless otherwise indicated in the drawing inside edges shall be rounded off	
33	Nozzle neck fabricated from plate shall be fully radiographed	
34	Erection shall be done in such a manner that the load is equally distributed on all the columns	
35	Spiral wound stainless steel (AISI 304) asbestos filled gaskets with guide rings will be used	
36	Tolerances on vertically of column +/-15mm	
37	The difference between maximum and minimum inside diameter at any cross section shall not exceed 40 mm	
38	Variation in projection of top and bottom nozzle for sphere surface shall not exceed +/-6 mm. D.P. test shall be conducted in following cases a) At root of fillet weld & after completion of fillet welds b) Places where temporary. Supports had been welded c) All main but weld joint and nozzle connection on out side surface. d) All Welding of are striking	
39	All circumferential (longitudinal weld seams of supporting columns shall be dip checked for detection of Cracks)	
40	All Flange faces shall be suitably protected against oxidation during stress relieving of sphere	
41	Stress relieved cycle a) Holding temp – 600° C + - 20°C b) Soaking Time – 1 hour 45 minutes c) Heating rate – 100°C/hr (max) above 300°C d) Cooling rate- 100°C/hr up to 400°C e) Cooling below- 400°C – Still air	
42	Sphere internal surfaces shall be cleaned by wire brushing	
43	After Hydrostatic testing all water shall be removed and vessel dried out completely	
	The total sphere outside surface shall be cleaned by sand blasting prior to application of paint	
	All C.S. external surfaces to be painted with two coats of red oxide zinc chromate primer as per IS-2074. Paint will be applied only at site after post weld heat treatment and hydro test	
	Final painting will be done with two coat of synthetic enamel (100 microns) white paint (snow white paints)	
	Safety relief valve: Calculations of the sizing of safety relief valve to be approved by TPIA and in any case the orifice area should not be less than 16 sq. inch for the first and second valves	
	Top & Bottom Crown	SA-537-CL.1
	Petals for top & Bottom Polar	SA-537-CL.1
	Equator petals	SA-537-CL.1
	Sliding Plate	IS: 226
	Support pad	SA-537-CL.1
	Pad plate product pipeline supports	SA-537-CL.1

SECTION F

SAFETY REQUIREMENTS

SUMMARY OF SAFETY REQUIREMENTS

CLIENT : AEGIS GAS (LPG) PVT LTD

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1.0 GENERAL

1.1 OBJECTIVE

The Objective of the document is to provide and establish a construction Site Safety Management system at the LOBP and AGPL's construction site.

This "Summarised Safety Requirement" shall be employed on the Site and shall be obligatory on the Contractor

Depending upon the location of the Site, it is likely that some discrepancies will arise between the requirements of this "Summarized Safety Requirement" and the laws governing safety at work in the country. In such an event, the more stringent regulation shall be followed by the Contractor at all times.

1.2 DEFINITIONS

In this "Summarised Safety Requirement" the following words and expressions are used and they have the respective meanings hereby assigned to them, except where the context otherwise requires:-

1. "OWNER" means Aegis Gas (LPG) Private Limited and includes its personnel representatives, its successors and permitted assignees.
2. "CONSULTANT" means an agency who is engaged by the Owner for the engineering services for the project, construction supervision and commissioning assistance works.
3. "CONTRACTOR" means the local construction Contractor(s) to be employed by the Owner for the construction/erection works of the plant or part thereof
4. "PLANT" means the plant(s) and associated facilities and installations, all of which shall be completed for the Owner.
5. 'SITE' means the place or places so designated by the Owner for the construction of the plant, including such places against thereto which are for storage and assembly of equipment and material.
6. "COUNTRY" means the country in which the plant is to be built.
7. "PSA" means the "Project Safety Advisor" who is responsible for the Health Safety & Environment of the Site as to the construction works performed at the Site and who shall be engaged in carry out and/or co-ordinate the required actions for the observance of Safety regulations, and cause other persons to observe the safety regulation.

2.0 HEALTH SAFETY ENVIRONMENT AT SITE

2.1 SAFETY-A LINE FUNCTION

The Health Safety & Environment at site is a line function and hence it is the responsibility of the concerned site supervisor or Foreman to ensure that any and all activities at all times shall be carried out as per the Safety norms.

Aegis recognizes “SAFETY” as a line function and not the responsibility of a Safety Officer. It is so important and involved to be left to one such individual. As such, the site safety committee is made up of line functionaries representing all parties engaged in the project including the Contractors, Consultants and the Owner’s representatives.

Exhibit A is a Sample of a “Safety Audit” form. This Safety Audit form, that shall be made available at site to all and shall be used to point out any unsafe method of work or any unsafe situation or condition existing at site. All persons at site or any person visiting the site shall extensively use the Safety Audit to ensure that no unsafe practice at site is allowed to carry on.

2.2 SAFETY TRAINING

An initiation training shall be given to all the Contractor’s personnel who enter the site for the first time to carry out a particular work. This initiation training shall be made in the form of a video presentation or short demonstrations or a combination of the two and shall last for approximately 40 minutes. At the end of such training, the individual shall become a **AGPL TRAINED WORKMAN**”

At times, short “how to do sessions called “Tool Box Meetings” shall take place at the local work area. This is to enable the concerned set of personnel to be aware of certain specific needs at that point in time.

Scientific training on specialized subjects/areas shall be provided to the Contractor’s personnel if found necessary

2.3 SAFETY MEETING

2.3.1 The Aegis system shall be followed for the site safety meetings. There shall be a daily site safety meeting. The meeting will be chaired by the Owner’s Project Manager or the Consultant’s Safety Advisor.

2.3.2 It is **MANDATORY** for the Contractor to attend the site safety meeting. The contractor shall be represented by the senior-most Site representative from their organization. The safety aspects followed by the Contractor at Site and the daily changing working environment at Site shall be discussed. The “Safety Audit” forms collected the day before, shall also be discussed.

2.3.3 The Contractor shall be responsible for maintaining and enhancing the Safety awareness of its personnel and sub-contractor’s personnel including its own safety

meetings (Tool Box Meeting) and participating in the other regular safety meetings.

2.3.4 The contractor will inform AGPL/Consultant's PSA about the time and place of safety meetings arranged by it.

2.3.5 Copies of minutes of the Contractor's safety meetings shall be sent to AGPL.

2.3.6 During such meetings, the safety requirements of the Site and the working environment, changing day to day shall be fully explained in order that all personnel are aware of the standards to be achieved and maintained.

3.0 SAFETY CONTROL

3.1 SAFETY WORKING PRACTICES

All personnel at Site shall strictly observe the safety working practices detailed in Exhibit "B" "Safety Working Practice"

3.2 SAFETY PATROL & REPORTING

The Consultant's PSA shall conduct routine safety patrols during which all the Contractor's PSA attend and at which observance of the safety procedures by the Contractors and their personnel shall be audited jointly by the Consultant's PSA and the Contractor's PSA.

The result of the weekly safety patrol shall be reported to the Site representative by the Contractor's PSA using the "Safety Patrol Check List"

In case of a violation of the Safety procedure being found out or any action that is required for betterment, the Consultant's PSA shall instruct, the remedial actions to the Contractor, using the form for "Safety Audit"

The Contractor shall take the remedial actions and report to the Consultant's PSA using the form for "Report of Remedial Action"

The Contractor's PSA shall prepare and submit a "Monthly Safety Report" to the Consultant's PSA

3.3 FIRST AID

First Aid is defined as the prompt treatment of injuries such as cuts or bruises. More serious injuries involving fractures or breakage to limbs, head injuries or other sever wounds should be treated by qualified and experienced medical personnel.

In the absence of any permanent medical facility at Site, the Owner and Contractors shall be responsible for establishing first aid facilities at Site and arranging emergency transports.

The Contractors shall establish their own first aid facilities at the site and arrange emergency transports, when required. The Contractor shall provide first aid boxes or similar containers like bags or cupboards that are designed to protect the contents from damp and dust. The boxes and containers should be clearly identified as first aid containers and kept in easily accessible places which should be made known to every employee of that location. Sufficient quantities of each medicine should always be available in every first aid box or container and should be replaced as necessary. Contents should be checked regularly for expiry dates. A list of items to be provided (but not limited to) in the first aid box is given in exhibit D.

