

**3 x 660 MW NORTH KARANPURA STPP**

OF  
**NTPC LTD.**

***TECHNICAL SPECIFICATION***  
***FOR***  
***FIRE TENDERS, FIRE JEEP & FIRE SAFETY***  
***EQUIPMENT***

**SPECIFICATION NO. : PE-TS-405-550-A001**



**BHARAT HEAVY ELECTRICALS LIMITED**  
**POWER SECTOR**  
**PROJECT ENGINEERING MANAGEMENT**  
**NOIDA (INDIA)**



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE SAFETY  
EQUIPMENT  
3 X 660 MW NORTH KARANPURA STPP  
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SPECIFICATION NO. PE-TS-405-550-A001

VOLUME: II B &amp; III

REVISION 00

DATE: 21/12/2015

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**TECHNICAL SPECIFICATION FOR  
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SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550 -A001**

**VOLUME: II B**

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**VOLUME II B**



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE SAFETY  
EQUIPMENT  
3 X 660 MW NORTH KARANPURA STPP  
INTENT OF SPECIFICATION**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME: II B**

**SECTION : A**

**REV. 00**

**DATE: 21/12/2015**

**SECTION-A  
INTENT OF SPECIFICATION**



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE SAFETY  
EQUIPMENT  
3 X 660 MW NORTH KARANPURA STPP**

SPEC NO.PE-TS-405-550-A001

VOLUME-IIB

SECTION

REV.NO.0 | DATE:21/12/2015

**1.0 INTENT OF SPECIFICATION**

1.1 This specification covers the design, material, fabrication, manufacturing, inspection and testing at manufacturer's work, suitable painting and performance requirement of fire tenders, fire jeep & fire safety equipment's complete with all accessories as specified, transportation to project site, freight and insurance including performance demonstration at site.

The bidder's scope shall also include any other services, etc. if called for in the succeeding sections of the specification.

1.2 It is not the intent to specify completely all details and construction of the equipment. However, all the equipment shall conform, in all respect, to high standard of engineering, design and workmanship and be capable of performing in continuous commercial operation up to desired period.

1.3 BIDDER's guarantee in a manner acceptable to the PURCHASER who will interpret the meaning of drawing and specification and shall have power to reject any work or material which, in his judgement, are not in full accordance with specified specification and technical parameter.

1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.

1.5 Items though not specifically mentioned but needed to make the system complete as stipulated under these specifications are also to be furnished unless otherwise specifically excluded.

1.6 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are hereby made part of the tender specifications. The equipment / material and works covered by this specification is subject to compliance to all the attachments referred in the specification. The tenderer shall be responsible for adherence to all requirements stipulated herein.

1.7 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol.-III of the specification within 10 days of receipt of tender documents. In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such



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requirements shall be binding on the successful bidder without any commercial & delivery implication.

- 1.8 No deviation is permitted in normal case. Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.
- 1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/vendor and Customer/Purchaser/Employer will mean BHEL and/or Customer (NTPC Limited) as interpreted by BHEL in the relevant context. Please refer GCC/SCC for better clarity.
- 1.11 In the event of conflict between requirements of two clauses of this specification/ documents or requirements of different codes/standard specified, the more stringent requirement as per interpretation of owner shall apply.
- 1.12 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and dispatch release issued by BHEL/Customer.
- 1.13 BHEL's Customer's representative shall be given full access to the shop in which the equipment's are being manufactured or tested and all test records shall be made available to him.
- 1.14 Various codes and standards to be used shall be as indicated in various parts of the specification. In case bidder uses any standard other than those indicated in the specification, the onus of establishing equivalence of the same with the specified standards will rest with the bidder and acceptance of the same shall be sole prerogative of customer. The bidder will also arrange for BHEL a copy of the standards in ENGLISH language. The cost of such service will be deemed to have been included by the bidder in the total cost of the package. BHEL will not entertain any additional cost on account of the same.
- 1.15 All text/ numeric in the document / drawings to be generated by the successful bidder will be in English language only.
- 1.16 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.
- 1.17 The inspection and testing of all the equipment shall be as per approved quality Plan/Inspection checklist.