The Consultant and Contractor shall train personnel to take or deploy personnel who is able to take the first aid treatment for

- heat exhaustion
- burns
- wound and bleeding
- bone fracture
- and who is capable to do
- artificial respiration
- oxygen feeding

3.4 ENTRY INTO CONFINED SPACES

The terms “confined space” is defined as any place with restricted access and entries which does not provide adequate natural or artificial ventilation.

The main risks associated with confined space come from toxic and/or flammable gases, fumes and vapours, or oxygen deficiency.

Before any person may enter into confined space oxygen check and explosive and/or toxic gas check must be carried out to determine the nature of the atmosphere within.

All personnel entering into confined spaces shall be trained in the use of fresh air type, static bottled-type, or self contained-type breathing apparatus, and shall be equipped with a life-line to standby personnel outside.

In the event of an emergency developing anywhere on the work site, all personnel shall immediately evacuate from the confined space.

3.5 RADIOGRAPHY

Protection against Radiography in construction works must be properly controlled and Contractor shall employ the personnel of a required number, duly qualified for the works and shall follow the Health Safety & Environment manual procedures.

3.6 WORK PERMIT SYSTEM

- 3.6.1 The Work permit is a written document authorizing persons to carry out the work concerned, warning them of the possible changes and spelling out precautions needed if the job is to be done safely. The Work permit itself

does not make the job safe. This can only be achieved by those doing the job. The work permit is given for three months at an instance.

3.6.2 The contractor shall be fully aware of the details of the work permit system as laid down by AGPL. Exhibit "E" shows a work permit form that is to be renewed daily the Contractor for the safe execution of work by his personnel.

3.6.3 Unless AGPL expressly states otherwise, the Contractor shall obtain a Work Permit signed by AGPL's authorized representative before any work is started. The work permit shall be accompanied by associated permits, such as a hot work permit or permits for specific work and shall define the conditions under which the work is to be carried out.

3.7 A Hot work Permit shall be obtained for any work involving the

- Use of fire
- Naked lights, spark-producing tools and instruments or other potential sources of ignition like welding arcs, combustion engines, torches, matches, lighters etc.
- Drilling, cutting, chipping or wrenching with power tools
- Soldering
- Operation of grinding or burnishing tools and nylon cutting discs
- Melting asphalt, lagging or electrical insulating compounds
- Operation of annealing equipment
- Grit blasting
- Use of light oils for cleaning or testing in areas containing sources of ignition
- Hot-tapping of process lines
- Burning of waste materials
- Operation of diesel or gasoline engines in areas where flammable gases or vapour may be present

3.6.5 In addition, certain specific and particularly hazardous works are controlled by a special hazard permit system. Some special hazards include

- Radiographic inspection
- Chemical handling
- Entry into a confined space
- Height work

3.6.6 it is essential that the Contractor personnel read, understand and sign to that effect and carry out any conditions or precautions laid down in work permits. If any doubts exists, guidance from the AGPL Company representative/Consultant's shall be obtained.

3.7 SITE TRAFFIC REGULATION

The security personnel at Site shall stipulate Site traffic regulation and ensure observance of the regulation by all personnel.

No oil leaks from in-coming vehicles shall be allowed at site. Oil leak observed on an approaching vehicle to the site will not be allowed to enter the site on any account.

In case of an accident of a vehicle either at the Site or outside, the AGPL Security personnel shall report the detail to the Owner in the format attached in Exhibit 'C'. Guidance for remedial action can be taken from Consultant's PSA, if necessary.

3.8 CONDUCT OF CONTRACTOR'S PERSONNEL

The Contractor shall instruct his personnel to comply with the following:

- 3.8.1 No one shall enter any part of the AGPL premises including the work site other than the purpose of carrying out the work. All Contractor personnel needing access will be required to obtain a pass issued by AGPL and produced it, if required.
- 3.8.2 Smoking in the AGPL premises is strictly forbidden except in the authorized smoking rooms or other designated areas. Anybody found smoking outside the authorized smoking rooms or designated areas will be immediately removed from AGPL's premises by security personnel of AGPL.
- 3.8.3 No fire or naked light, matches, cigarette lighters or any apparatus which can cause ignition, shall be taken onto AGPL premises or elsewhere, as instructed by AGPL unless covered by a Hot Work Permit.
- 3.8.4 Personnel protective equipment shall be used and worn in accordance with the safety regulations. Exhibit 'F' gives a personal protective equipment checklist. The Contractor shall ensure that his personnel are properly and sufficiently equipped. However, hard hats and boots are mandatory for all workmen at all times while at site. Gloves and protective equipment shall be provided as deemed necessary by Owner and the Consultant.
- 3.8.5 During execution, if the Owner or Consultant's PSA feels that Contractor's personnel are not adequately protected and are a potential safety hazard, the work can be stopped immediately. Any delay that is caused due to this shall be considered as a delay caused by the Contractor and the Contractor shall suitably compensate for the same.
- 3.8.6 It is essential that good housekeeping is maintained throughout the period of any work, both at the work site area and in and around any temporary building. The working area shall be kept tidy at all times. Escape and other access ways kept clear, safety equipment kept accessible and surplus/scrap material removed daily. Cleaning up only at the end of a job is not considered sufficient. Spillages of oils or chemicals shall be cleared up immediately in view of the hazards from fire, slippery surfaces, toxic substances and environmental hazard etc. Appropriate safety precautions shall be taken during the clearing up.
- 3.8.7 The contractor shall ensure that at any time during the performance of the work,

his personnel are neither under the influence of nor partake of any alcoholic liquor drug or other intoxicating substance, other than bonafide medical reasons or other proper reasons which must first be approved by AGPL.

4 RESPONSIBILITY

4.1 RESPONSIBILITY OF THE CONTRACTOR

4.1.1 The Contractor is responsible for the Safety of his employees and those of his sub-contractors and for the implementation of the Owner's safety requirements in the execution of the Contract. While providing the initiation training to the Contractor's personnel, a minimum requirement for the Contractor personnel will be the familiarization with existing rules and regulations and the hazards of their work environment including:

- Smoking limitations
- Work permit procedures
- General hygiene and Sanitation codes to be followed at site
- Traffic and parking regulations
- Restrictions to the use of drugs and alcohol
- Limitations on places for eating and drinking.
- Housekeeping standards
- Prohibition of the use of solvents, chemicals and oil products for any purpose unless specifically authorized.
- Dangers and handling procedures for any noxious or hazardous substances.
- Hazards of excavation operation e.g damaging underground cabling or piping.
- Use of Safety equipment such as personal protective equipment, fire extinguishers and life saving devices.
- Meaning of and required action upon fire and gas alarms.
- Action in the event of discovering fire or loss of containment.
- Action in the event of an accident.

4.1.2 The Contractor shall in the execution of the work be fully responsible for compliance with

- a) Relevant local, national international laws and regulations.
- b) The AGPL company's regulations.
- c) Local, national standards or codes of practice, whichever are more stringent unless specified otherwise.
- d) International standards or codes of practice whichever is the more stringent unless otherwise specified.

4.1.3 The contractor shall appoint one of his personnel on the work site at its safety advisor and shall seek the Owner's approval for the individual so appointed.

- 4.1.4 The Contractor's Site-in-Charge shall be responsible for coordinating the Contractor's Safety activities.
- 4.1.5 The Contractor's shall at its own expense ensure that all its personnel and sub-contractor's personnel have been given the necessary safety, survival and job-related training required by law.
- 4.1.6 The Contractor's personnel shall participate in any additional training which may be provided by the Owner.
- 4.1.7 The Owner may refuse access to its work site by the Contractor's personnel who in its opinion, do not comply with the AGPL Company standards for safe and good workmanship owing to attitude, lack of skill or repeated violation of the Owner's rules.
- 4.1.8 The Contractor shall be responsible for the medical welfare of its won and sub-contractor personnel and shall provide for
- Facilities for administering first aid
 - Periodic medical examinations
 - Arrangements for professional medical treatment
 - Hospitalization
- 4.1.9 The Contractor shall ensure that all its personnel are medically fit to perform their work. If requested by AGPL, the Contractor shall provide health certificates for its own and sub-contractor's personnel.
- 4.1.10 The Contractor shall ensure that all his tools, tackles, and equipment are inspected by the Owner or the Consultant for Safety Compliance.