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP  
PROJECT INFORMATION**

**SPECIFICATION No: PE-TS-405-550-A001**


**VOLUME: II B**


**SECTION : B**


**REV. 00**

**DATE: 21/12/2015**

**SECTION: B  
PROJECT INFORMATION**

CLAUSE NO.	PROJECT INFORMATION												
1.00.00	<p><b>BACKGROUND</b></p> <p>North Karanpura Super Thermal Power Project (3x660 MW), a pit head coal based thermal power project, is located in Hazaribagh and Chatra districts of Jharkhand State. Basic inputs i.e. coal, water and land have already been tied up. The project is proposed for the States &amp; Union Territories of Northern, Western and Eastern Regions and the State of Jharkhand.</p> <p>The capacity of the project is 1980 MW comprising of three (3) units of 660 MW each.</p>												
1.01.00	<p><b>Location and Approach</b></p> <p>The power project is proposed to be located near Tandwa town in Chatra districts in the state of Jharkhand on Hazaribagh-Chatra State highway at a distance of about 50 kms from Hazaribagh city. The nearest commercial airport is Ranchi at a distance of 150 kms from project site. The nearest railhead Khalari Railway Station on Ranchi-Garhwa section of Eastern Railways is about 40 kms from project site. Major rail/road distances from the project site are as under:</p> <table border="1" data-bbox="395 813 1190 958"> <thead> <tr> <th><u>City</u></th> <th></th> <th><u>Distance Approx. (kms)</u></th> </tr> </thead> <tbody> <tr> <td>Ranchi</td> <td>:</td> <td>150</td> </tr> <tr> <td>Khalari</td> <td>:</td> <td>40</td> </tr> </tbody> </table> <p>The site is located near Tandwa town having latitude and longitude of about 23<sup>0</sup> 50' N to 23<sup>0</sup> 52' N and 84<sup>0</sup> 59' E to 85<sup>0</sup> 2' E respectively. The Vicinity Plan of the project is placed at <b>Annexure-I</b>.</p> <p>Further to the information given in this sub-section, Bidders are also advised to visit the project site and collect data on local site conditions.</p>				<u>City</u>		<u>Distance Approx. (kms)</u>	Ranchi	:	150	Khalari	:	40
<u>City</u>		<u>Distance Approx. (kms)</u>											
Ranchi	:	150											
Khalari	:	40											
1.02.00	<p><b>Land</b></p> <p>About 2245 acres of land is being acquired for the project. About 1500 acres of land is under possession/legal possession and out of 1500 acres, about 890 acres of land is to be used for plant, ash dyke and initial enabling township. No additional land is envisaged to be acquired in plant area. About 15 acres of land is envisaged to be acquired in Hazaribagh city for Township. Commissioner, Chatra vide dated 25.05.1999 and 14.06.2000 has given in-principle clearance for NKSTPP.</p>												
1.03.00	<p><b>Water</b></p> <p>Make up water available for this project would be about 22 cusec and will be arranged by constructing a dam/reservoir across river Garhi.</p>												
1.04.00	<p><b>Fuel (Coal)</b></p>												
1.04.01	<p><b>Coal Requirement, Availability and Linkage</b></p> <p>Coal requirement for the project is estimated as 10.6 Million Tonne/Annum (MTPA), considering a GCV of 3800 kcal/kg. Ministry of Coal vide letter dated 21.10.99 accorded in-principle coal linkage of 10.00 MTPA subject to ratification by Standing Linkage Committee-Long Term (SLC (LT)), of MOC. SLC (LT) in its meeting held on 15.12.2000 firmed up the coal linkage of 10.24 MTPA for the project. Subsequently, the coal linkage was withdrawn by SLC (LT) in its meeting held on 22/23.10.08.</p>												
<p><b>NORTH KARANPURA STPP (3 X 660 MW) EPC PACKAGE</b></p>		<p><b>TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO.:CS-4410-001-2</b></p>	<p><b>SUB-SECTION-IB PROJECT INFORMATION</b></p>	<p><b>PAGE 1 OF 10</b></p>									

CLAUSE NO.	PROJECT INFORMATION			
1.04.02	<p>Cabinet Committee on Investment (GOI) in its meeting on 20.02.13 decided in-principle to restore the original coal linkage granted to NKSTPP (i.e. from Magadh Coal Block) with the stipulation that the coal supply will commence during the 13th Five Year Plan. MOC vide letter dated 09.05.2013 restored the coal linkage with the stipulation that the coal supply will commence during the 13<sup>th</sup> five year plan.</p> <p><b>Coal Transportation</b></p> <p>Coal from Magadh block of North Karanpura Coalfields is proposed to be transported to the project site through conveyor belt system. One external coal handling plant and one internal coal handling plant are envisaged.</p>			
1.05.00	<p><b>Meteorological Data</b></p> <p>Important meteorological data from nearest observatory at Hazaribag is placed at Annexure-II.</p>			
1.06.00	<p><b>Plant Water Scheme</b></p> <p>The Plant water scheme is described below.</p>			
1.06.01	<p><b>Condenser Cooling System</b></p> <p>It is proposed to adopt Air Cooled Condenser for the project.</p>			
1.06.02	<p><b>Equipment Cooling Water (ECW) System (Unit Auxiliaries)</b></p> <p>All plant auxiliaries shall be cooled by De-mineralized water (DM) in a closed circuit. The primary circuit DM water shall be cooled through heat exchangers by auxiliary cooling water system. The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system.</p>			
1.06.03	<p><b>Ash Water System</b></p> <p>It is proposed to have HCSD (High concentration Slurry Disposal) system for combined fly ash and bottom ash. No recirculation of ash water from ash disposal area is envisaged.</p>			
1.06.04	<p><b>Other Miscellaneous Water Systems</b></p> <p>(a) Raw water shall be used for meeting the Fly ash and bottom ash system requirement etc.</p> <p>(b) The service water shall be taken from clarified water tank of Pretreatment plant. Service water (wash water) collected from various areas shall be treated using oil water separators, tube settlers, coal settling pits etc. as per requirement and treated water from liquid effluent treatment plant shall be recycled back to the service water system for re-use.</p> <p>(c) The drinking water requirement of the plant shall be provided from water treatment plant.</p>			
<p><b>NORTH KARANPURA STPP (3 X 660 MW) EPC PACKAGE</b></p>	<p><b>TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO.:CS-4410-001-2</b></p>	<p><b>SUB-SECTION-IB PROJECT INFORMATION</b></p>	<p><b>PAGE 2 OF 10</b></p>	

CLAUSE NO.	PROJECT INFORMATION			
1.07.00	<p>(d) Steam Cycle make-up water, makeup to the primary circuit of ECW (unit auxiliaries) system, boiler fill water and makeup to the hydrogen generation plant shall be provided from Demineralising plant.</p> <p>(e) The quality of Raw water is enclosed with this sub-section as Annexure-III.</p> <p><b>Criteria for Earthquake Resistant Design of Structures and Equipment</b></p> <p>All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed for seismic forces as given in the Part - B of this section.</p>			
1.08.00	<p><b>Criteria for Wind Resistant Design of Structures and Equipment</b></p> <p>All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given as given in Part B of this section.</p>			
<p><b>NORTH KARANPURA STPP (3 X 660 MW) EPC PACKAGE</b></p>	<p><b>TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO.:CS-4410-001-2</b></p>	<p><b>SUB-SECTION-IB PROJECT INFORMATION</b></p>	<p><b>PAGE 3 OF 10</b></p>	

CRITERIA FOR WIND RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT

All structures shall be designed for wind forces in accordance with IS: 875 (Part-3) and as specified in this document. See Annexure – B for site specific information.