4.2 RESPONSIBILITY OF THE CONTRACTOR'S SAFETY ADVISOR

- 4.2.1 The Safety Advisor shall be responsible for educating the Contractor's personnel in safe working practices and to this end, shall constantly monitor such practices at the Site taking any and all remedial steps to eliminate hazards.
- 4.2.2 The contractor's Safety Advisor shall have received basic training in matters related to first aid.
- 4.2.3 Besides, the Contractor's Safety Advisor, all the supervisory personnel of every contractor shall also be required to ensure that works under their control are carried out in a safe manner (practice). Knowledge of safe working practices shall be considered a fundamental element of a supervisor's skills.
- 4.2.4 In case of an accident, the Safety Advisor shall investigate and report the same to the Consultant's PSA.

5 FIRE CONTROL

6.4 FIRE EXTINGUISHERS

The contractors shall provide for an adequate number of portable fire extinguishers at Site, where welding cutting, grinding operations are in progress. All extinguishers should be checked periodically to ensure that

- They are full
- Pressure is maintained
- Seal is unbroken
- Operating mechanism is in good order.

Every Contractor's PSA shall demonstrate and provide all the personnel with the training of using the fire extinguishers, if they need help of Consultant advisor and AGPL help can be taken.

6.5 SAFE STORING OF FLAMMABLE MATERIALS

Flammable materials, such as paint, chemicals etc., shall be stored under a safe condition, to prevent fire hazards.

The consultant's PSA and each Contractor's safety Advisor shall check the storing condition during the weekly safety patrol.

6 HOUSEKEEPING

The Site shall be kept clean and tidy at all times to prevent hazards, and improve general working conditions.

Rags, paper, wood shavings and other flammable materials shall not be scattered over and shall be collected and disposed of in sufficient frequency. Temporary electrical cables shall be so installed as not to cause a tripping hazard to personnel, nor be liable to mechanical damage by equipment. Cables joined by tapes are not permitted for power tools and welding sets. All Electrical tools shall be grounded.

Elevated cables shall be installed at such a height as to allow unrestricted movement of construction equipment and vehicles.

Particular emphasis shall be placed on maintaining platforms, scaffolding, stairways or other elevated places free of construction debris.

Equipment or materials stored at the Site shall not obstruct access to essential facilities and/or equipment, such as fire extinguishers, fire hydrants, valves, gauges, emergency exits etc.

Each Contractor shall be responsible for maintaining his work and temporary facilities areas tidy and workmanlike.

7.0 ASBETOS

It has been established as a policy to avoid Asbestos in any form at Site. Even covering of temporary sheds shall be done using aluminum sheets or GI Sheets. Asbestos shall be avoided at site totally.

AEGIS GAS (LPG) PRIVATE LIMITED

PROJECT : PIPAVAV SPHERES EXPANSION

EXHIBIT 'A'

SAFETY AUDIT FORM

ITEM NO	DESCRIPTION	UNSAFE CONDITION	UNSAFE ACT	WHO RESPONSIBLE (CONTRACTOR)	BY WHOM	BY WHEN	DATE DONE	REMARKS

EXHIBIT B

SAFETY WORKING PRACTICES

SAFE WORKING PRACTICE

This exhibit of the REQUIREMENTS details the safe working practices which shall govern all construction works undertaken through out the project.

1.0 PERSONAL PROTECTIVE EQUIPMENT

1.1 HEAD PROTECTION

All personnel shall be issued with safety helmets, which shall be used at all times that personnel are on the site.

Safety helmets shall be checked periodically for signs of wear, and in particular for cracks in the shell, and damage to hammock. Any evidence of such wear shall result in the helmet being discarded, and a replacement issued.

Helmets shall not be painted, as this may result in embrittlement of the shell.

1.2 HAND PROTECTION

Gloves shall be used by personnel involved in works for possibility of the following hazards:

- risk of abrasion
- risk of cutting
- risk of tearing
- risk of chemical, or other, burn
- risk of infection

the wearing of gloves should be avoided if possible, when works are being carried out on, or immediately next to rotating or moving equipment.

1.3 suitable safety footwear shall be worn by personnel, considering the nature of works and such hazards as :

- risk of crushing by heavy objects
- penetration by sharp objects
- penetration by chemicals or harmful liquids weld spatter.

1.4 HEARING PROTECTION

Hearing protection shall be worn by personnel involved in works in areas of high noise levels, or when working with equipment that generate high noise levels.

Hearing protection is available in 2 (two) basic types, being an external 'cup type' defender which fits over the outside of the ear, and an internal 'plug type' usually made of compressible foam, which fits inside the ear.

Selection of correct type shall depend upon:

- the nature and source of the noise
- the assumed, or known, level of the noise, (measured in decibels, and recorded as db (A))
- the pitch, or frequency of the noise
- the attenuation, (or protection factor), offered by the defender.

Whenever practicable, equipment generating high' noise levels shall be located the maximum distance from any works being performed, and sound 'mufflers' fitted.

1.5 EYE PROTECTION

All personnel shall be provided with suitable eye protection wherever there is a risk from:

- flying particles
- high speed flying particles
- dust ingress
- chemical splash
- radiation glare
- hot sparks or metal spatter
- harmful vapours

the correct selection of eye protection shall depend on the assessment of the risk, or combination of risks, based on site situation.

Eye protection with scratched or 'fogged' lenses shall be discarded, and replacements issued.

1.6 RESPIRATORY PROTECTION

Respiratory equipment whether static bottled – type, or self contained breathing apparatus shall only be worn by trained and qualified personnel.

Persons with beards shall not be permitted to operate with respiratory equipment.

Self contained breathing apparatus shall generally used in emergency situations, whilst scheduled works shall utilize the static bottle type.

All equipment shall be thoroughly checked prior to use to ensure:

- cylinders are full and gauges function correctly
- all connections are proven tight
- face masks show no sign of damage or possible leakage

All operatives shall be fitted with life – lines when entering hazardous areas.

Operatives shall be rotated at regular intervals, depending upon the nature of the works being performed.

1.7 SAFETY BELTS

Safety belts shall be worn by all personnel working above water or at a height greater than [2.0 M] above the ground level, where properly constructed working platforms are neither available, nor practical.

2.3 EXCAVATION

Before commencing excavation works, the following must be established:

- Nature of the ground, i.e. sand, rock, clay, etc.
- level of ground water
- Existence of buried services, i.e. power cables, pipelines, etc.
-

Wherever there is risk of trench or pit side wall collapse, adequate protection must be provided by means of shoring. Acceptable shoring shall be made of wooden planking, or steel piling, and shall be made properly braced to give the necessary support to the trench or pit side – wall.

In any event, no excavation greater than [1.2 m] in depth, regardless of the nature of the ground, shall be carried out without such shoring being installed.

All excavated materials shall deposit in minimum of (0.5) from the edge of the excavation.

Adequate access to, and egress from the trench or pit must be provided at all times, and this may be by installing and securing ladders at regular intervals in any event not more than (50 m) apart, or by ‘stepping’ the edge of the excavation.

In the event that an electric cable or other buried service is exposed, all works shall halt immediately. Under no circumstances shall work resume until so advised by an appropriate authority.

Excavation shall be protected by the installation of barriers, if any.

3.0 FABRICATION AND WELDING

3.1 GAS CUTTING AND WELDING

Safety Procedures for welding & cutting have been elaborated by AGPL in their manual. The manual is available for reference at the OWNER’S office.