Along wind forces shall generally be computed by the Peak (i.e. 3 second gust) Wind Speed method as defined in the standard.

Along wind forces on slender and wind sensitive structures and structural elements shall also be computed, for dynamic effects, using the Gust Factor or Gust Effectiveness Factor method as defined in the standard. The structures shall be designed for the higher of the forces obtained from Gust Factor method and the Peak Wind Speed method.

Analysis for dynamic effects of wind must be undertaken for any structure which has a height to minimum lateral dimension ratio greater than “5” and/or if the fundamental frequency of the structure is less than 1 Hz.


Susceptibility of structures to across-wind forces, galloping, flutter, ovaling etc. should be examined and designed/detailed accordingly following the recommendations of IS:875(Part-3) and other relevant Indian standards.


It should be estimated if size and relative position of other structures are likely to enhance the wind loading on the structure under consideration. Enhancement factor, if necessary, shall suitably be estimated and applied to the wind loading to account for the interference effects.


**Damping in Structures**


The damping factor (as a percentage of critical damping) to be adopted shall not be more than as indicated below for:

a) Welded steel structures	:	1.0%
b) Bolted steel structures	:	2.0%
c) Reinforced concrete structures	:	1.6%
d) Steel stacks	:	As per IS:6533 & CICIND Model Code whichever is more critical.

CLAUSE NO.	TECHNICAL REQUIREMENTS												
	<p style="text-align: right;"><b>ANNEXURE-B</b></p> <p>SITE SPECIFIC DESIGN PARAMETERS</p> <p>The various design parameters, as defined in IS: 875 (Part-3), to be adopted for the project site shall be as follows:</p> <table border="1" data-bbox="347 528 1465 779"> <tr> <td data-bbox="347 528 914 636">a) The basic wind speed "<math>V_b</math>" at ten metres above the mean ground level</td> <td data-bbox="914 528 1026 636">:</td> <td data-bbox="1026 528 1465 636">39 metres/second</td> </tr> <tr> <td data-bbox="347 636 914 710">b) The risk coefficient "<math>K_1</math>"</td> <td data-bbox="914 636 1026 710">:</td> <td data-bbox="1026 636 1465 710">1.06</td> </tr> <tr> <td data-bbox="347 710 914 779">c) Category of terrain</td> <td data-bbox="914 710 1026 779">:</td> <td data-bbox="1026 710 1465 779">Category-2</td> </tr> </table> <p style="text-align: center;">:</p> <p>Note: Notwithstanding the values of the above mentioned parameters,  1. The design wind pressure "<math>p_z</math>" at any point (computed using Peak Wind Speed method) shall not be taken less than 1500 N/Sq. metre for all classes of structures, i.e. A, B &amp; C, as defined in IS:875(Part-3).</p> <p>The design wind pressure " <math>\bar{p}_z</math> " at any point (computed using Gust Factor method) multiplied by the gust factor "G" shall not be taken less than 1500 N/Sq. metre.</p>			a) The basic wind speed " $V_b$ " at ten metres above the mean ground level	:	39 metres/second	b) The risk coefficient " $K_1$ "	:	1.06	c) Category of terrain	:	Category-2	
a) The basic wind speed " $V_b$ " at ten metres above the mean ground level	:	39 metres/second											
b) The risk coefficient " $K_1$ "	:	1.06											
c) Category of terrain	:	Category-2											
<p style="text-align: center;"><b>NORTH KARANPURA STPP (3X660MW) EPC PACKAGE</b></p>	<p style="text-align: center;"><b>TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO.:CS-4410-001-2</b></p>	<p style="text-align: center;"><b>SUB-SECTION-D-01 CIVIL WORKS</b></p>	<p style="text-align: center;"><b>PAGE 226 OF 234</b></p>										

CLAUSE NO.	TECHNICAL REQUIREMENTS																			
	<p style="text-align: right;"><b>Annexure-(e)</b></p> <p><b>CRITERIA FOR EARTHQUAKE RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT</b></p> <p>All structures and equipment shall be designed for seismic forces adopting the site specific seismic information provided in this document and using the other provisions in accordance with IS:1893 (Part 1):2002 and IS:1893 (Part 4):2005. Pending finalization of Parts 2, 3 and 5 of IS:1893, provisions of part 1 shall be read along with the relevant clauses of IS:1893:1984, for structures other than the buildings and industrial structures including stack-like structures.</p> <p>A site specific seismic study has been conducted for the project site. The peak ground horizontal acceleration for the project site, the site specific acceleration spectral coefficients (in units of gravity acceleration 'g') in the horizontal direction for the various damping values and the multiplying factor (to be used over the spectral coefficients) for evaluating the design acceleration spectra are as given at Annexure-I.</p> <p>Vertical acceleration spectral values shall be taken as 2/3rd of the corresponding horizontal values.</p> <p>The site specific design acceleration spectra shall be used in place of the response acceleration spectra, given at figure-2 in IS:1893 (Part 1) and Annex B of IS:1893 (Part 4). The site specific acceleration spectra along with multiplying factors specified in Annexure-I includes the effect of the seismic environment of the site, the importance factor related to the structures and the response reduction factor. Hence, the design spectra do not require any further consideration of the zone factor (Z), the importance factor (I) and response reduction factor (R) as used in the IS:1893 (Part 1 and Part 4).</p> <p><b>Damping in Structures</b></p> <p>The damping factor (as a percentage of critical damping) to be adopted shall not be more than as indicated below for:</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 5%;">a)</td> <td style="width: 70%;">Steel structures</td> <td style="width: 5%;">:</td> <td style="width: 10%;">2%</td> </tr> <tr> <td>b)</td> <td>Reinforced Concrete structures</td> <td>:</td> <td>5%</td> </tr> <tr> <td>c)</td> <td>Reinforced Concrete Stacks</td> <td>:</td> <td>3%</td> </tr> <tr> <td>d)</td> <td>Steel stacks</td> <td>:</td> <td>2%</td> </tr> </table>				a)	Steel structures	:	2%	b)	Reinforced Concrete structures	:	5%	c)	Reinforced Concrete Stacks	:	3%	d)	Steel stacks	:	2%
a)	Steel structures	:	2%																	
b)	Reinforced Concrete structures	:	5%																	
c)	Reinforced Concrete Stacks	:	3%																	
d)	Steel stacks	:	2%																	
<p style="text-align: center;"><b>NORTH KARANPURA STPP (3X660MW) EPC PACKAGE</b></p>	<p style="text-align: center;"><b>TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO.:CS-4410-001-2</b></p>	<p style="text-align: center;"><b>SUB-SECTION-D-01 CIVIL WORKS</b></p>	<p style="text-align: center;"><b>PAGE 227 OF 234</b></p>																	