Gas cylinders used in cutting and welding shall:

- Be stored separately, depending on the type of gas contained, and whether empty or full.
- Be stored upright, and shielded from direct sunlight or other heat source.
- Be fitted with safety caps when not in use.
- Be properly secured during transportation
- Not be lifted by the nozzle, rolled, or used a rollers themselves.

When handling cylinders, ensure hands, cloths, gloves, etc., are free from oil, dirt, grit and grease. Under no circumstances shall oil be allowed to contaminate a cylinder containing oxygen.

All gas and oxygen regulators shall be fitted with Flashback Arrestors, being non-return valves designed to prevent an explosive mix developing in either cylinder. Such explosive mixes can occur due to loose connections, leaking hoses etc.

Prior to use, all equipment shall be thoroughly checked to ensure that:-

- All connections are ‘tight’
- All fittings such as gauges, flashback arrestors, etc. are functioning correctly
- Hoses are in good conditions, and free from signs of cracking or perishing.

Checking for leaks shall be by means of soapy liquid applied to each joint.

UNDER THE CIRCUMSTANCES SHALL A NAKED FLAME BE APPLIED TO ANY PART OF THE CYLINDER OR HOSE ARRANGEMENT OT DETECTS LEAKS.

The cutting and welding of certain metals, or metal coatings such as zinc galvanised surfaces give off harmful fumes and such works must, where possible be carried out in a well ventilated area.

When working at height, do not place cylinders directly beneath the work area, as molten metal may fall on to hoses, causing leaks, and possibly igniting the gases.

3.2 ELECTRIC ARC

During the electric arc welding process, very high ultra-violet radiation is generated. Suitable eye protection must be worn by the welder, and any other persons working in a close proximity to the welding works, in order to prevent p permanent damage in the eyes.

When not in use, the current to the holder and electrode must be turned off.

All equipment must be properly earthed, and cables securely connected.

All equipment must be thoroughly inspected prior to use and cable connections shall be completely insulated to prevent injury from electric shock.

3.3 STANDARD PRACTICES

Ensure the work area beneath or adjacent to fabrication or welding works is free from combustible materials, and cordoned-off to prevent personnel being injured by weld spatter or molten metal.

Retain a dry chemical fire extinguisher at the location of fabrication or welding works at all times.

4.0 SCAFFOLDING AND LADDRES

Safety procedures for scaffolding have been elaborated by AGPL in their manual. The manual is available for reference at the OWNER's office site.

4.1 WORKING PLATFORM

Wherever possible, all works to be carried out over water or at a height greater than (2.0 m) above the ground level, must be performed from a properly constructed and maintained working platform

The working platform shall be:-

- Closely boarded
- Atleast (o.7 m) wide if used only as a footing
- If used to store materials in addition, at least the width of the materials plus (0.7m)
- Provided with toe-boards of minimum (0.15 m) in height
- Provided with handrails not greater than (0.85 m) above the toe-board.
- Constructed as close to the structure or building as possible.

Boards to be used on the platform shall be

- Of a suitable thickness, in due consideration of the spacing of supports beneath
- Supported by at least (three (3)) transom, (or cross supports).
- Not project beyond the last support by more than twice their thickness.
- Be adequately fastened to prevent slippage or movement during use
- Wherever possible, not overlap another board
- Be free from cracks, twists, holes or other defects which may affect the load bearing strength.
- Protected from weathering by means of a clear preservative. Boards shall never be painted as this disguises defects.

Scaffolding shall be properly designated and erected, with its intended use in mind . Where additional, anticipated loads are to be applied, the structure shall be redesigned and modified accordingly.

Mobile tower scaffolding shall be fitted with lockable wheels of a minimum (0.12 m) in diameter.

The height of the working platform not greater than (3 times) the shorter base dimension.

All working platforms shall be kept clean and free form grease. Oil, rubble, debris or rubbish to ensure safe movement for personnel performing the works.

4.2 LADDERS

Wooden ladders shall be checked such as splits in the rungs or stiles, unduly work rungs, loose wedges or tie rods, and split or frayed feet.

Wooden ladders shall be protected from “weathering” by means of a clear preservative. Wooden ladders shall not be painted as this disguises defects.

Metal ladders shall not be used where overhead electric cables are present.

Ladders to scaffolding shall be clamped at a minimum of (three (3) points and shall extend a minimum of (1.0 m) above the level of the platform it access.

In other situations, ladders shall be clamped near the top to a convenient point. And sloped at an angle of (-5° , (base: height ration 1:4)), to the horizontal, to limit the risk of slippage.

If the nature of the works is such that both hands are required to perform those works, a safety belt, secured to the ladder must be worn at all times

5.0 CRANE AND RIGGING

All works involving the use of a crane shall be properly planned in advance, and a ‘rigging study’ carried out to ensure that:-

- The crane is capable of lifting the load given the known working radius, boom length, weight of the load etc.
- The condition of the ground at the crane location is satisfactory to support the crane and the load.
- The rotation of the cab, and therefore the boom is not restricted.
- Suitable “matting” or plates are available to protect underground services and paving
- All slings, shackles, hooks, etc of the correct rating are available and in good condition.

Cranes and lifting equipment must be inspected and carry a valid test certificate issued by an accredited testing agency, designated by the Government of the COUNTRY.

Crane hooks are to be fitted with properly functioning safety clips to prevent the displacement of the sling form the hook during the lift.

The contractor shall appoint a suitably qualified and experienced person to act as Supervising Rigger, and his responsibilities will include the preparation of the ‘rigging study” and the safe rigging and lifting of the load at the location.

6.0 PLANT, TOOLS AND EQUIPMENT

The following four basic principles shall be applied to and govern the safe use of hand and power tools, and which principles are:-

- To choose the right tool for the job
- To use only tools in good condition
- To use the tools correctly, and only for the purpose they were intended.
- To maintain and store tools properly

Electrical tools shall be checked to ensure the supplied voltage is comparable to the machine's design.

Electrical leads and connections shall be inspected for signs of damage or wear, and repaired or replaced accordingly.

At no time shall two (2) or more power tools be connected to a single power plug.

Where required, electrical tools shall be properly earthed.

Hoses supplying air to pneumatic tools shall be inspected for signs of wear or damage, and connecting clamps proved secure.

High speed rotating equipment, such as grinders, shall be fitted with protective guards.

Grinding discs are rated by the speed at which the disc rotates, and this must be compatible with the rotational speed of the grinder itself.

Power tools shall never be left operating unattended.

Spark arrestors shall be fitted to all equipment exhausts

Where a risk of combustible gases in the atmosphere exists.

The Contractor shall carry out periodical inspection of plant, tools and equipment, and prepare "Equipment Check list" using the form in Exhibit C: Form of Report of the REQUIREMENT. The check list shall be submitted to the Consultant's PSA every month.

Loads must always be slung with the centre of gravity directly beneath the crane hook, to prevent uneven tensions being applied to the sling legs.

The angle between sling legs shall not, under any circumstances exceed (120°), as this doubles the tension on each leg, thereby reducing the lifting capacity of the sling by 50%

One (1) person only usually, the Supervising Rigger shall give instructions to the crane operator.

For wheeled cranes, outriggers shall be used for each lift, regardless shall be used for each lift regardless of the size, and shall always be fully extended.

A 'trial' lift shall be carried out, raising the load a short distance above its pick-up point, to check the stability of the crane, and the efficiency of the brakes.

The load shall, at all times, be kept as close to the ground as possible.

Whenever possible, and after lifting the load from its pick-up point, the radius of the lift should be shortened to increase the crane's lifting capacity and stability.,

Wire slings which show signs of excessive wear, kinking or broken wires shall be discarded and not used further.

Shakles shall be complete with the original pin, and under no circumstances shall a substitute bolt be fitted.

At no time whilst the crane's machinery is running, shall the operator leave the cab.

At no time, whilst a load is suspended shall the crane's engine (s) be intentionally turned off.

At no time whilst a load is suspended, shall personnel perform any works directly beneath.

Particular consideration to the presence of low-level structure such as pipe bridges shall be given, where crane is to move about the SITE.