CLAUSE NO.	<b>TECHNICAL REQUIREMENTS</b> 		
	<p><b>Method of Analysis</b></p> <p>Since most structures in a power plant are irregular in shape and have irregular distribution of mass and stiffness, dynamic analysis for obtaining the design seismic forces shall be carried out using the response spectrum method. The number of vibration modes used in the analysis should be such that the sum total of modal masses of all modes considered is at least 90 percent of the total seismic mass and shall also meet requirements of IS:1893 (Part 1). Modal combination of the peak response quantities shall be performed as per Complete Quadratic Combination (CQC) method or by an acceptable alternative as per IS:1893 (Part 1).</p> <p>In general, seismic analysis shall be performed for the three orthogonal (two principal horizontal and one vertical) components of earthquake motion. The seismic response from the three components shall be combined as specified in IS:1893 (Part 1).</p> <p>For buildings, if the design base shear (<math>V_B</math>) obtained from modal combination is less than the base shear (<math>\bar{V}_B</math>) computed using the approximate fundamental period (<math>T_a</math>) given in IS:1893:Part 1 and using site specific acceleration spectra with appropriate multiplying factor, the response quantities (e.g. member forces, displacements, storey forces, storey shears and base reactions) shall be enhanced in the ratio of <math>\bar{V}_B / V_B</math>. However, no reduction is permitted if <math>\bar{V}_B</math> is less than <math>V_B</math>.</p> <p>For regular buildings less than 12m in height, design seismic base shear and its distribution to different floor levels along the height of the building may be carried out as specified under clause 7.5, 7.6 &amp; 7.7 of IS:1893 (Part 1) and using site specific design acceleration spectra. The design horizontal acceleration spectrum value (<math>A_h</math>) shall be computed for the fundamental natural period as per clause 7.6 of IS:1893 (Part 1) using site specific spectral acceleration coefficients with appropriate multiplying factor given in Annexure-I. Further, the spectral acceleration coefficient shall get restricted to the peak spectral value if the fundamental natural period of the building falls to the left of the peak in the spectral acceleration curve.</p> <p><b>Design/Detailing for Ductility for Structures</b></p> <p>The site specific design acceleration spectra is a reduced spectra and has an in-built allowance for ductility. Structures shall be engineered and detailed in accordance with relevant Indian/International standards to achieve ductility.</p>		
<b>NORTH KARANPURA STPP (3X660MW) EPC PACKAGE</b>	<b>TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO.:CS-4410-001-2</b>	<b>SUB-SECTION-D-01 CIVIL WORKS</b>	<b>PAGE 228 OF 234</b>

CLAUSE NO.	TECHNICAL REQUIREMENTS			
	<p style="text-align: right;">ANNEXURE – I</p> <p><u>SITE SPECIFIC SEISMIC PARAMETERS FOR DESIGN OF STRUCTURES AND EQUIPMENT</u></p> <p><b>The various site specific seismic parameters for the project site shall be as follows:</b></p> <ol style="list-style-type: none"> <li>1) Peak ground horizontal acceleration : 0.19g</li> <li>2) Multiplying factor to be applied to the site specific horizontal acceleration spectral coefficients (in units of gravity acceleration 'g') to obtain the design acceleration spectra               <ol style="list-style-type: none"> <li>a) for moment resisting steel frames designed and detailed as per IS:800 and moment resisting RC frames designed and detailed as per IS:456 : 0.067</li> <li>b) for braced steel frames designed and detailed as per IS:800 : 0.05</li> <li>c) for moment resisting RC frames designed and detailed as per IS:456 and IS:13920 : 0.04</li> <li>d) for steel chimney : 0.10</li> <li>e) for design of structures not covered under 2 (a) to 2 (d) above and under 3 below : 0.067</li> </ol> </li> <li>3) Multiplying factor to be applied to the site specific horizontal acceleration spectral coefficients (in units of gravity acceleration 'g') for design of equipment and structures where inelastic action is not relevant or not permitted : 0.127</li> </ol> <p>Note: g = Acceleration due to gravity</p> <p>The horizontal seismic acceleration spectral coefficients are furnished in subsequent pages.</p>			
<p style="text-align: center;">NORTH KARANPURA STPP (3X660MW) EPC PACKAGE</p>	<p style="text-align: center;">TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC.NO.:CS-4410-001-2</p>	<p style="text-align: center;">SUB-SECTION-D-01 CIVIL WORKS</p>	<p style="text-align: center;">PAGE 229 OF 234</p>	

## ANNEXURE – I

**HORIZONTAL SEISMIC ACCELERATION SPECTRAL COEFFICIENTS**  
**In units of 'g' for NORTH KARANPURA STPP**

Period (Sec)	Damping Factor (as a percentage of critical damping)		
	2%	3%	5%
0.000	1	1	1
0.030	1	1	1
0.040	1.693	1.564	1.418
0.050	2.548	2.213	1.859
0.058	3.344	2.787	2.226
0.059	3.450	2.863	2.273
0.060	3.558	2.938	2.320
0.061	3.667	3.015	2.367
0.062	3.778	3.092	2.414
0.065	4.119	3.328	2.557
0.067	4.366	3.488	2.652
0.070	4.366	3.734	2.797
0.071	4.366	3.772	2.846
0.074	4.366	3.772	2.992
0.075	4.366	3.772	3.042
0.084	4.366	3.772	3.054
0.094	4.366	3.772	3.054
0.104	4.366	3.772	3.054
0.114	4.366	3.772	3.054
0.120	4.366	3.772	3.054
0.121	4.366	3.772	3.054
0.123	4.366	3.772	3.054
0.124	4.366	3.772	3.054
0.126	4.366	3.772	3.054
0.133	4.366	3.772	3.054
0.304	4.366	3.772	3.054
0.310	4.366	3.772	3.054
0.327	4.366	3.772	3.054
0.335	4.366	3.772	3.054
0.352	4.366	3.772	3.054
0.376	4.366	3.772	3.054
0.400	4.366	3.772	3.054
0.450	4.350	3.760	3.042
0.500	3.808	3.454	2.720
0.550	3.462	3.140	2.473
0.601	3.168	2.874	2.263
0.604	3.152	2.859	2.252
0.617	3.086	2.799	2.204
0.622	3.061	2.777	2.186

## ANNEXURE – I

**HORIZONTAL SEISMIC ACCELERATION SPECTRAL COEFFICIENTS**  
**In units of 'g' for NORTH KARANPURA STPP**

Period (Sec)	Damping Factor (as a percentage of critical damping)		
	2%	3%	5%
0.632	3.013	2.733	2.152
0.667	2.855	2.589	2.039
0.767	2.482	2.252	1.773
0.867	2.196	1.992	1.569
0.967	1.969	1.786	1.406
1.067	1.784	1.619	1.275
1.167	1.632	1.480	1.165
1.267	1.503	1.363	1.073
1.367	1.393	1.263	0.995
1.467	1.298	1.177	0.927
1.567	1.215	1.102	0.868
1.667	1.142	1.036	0.816
1.767	1.078	0.977	0.770
1.867	1.020	0.925	0.728
1.967	0.968	0.878	0.691
2.067	0.921	0.836	0.658
2.167	0.879	0.797	0.628
2.267	0.840	0.762	0.600
2.367	0.804	0.730	0.575
2.467	0.772	0.700	0.551
2.567	0.742	0.673	0.530
2.667	0.714	0.648	0.510
2.767	0.688	0.624	0.492
2.867	0.664	0.602	0.474
2.967	0.642	0.582	0.458
3.067	0.621	0.563	0.443
3.167	0.601	0.545	0.429
3.267	0.583	0.529	0.416
3.367	0.565	0.513	0.404
3.467	0.549	0.498	0.392
3.544	0.537	0.487	0.384
3.559	0.535	0.485	0.382
3.666	0.519	0.471	0.371
3.765	0.506	0.459	0.361
3.865	0.493	0.447	0.352
3.965	0.480	0.436	0.343
4.006	0.475	0.431	0.339
4.017	0.474	0.430	0.339
4.056	0.469	0.426	0.335