Consideration shall be given to prevailing weather conditions, and where a greater than normal risk exists, the lift shall be postponed under more favorable condition develop

GENERAL SAFETY PRECAUTIONS IN ELECTRICITY

1. Only authorized persons shall carry out operations and maintenance of electrical systems.
2. Obtain a work permit and ensure isolation of the electrical systems before taking up the work. Display “Look Out” Board.
3. Use proper protective equipment.
4. Check for defective cables cracked or perished insulation, loose joints in conduits, damaged fuse boxes and switch boards, loose pins, faulty sockets and defective earth wire.
5. Do not overload electrical equipment. If the fuse blows, report it. Do not fit make shift fuse wire.
6. Do not use lighting circuits for portable tools.
7. Avoid kinking, twisting, binding or crushing of cables.
8. Do not use portable tools near inflammable vapour or gases.
9. Ensure that all the equipments are suitably earthed.
10. Use right type of tools for the jobs.
11. Do not let cables trail across the floor.
12. To disconnect equipment, do not pull the cables. Pull the plug.
13. After maintenance of flame proof fittings, ensure that the fittings meet requirements of flame fittings.
14. All switch boards, extension boards, etc., should be protected from rain & water no water logging should be allowed around switch boards.
15. Earth leakage. Circuit breakers should be provided on all distribution boards and main switch boards.

CIRCUITS AND FUSES:

- 0.1 Fuses meant as a source of protection & safety can become fire hazardous if not selected and maintained carefully.
- 0.2 Ensure all fuses are of good quality and conform to correct ratings MCBS are better than ordinary fuses.

- 0.3 In new installations, a totally enclosed switch gear is recommended.
- 0.4 Electrical maintenance workman working around a wet area near a fuse box must use wooden platform, insulated tools or rubber boots.
- 0.5 Always replace a fuse with the same type and size as the original, for e.g a copper wire or other conductor must never be as substitute.

A) HOUSEKEEPING ON SITES & AT SITE STORES

1. Arrange all machinery such as welding machine, generators, cutting machine etc in such a way that special fire risk equipment are segregated and protected.
2. Check the machine at periodic intervals.
3. Never over heat the machines.
4. Do not accumulate unwanted material near the machines, which may cause fire hazards.
5. DCP type fire extinguisher must be kept in main D.B. Boards. No smoking board should be displayed at various points.

B) HOUSE KEEPING AT SITE STORES

1. Do not store wet or oily materials and materials like coir, jute, cotton gunny bags etc, they can ignite spontaneously.
2. Store Chemical & other such goods in stable racks properly labeled. Mutually re-active chemicals should be kept away from each other.
3. Hot goods must be arranged so as to allow safe cooling and should not come in contact with combustible material.
4. Tools which are returned back after use must be kept at a earlier marked place so that It can be traceable immediately and proper stock can be kept.
5. Storage place should have proper ventilation.
6. Electrical, welding, cables should be stored properly & secured from theft.
7. "No Smoking" boards should be displayed in store.
8. Electrical switch boards should be properly secured.
9. No other work such as repair of machinery, testing of grinding machine or what so ever should be done in a small workshop shed which is temporarily constructed at site.

PRECAUTIONS TO BE TAKEN ON CONSTRUCTION SITE WHILE USING SCAFFOLDING

1. No structure, temporary support, scaffolding to be loaded beyond allowable loads.
2. If there is a doubt the structural quality scaffolding to be lasted to two and half times to live load.
3. Whenever making an opening in the existing wall adequate supports to be Provided against the collapse or cracking or the wall portion above.
4. Prevention of accidental falling of workmen during the construction of roofs to be ensured by providing platforms or catching ropes.

5. All scaffolding joints should be inspected time to time.
6. Adequate hand railing to be provided on an top of the platform so that men working at height will not fall down.
7. Even after completion of roof work, frame work to the frequency inspected to prevent collapsing before the due date.

CONCRETE MIXERS

1. All gears, chains and rollers of concrete mixers to be adequately guarded to prevent danger.
2. Concrete mixers skip to be protected by side railing to prevent workers from passing under them and operation to make sure before lowering skip.

CONCRETE VIBRATORS

1. Vibrating unit should be completely enclosed and the beep transmitting the power to the unit adequately guarded.
2. Vibrating needless to poker type vibrator to be completely sealed against concrete.
3. Electrically operated compact vibrators to be totally enclosed units.
4. All operated type vibrators to have arrangements to change the speed of rotating shafts and air motor to rotate the vibrating needle which is to be totally guarded against concrete.
5. Power operated vibrators to be provided with effective means of stopping the vibrations.
6. The vibrator to be fitted with shock absorbing handles with rubber or suitable overload relays and not to be effectively earthed. A low voltage drive with suitable transformer is recommended where the operator has direct contact with the vibrator during its operation.
7. The needle to the resting on a hard surface to avoid bounding while starting the poker type vibrators.
8. Excessive handling of the flexible shafts of the poker vibrators when in operation to be avoided.

SAFETT IN RADIOGRAPHY WORKS

Planning & procedure for radiography initially should be formulated by contractors and submitted to the proper authority. Procedure should be thoroughly discussed by all related persons for familiarization.

All radiation equipment and radioactive materials should be stored, handled, transported or disposed off so that no persons receives an unnecessary does of radiation.

Shield ability of the radioactive materials container should be inspected every six months.

Warning signs and posters used internationally should be displayed.

Radiography should be performed under the direction of radioactive supervisors/officers responsible for this work.

All workers should be given/should have extensive knowledge of the work such as radiation procedure, operation of radiation apparatus and effects of radiation on the body.

The following spaces or areas should be classified as restricted areas.

- a) Storage place of radioactive materials
- b) Any area where the radiation exists at levels such that large portion of the body could receive a dose in excess of 30 milligrams per week.
- c) Emergency storage area for radiation apparatus or radioactive material capsules.

Warning signs, labels and safety ropes or a fence should be provided for restricted area to prevent trespassing.

Poster showing the rated powder output that radiation is taking place. No entry allowed and the danger should be displayed where radiation work is being carried out. Before starting radiological work the restricted area should checked that no unauthorized persons in the area and reconfirmed during the radiation work.

All workers entering a restricted area should wear film badges sensitive to radiation.

Radiation apparatus should be operated by a supervisor or a Assistant, authorised by a supervisor

All workers who could receive a does of radiation in excess of 100 milligrams per day should be wearing a pocket dosimeter. And the dose of radiation received should be recorded every day. The dose of radiation should be checked by the supervisor for each radiation exposure when the dose of radiation exceeds 100 milligrams.

A supervisor should stand by or suitable alternative such as shortening the radiation time, reinforcing the shield plate etc should be arranged.

During radiation work doses of radiation at the boundary of the restricted area should be measured and recorded.

The radiography supervisor should measure and record the surface dose rate of restricted area every day.

- a) Date of measurement.
- b) Measuring method
- c) Description & capacity of apparatus
- d) Measured condition
- e) Measurement condition
- f) Results of measurement
- g) Name of measurement
- h) Any action taken

Radioactive materials should be stored separately from other material or equipments. The storage place of radioactive materials should be 10 cm or more above the ground & locked to prevent accidents.

Radioactive materials should be stored in a case made of lead of ample thickness with a lock on the exterior surface of the case. The name of the Company, description of materials, quantity and danger sign should be distinctly visible, labels and posters must indicate the description and quantity of radioactive material. Name of responsible person and sign limits.

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PROJECT

EXHIBIT C

FORM OF REPORT

1. Safety Patrol Check List
2. Personnel Accident Report
3. Vehicle Accident Report
4. Safety, Health & Welfare Inspection Report
5. Monthly Safety Report
6. Report of Remedial Action

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PROJECT

SAFETY PATROL CHECK LIST

CHECKED DATE : _____

CHECKED TIME : FROM _____ TO _____

CHECK ITEM	CHECK ITEM
1. GENERAL CONTROL	4. FIRE PREVENTION (CONT..D)
i) GSE OF PERSONNEL PROTECTION TOOLS SUCH AS HARD HAT SAFETY BELT ETC	4) INDICATION OF HOT WORK PERMIT
2) ADEQUATE LIGHTINGS	5) PROPER HANDLING OF OXYGEN AND ACETYLENE CYLINDERS
3) HOUSE KEEPING OF WORK AREA	6) PROPER USE OF HOSE FOR GAS
4) CONDITION OF SITE BOUNARY FENCE	7) CONDITION OF WELDING HOLDER, CABLE, CIRCUIT BREAKER
2. FALLING PREVENTION	5. ELECTRICAL SHOCK PREVENTION
1) CONDITION OF SCAFFOLDINGS – SUPPORT-CONNECTION-HANDRAIL-BRACING., ETC.	1) PROTECTION FOR H.V RECEIVING FACILITY
2) LIGHT CONNECTION OF FLOOR PLATES	2) PROTECTION FOR AERIAL CABLES.
3) INDICATION OF WORKING LOAD LIMITATION	3) EARTH LEAKAGE BREAKER
4) PROPER USE OF: LADDER, ROLLING TOWER, STEP ETC	4) ELECTRIC SHOCK PREVENTION DEVICE
3. EXCAVATION WORK	6 HEAVY LIFTING
1) SAFE SLOPE AND SHORTING	1) SIGN BOARD AND BARRICADE
2) SIGN WARNING AND LIGHT	2) CERTIFICATE OF CRANE
4. FIRE PREVENTION	3) CERFICIATE OF OPERATOR
1) ARRANGING OF FIRE EXTINGUISHERS	4) CONDITION OF LIFTING WIRE, HOOK ETC.
2) SAFE STORING OF INFLAMMABLE MTR	5) OFF-WIRE PREVENTION OF HOOK
3) SMOKING RESTRICTION	6) OVER WINDING PREVENTION DEVICE
	7) PROPER MATTING FOR CRANE

Safety Checklist

Cables

- Ensure all necessary precautions are taken where overhead exist
- Distribution cables must not cause a hazard at openings, passages, ladders, stairs etc.
- Ensure that cables are not lying on the ground unprotected from physical damage or wet conditioning
- Cables must not hang directly from nails, etc which may cause insulation damage.
- Ensure that cables are protected from edges of sharp objects
- Suspended cables should not carry any weight. They should be supported by rods or centenary wires.
- Ensure that all cables are visible if necessary attach (yellow and black or red and white) plastic bunting strips.
- Is there an adequate supply of extension cable for site use?
- Remove all unapproved junctions and makeshift repairs.
- Lighting circuits must not be used for power tools. Especially where lighting testoons are fitted with trailing leads.
- If cables are buried, a 450 mm (bins) cover and protection with cover tiles must be provided. The line of the cable should be clearly marked.
- Must be adequate for their purpose.

Plugs etc.

- See that covers, etc are not damaged.
- Ensure that the splash roof covers are actually used.
- Check that the correct plugs are fitted especially by sub-contractors.
- Must be suitable for the site –conditions
- See that plugs have not been forced into the wrong sockets
- Check that the correct connections have been made, colour coding should be distinctive.
- Check that cable grips are used and that the earth cable is fitted with some slack so that it is the last to be pulled out.
- No improvised junctions, nails, matches, silver paper etc.
- Ensure that the correct type and rating of fuses are fitted.
- Ensure that any made up leads/extensions etc., are fitted by a competent electrician.

POWER TOOLS

- Check for BS 2769 (kite Mark) or double insulated mark (BS 2754).
- Is the tool fitted with the correct plug type and size?
- Check plug is undamaged
- Are cable clamps secure?
- Check trailing lead is not cut or frayed

- Is the cable protected from excessive flexing by rubber sleeve where the cable enters the tool?
- Are all screws in place and secure?
- Ensure that there are no cracks or pieces missing on the machine.
- Is the chuck in good condition and is the correct key attached?
- Check that any bit retaining mechanism is in working order.

Fuses

Fuses usually blow for a reason. The reason should be discovered before a fuse is replaced.

Nails, screws, wire or silver paper must never be used to replace fuses. It is illegal as well as very dangerous.

Lighting.

Lighting is needed for safety, productivity security.

The construction (General Provisions) Regulation 47 requires that every working place, approach, dangerous opening and lifting appliance be adequately and suitably lighted.

There are many different types of lighting each with its own most suitable application. Advice should be sought for the best light for a particular. Place considering such factors as colour rendition. Humidity and flammable or explosive atmosphere etc.

Levels of illumination

Illumination is measure in units of lumens (or Lux) which is the amount of light falling on one square meter.) which is the amount of light falling on one square metre.

Light meters are used to check levels of illumination. Illumination should be measured at the actual work place not at the light fitting. There are factors that can affect the efficiency of lighting.

- Amount of daylight available
- Cleanliness and maintenance of light fittings and reflectors
- Reflections from walls/ceilings
- Distance of light source from work area
- Shadows from furniture/fittings.

If the distance from the source is doubled the illumination will be reduced to one quarter (inverse square law).

Engineers Code of Practice for Interior Lighting and Lighting Guide for Building and civil Engineering Site.

Recommended Levels for Site lighting

Applies to both indoor and outdoor activities and relates to the value on the ground, floor, or horizontal working plane. They may require adjustment according to district brightness.

Security	Depending on degree of risk	Design Value lux 5:30
Movement and handling	Movement of people, machines and vehicles, handling of materials, walkways and access routes	20
Stores and stockyards	For stored foods etc	30
Site Entrances	General rough work site clearance	30 50
Craft Work	Reinforcing concreting, shuttering erection, bricklaying, scaffolding	100
Fine Craft Work	Joinery, all work with power tools and circular saws, plastering, painting, electrical, plumbing, shop fitting, brickwork	300
Special Work (3)	Retouching paint, locker rooms, toilets	150
Site huts	Rest rooms, locker rooms, toilets	150
Site Offices	On desks and reference tables, general lighting of drawing office	500
Drawing offices on site	On Drawing board	750
Emergency lighting	For escape and standby purposes	570

REFERENCES

HSC Guidance Note PM 38- Selection and use of electric hand lamps
Chartered Institute of Building services

Plant and Equipment

Safety Checklist

- When plant or equipment was last checked or tested? Are statutory records kept up to date?
- Have faults developed through neglect?
- Have any faults/defects been reported?
- Are they being remedied?
- Does plant or equipment comply with regulations?
- Are spot checks made on condition of hand tools and minor items of equipments?
- Is there a procedure for inspecting and repairing/replacing such equipment and tools?>
- Are drivers, operators trained or specific plant or equipment, and aware of hazards associated with its operation?
- Is safety training included in instruction?
- Is personal protective equipment available and issued to all who need it?
- Have lists of authorised drivers and operators been kept up-to-date?
- Is equipment issued to and used only being authorised persons?
- What information is available for specific plant? Who has it?
- Do checks show plant is being used safety?
- Do operators know the regulations bearing on their activities and their own responsibilities?
- Are rules observed by site vehicles?
- Has any instance of overloading or overstressing plant come to light?
- Any signs of unplanned or dangerous location of plant?
- Are locations of supply cables, pipes, services etc identified before plant and other equipment is brought into vicinity?
- Are communications adequate between:
 - Teams doing different work in same area
 - Different shifts using same plant
 - Workers engaged in co-ordinates operation

Plant and Equipment

Safety Checklist

- When plant or equipment was last checked or tested? Are statutory records kept up to date?
- Have faults developed through neglect?
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- Does plant or equipment comply with regulations?
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- Is there a procedure for inspecting and repairing/replacing such equipment and tools?
- Are drivers, operators trained or specific plant or equipment, and aware of hazards associated with its operation?
- Is safety training included in instruction?
- Is personal protective equipment available and issued
- Have lists of authorized drivers and operators been kept up-to-date?
- Is equipment issued to and used only by authorised persons?
- What information is available for specific plant? Who has it?
- Do checks show plant is being used safely?
- Do operatives know the regulations bearing on their activities and their own responsibilities?
- Are rules observed by site vehicles?
- Have any instances of overloading or overstressing plant come to light?
- Any signs of unplanned or dangerous location of plant?
- Any locations of supply cable, pipes services etc., identified before plant and other equipment is brought into vicinity?
- Are communications adequate between:
 - teams doing different work in same area
 - different shifts using same plant
 - Workers engaged in co-ordinated operations.

Chains, Rope slings and Lifting Gear

Safety Checklist

Prior to commencement of Work,

- Ensure that an adequately trained, competent, appointed person is available to take charge of the operation.
- Ensure that a current test certificate has been issued for each chain, rope, sling and item of lifting gear (F97), or wire rope (F87).
- Ensure weekly inspections are carried out by competent persons and recorded
- Examine the slings that are provided and check that a “thorough examination has been carried out and recorded.
- Identify and ensure that all shops are clearly marked with Safe Working Load.
- Ensure that correct and up to date copies of the slung Chart and Safe Working Load Tables are available when using multi leg slings.
- Ensure that only the correct crane signals will be used.
- Ensure that a suitable rack is available for storing slings etc when not in use. Wire ropes should be stored in a dry atmosphere.
- Ensure that the weights of load to be lifted are known in advance, and that load weights are clearly marked.
- Find out in advance, the type of eye bolt fitted to the load to ensure that the correct equipment, shackles, hooks and lifting beams are available on site.

Whilst work is in progress

- Ensure that copies of the Sling Chart and Safe working Load Tables are being used where necessary.
- Ensure that the correct techniques are being used for the attachment to the appliance and slinging.
- Ensure wherever possible that the angle of slings are no more than 90°.
- Ensure that regular inspections of equipment are carried out.
- Stop persons “hooking back” on to the legs of slings.
- Limit the use of endless wire rope slings.
- Ensure that wire rope slings are protected from sharp corners of loads by suitable packing.
- Ensure that slingers understand that ‘doubling up’ sling does NOT ‘double up’ the safe working load; avoid this practice if possible.
- Prevent strops, slings, and ropes from being dragged along ground.
- Ensure that hooks used for lifting are NOT also carrying unused slings.
- Ensure that any unused leg of multi sling is correctly hooked back. The correct sling only should be used.
- Ensure that unfit slings are removed from the site and a responsible person informed.
- Ensure the crane hook is positioned above the load’s centre of gravity.

- Ensure that the load is free before lifting and that all sling legs have a direct load
- Ensure that "snatch loading does NOT take place
- Ensure that NO ONE Rides on a load being slung
- Use tag lines to stabilize long or large loads.
- Ensure that the load is landed on to battens to prevent damage to slings, and for their easy removal.
- Ensure that no one is under a load being lifted.

All ropes, chains, slings etc must be clearly marked and the safe working load specified. All equipment used in lifting operations must be

- Properly constructed and maintained
- Free of any defect or damage likely to affect its strength
- Regularly examined.
- Security attached to the load

The equipment must not be overloaded

In accordance with BS 7121 lifting operations must only be undertaken by trained and competent persons, authorised to do so.

Examinations and Tests

The construction (Lifting Operations) Regulations require that all ropes, chains and every item of loose lifting gear should be tested and examined before use and a certificate issued A certificate for chains B for ropes, must specify the safe working load (SWL) and should be signed and dated by the examiner.

Inspections

All chains, ropes and items of lifting up and used for raising or lowering and as a means of suspension, must be examined by a competent person (usually and insurance Company engineer-surveyor) every six months and a report must be issued (items not in regular use, need only be examined when required for use.

Marking

The rope, chain, etc must be clearly marked with SWL and carry an identity mark, except for rope and rope slings if this information is available from a table of safe working loads posted on the site or otherwise from Form 91 Part 2 (record of six monthly tests)

Overloading

Ropes, chains etc., must never be overloaded except under test and as authorised by an experienced and competent person.

Preventing Damage

The edges and corners of a load should be packed to prevent sharp edges damaging lifting ropes, chains slings etc.

Health and Safety at work (First Aid)

Checklist

First Aid provision

How many employees are involved?

How is the workforce distributed, (i.e grouped, widely dispersed etc)

Are remote locations involved?

Are shifts worked?

What is the nature of the work?

Does it involve special operations?

Can particular hazards be identified? (be falls, electric shock, dangerous substances)

Training

Are a sufficient number of first aiders or occupational first aiders available?

Does training meet foreseeable needs?

Are records of training kept?

Are individuals working in isolated locations trained to cope with emergencies?

Where appoint persons' are in charge do they understand their duties?

Does induction training cover first aid arrangement?

Equipment

Is first aid equipment placed in locations where it is likely to be needed?

Does it meet foreseeable needs, special hazards etc/

Are traveling first aid kits available when required?

Is a first aid room needed available and suitably equipped?

Are information signs provided?

Are first aid boxes and kits properly stocked and maintained?

General

Has responsibility for first aid provision and organization been assigned to an individual?

Are there established procedures for reviewing?

- Training and equipment needs?
- New work processes?
- Special operations?
- Changes in work patterns, site locations, size of labour force?
- Arrangements with sub-contractors?

Safety Nets

Safety Checklist

Before Use

- Erected and supervised by competent persons
- Tested within previous 3 months
- Records kept of tests
- Inspected within previous week
- All anchors and supports secure
- Net clear of debris
- Nothing positioned under net to affect its purpose. Minimum clearance.
- Free fall distance not more than specified.

During use

- Kept clear of debris
- Not abused, (to collect rubbish or people jumping into net)
- Inspected
 - after a fall
 - for effects of contamination etc
 - every week

-After use

- Inspected for damage
- Defects reported
- Records Maintained

- Dried and stored correctly

Safety Belts, Harnesses and Landyards

Safety Checklist

Before use

- Select most suitable harness or belt for the type of operation and hazard
- Ensure that operative is trained in its use
- Secure anchorage available, examine all equipment before use
- Check that weather conditions are such that operative can work safely
- Warn anyone in the vicinity of the hazard particularly occupiers of property. See that adequate warning notices are displayed.

During use

- Safety lines, etc set by a competent person
- Only authorised trained and competent personnel to use the equipment
- All equipment inspected before start of work each day, following and established routine.
- Set procedures established and implemented.
- Horseplay not permitted.

After Use

- Inspect equipment for damage
- Report defects
- Clean and store correctly

Personnel Accident Report

Cradles

Safety Checklist

Before use

- Installed and supervised by an experienced competent person
- Inspected and appropriate reports made. Test Certificates for winches, wire ropes blocks etc.
- Users fit for work and properly trained
- Adequate protection and warning of public etc. Occupiers of building warned not to open windows etc. Erect warning signs.
- Secondary safety ropes/harness provided
- Safe working load marked

In use

- Competed person in charge.
- Authorised operatives only
- Inspections carried out (weekly)
- No knots or kinks in ropes
- Ropes correctly reeve on drum at least two turns
- Check power supplies and cables before operating
- Check controls for correct function and ensure pendant controls secured to cradle
- Ropes securely anchored
- Stops and over runs operational
- Anchorage of secondary safety ropes secured
- Tie off to building to prevent sway
- Safe working load not exceeded
- Cradle kept clean and clear of rubbish. Ensure platform is not slippery.
- Tools secured
- Protection from above? (falling materials)
- Ensure proper access being used.
- No climbing down ropes
- No transferring between adjacent cradles
- Do not allow ropes and cradles or connections to lay in gutters
- Do not allow use in high winds or adverse weather conditions.

After Use

- The off cradles and ropes in a secure position preventing unauthorized access
- Ensure supplies are isolated and control equipment removed and secured
- Reports defects, breakdowns etc.
- Remove warning signs.

Personnel Accident Report

1	Division /Dept (if applicable)	Contact :
2	Name of Employer	
3	Injured person's Surname:	First Name
4	Injured Person's Address	
5	Net. Ins. No.	Age
		Check No.
6	Normal Occupation	
	Occupation at the time of accident	
7	State Precise nature of injury (if eye or limb state left or right)	
8	Date, time and place of accident	
9	Date and time of ceasing work	

10	To whom was the accident reported	Date	Time
11	Accident record in Accident Book B1 510 on		
	Form F 2508 sent to enforcing authority on		
	Enforcing authority informed by telephone		
	Accident recorded in official register on		
12	Did injured person receive first aid treatment on site / treatment by doctor (give name) hospital treatment (state name of hospital)?		
13	Was injured person authorised to be at the place for the purpose of his work?		
14	How was the accident caused? <i>(Note: (a) Give full description overleaf (b) state what injured person was doing at the time. (c) If falls of persons from heights or into holes or excavations are involved state distance of all in meters d) Use reverse of this form for Health</i>		
15	What action has been taken to prevent a recurrence?		
16	If machinery involved? a) Give name, no. of machine and part causing accident. b) Was it moved by mechanical power at the time?		
17	Name and address of any witness of the accident <i>(obtain witness wherever possible. Attached signed statement from each witness in serious cases) Statement from Agent.Gen Foreman how accident occurred)</i>		
18	To be completed by Head office	Date	
	Further Medical reports on injured person		
	Injured person ceased employment	Date	
	New address of injured person		
	Agent/Gen. fireman & Signature	Date	

.AEGIS GAS (LPG) PRVIATE LITED
PROJECT
VEHICLE ACCIDENT REPORT

COMPANY INVOLVED	
DATE ACCIDENT OCCURRED	DATE TIME
LOCATION OF ACCIDENT	
TYPE / MODEL OF VEHICLE	
NAME OF DRIVER	
REPORTED TO POLICE	YES/NO
DETAILED REPORT OF INJURY AND / OR DAMAGE SUSTAINED	
STEPS TO BE TAKEN TO PREVENT A RECURRENCE	
PREPARED BY	RECEIVED BY
SECURITY IN-CHARGE	AEGIS GAS (LPG) PRIVATE LTD
SAFETY ADVISOR OF CONTRACTOR	

Safety, health and Welfare Inspection Report

From

Report No.

Work Place

Welfare	Storage Areas	
1. Canteens	18) Tidiness	34) Services
2) Rest rooms	19) Flammables	35) Security
3) Changing Rooms	20) Gases	36) Fire precautions
4) First Aid training	21) Fuels lubricants	37) Electircal
5) first aid facilities	22) Fire precautions	38) Hoists
6) Washing	23) Tools & equipments	39) Tower cranes
7) Sanitations	24) Access equipments	40) Mobile cranes
8) Protections clothing	25) Timber	41) Lifting gear
9) Protections equipment	26) Dangerous materials/substances	42) Excavations
Offices	27) Stores procedures	43) Transport
10) Accident records	Construction Site	44) Other plant
11) Statutory forms Registers etc.	28) Scaffolding	45) Machinery
12) General Cleanliness	29) Ladders trestles	46) Power tools
13) Fire precautions	30) working Platforms	47) Hand tools, equipment
14) Environmental factors	31) Access/Egress	48) Tidiness
15) Seating	32) Signs & Notices	49) Noise levels
16) Access/Egress	33) Accommodations	50) Labour roads
17) Alarms Notices		

Action required for items

.....

 (details on reverse of form)

Signature Date of inspection
 (Safety Representative(s))

Circulation Original (pink) to Safety Advisor
 1st Copy (blue) To site Manger/Agent
 2nd Copy (white) to be retained
 3rd Copy (yellow) for management action and return

AEGIS GAS (LPG) PVT LTD
PROJECT
MONTHLY SAFETY REPORT

REPORT NO	ISSUE DTE
1. MAIN CHECK POINTS	
(a) GENERAL SAFETY PREVENTION	
(b) FALLING PREVENTION	
© EXCAVATION WORK	
(d) FIRE PREVENTION	
(e) ELECTRIC SHOCK PREVENTION	
(f) HEAVY LIFTING WORK	
PARTICULAR ACTION TAKEN	
NAME OF CONTRACTOR:	PREPARED BY

**AEGIS GAS (LPG) PVT LTD
PROJECT**

TO : AEGIS GAS (LPG) PVT LTD

FROM: CONTRACTOR'S SAFTEY ADVISOR

REPORT OF REMEDIAL ACTION	
REPORT NO:	
ISSUE DATE	
INSTRUCTION FROM CONTRACTOR USED	ACTION TAKEN FRO REMEDIAL
EXPECTED COMPLETION OF REMEDIAL	
PREPARED BY: CONTRACTOR SAFETY ADVISOR	RECEIVED BY AGPL/PSA

AGIES GAS (LPG) PVT LTD
PROJECT
EXHIBIT D

FIRST AID BOX

1	24	Wound dressing small (for fingers)
2	12	Wound dressing Medium (for Hand & Feet
3	12	Wound Dressing Medium (For body)
4	12	Burn Dressing Large (For Body)
5	12	12 Absorbent Cotton Wool I.P.13 Gms each
6	2	Bottle of Antiseptic Solution 100 mls each
7	2	Bottle of Mercurochrome Solution 2 % 100 mls N.F
8	1	Bottle of Sal Volatile 100 mls I.P
9	1	1 Dressing Scissors 5"
10	1	Roll of Adhesive Plaster 1.25 Cms x 5 Mt U.S.P
11	2	Rolls of Adhesive Plaster 2.5 cms x 5 Mt. U.S.P
12	12	Pieces of Eye drop with bandage each in pkt
13	1	Pkt contained 100 tablets Paracetamol I.P 0.5 g
14	1	Polythene with bottle 500 cc for washing eyes
15	12	Rolls Bandages Washable 10 cms x 4 Mt.
16	12	Rolls bandages Washable 5 cms x 4 mt
17	6	Triangular Bandages
18	1	Tourniquet Cotton Belt and Buckle
19	1	Pair Wooden Splints
20	2	Dozen Safety Pins
21	1	Kidney Tray
22	1	Snake Bite lancet
23	1	Pkt or Bot. 25 gms. Potassium Permanganate I.P
24	1	Tube of Burn Ointment x 25 gms
25	1	First Aid Leaflet issued by Directorate General of Factories
26	1	Book of instructions on First Aid to injured
27	1	Pkt of Bot. 25 gms Soda Bi Carb. I.P

WORK PERMIT
Exhibit F
A Safety and Health Personal Protective Equipment Checklist

Respirators	<ul style="list-style-type: none"> • Do you regularly monitor the work environment for contaminants? • Are you aware of how the hazard can be controlled or prevented? • Are you aware of the limitations of respirators? • If a respirator is the only solution, is it the proper respirators? • Was the fit tested? • Are employees educated in its use and maintenance.
Safety shoes and boots	<ul style="list-style-type: none"> • Does the footwear offer protection against the specific occupational exposure, such as temperature variations, slippery surfaces, punctures, and chemical exposure?
Gloves	<ul style="list-style-type: none"> • Are gloves the correct size? • Are gloves of the appropriate length to prevent exposure? • Do gloves offer protection against the specific occupational exposure such as punctures, chemical exposures, and temperature extremes? • Do gloves restrict hand movement? • Are they too slippery, too bulky etc?
Safety Goggles and Glasses	<ul style="list-style-type: none"> • Do the glasses/goggles offer protection against the specific exposure? • Do they desert vision? • Do they limit peripheral (side) vision? • Are there gaps between side shields and face which might allow particles to enter?
Safety Helmets	<ul style="list-style-type: none"> • Does the helmet fit property? • Does it offer protection against the specific occupational exposure, such as temperature extremes, falling objects, electrical hazards, etc., • Are limits, chin straps and sweatbands used to keep it in place?
Ear Muffs and Ear Plugs	<ul style="list-style-type: none"> • Are the ear muffs adjustable? • Are they comfortable to wear? • Do they create pressure to chin, head or behind the ears? • Do ear muffs/ear plugs provide adequate reduction of noise?
Protective Clothing	<ul style="list-style-type: none"> • Is clothing provided of right size • Is it made out of a material that protects from the specific hazard?