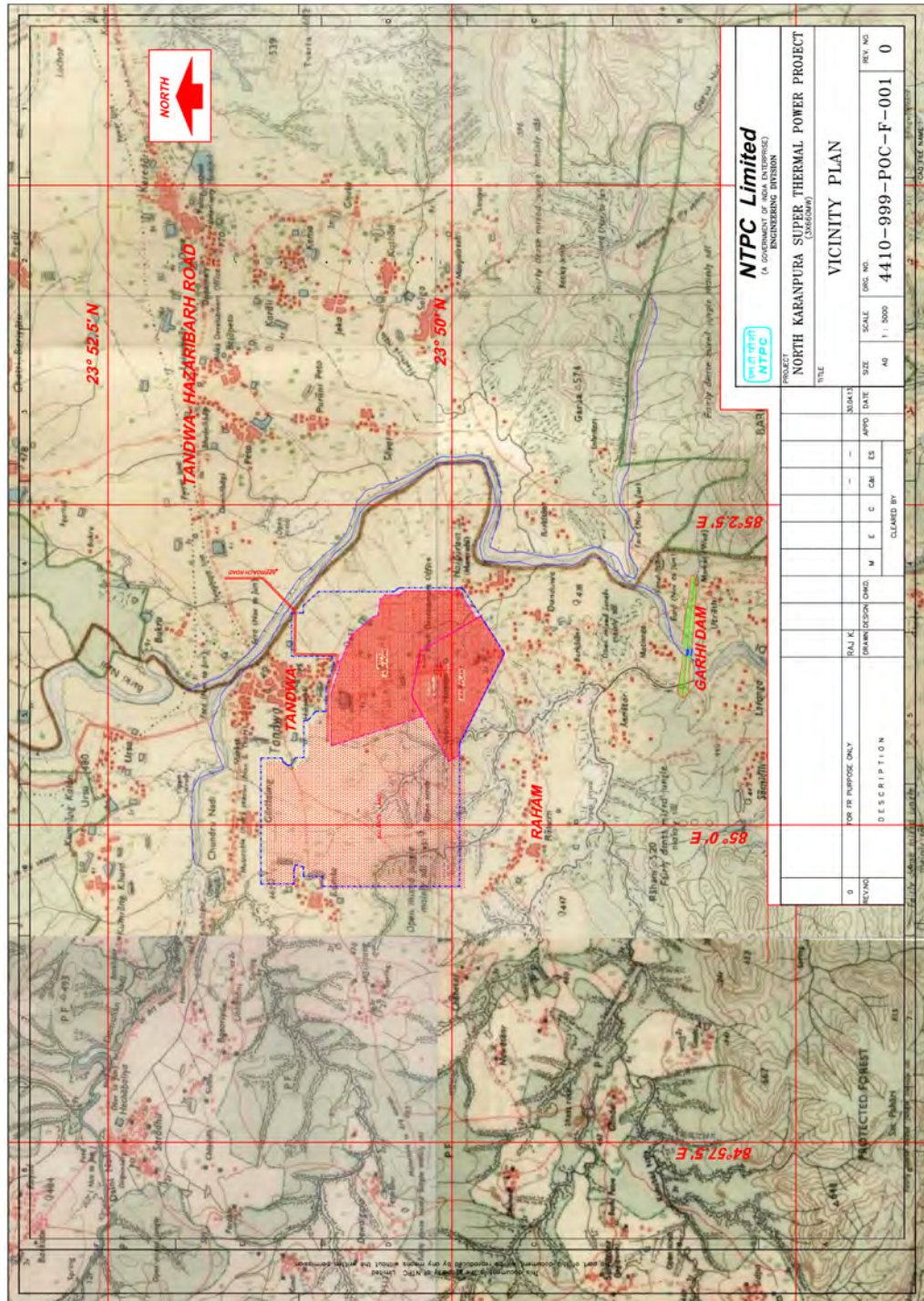
CLAUSE NO.

PROJECT INFORMATION



Annexure-I

VICINITY PLAN



NORTH KARANPURA STPP  
(3 X 660 MW)  
EPC PACKAGE

TECHNICAL SPECIFICATION  
SECTION – VI, PART-A  
BID DOC. NO.:CS-4410-001-2

SUB-SECTION-IB  
PROJECT INFORMATION

PAGE  
4 OF 10





**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENTS  
3 X 660 MW WANAKBORI TPS**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME: II B**

**SECTION : C**

**REV. 00**

**DATE: 21/12/2015**

**SECTION: C**  
**TECHNICAL SPECIFICATIONS**



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFIC TECHNICAL REQUIREMENT**

**SPECIFICATION No: PE-TS-405-550-A001**


**VOLUME: II B**

**SECTION : C.1**

**REV. 00**

**DATE: 21/12/2015**

**SECTION: C.1  
FIRE WATER TENDER**

	TITLE	DOCUMENT NO.: PE-TS-405-550-A001	
	<b>TECHNICAL SPECIFICATION FOR FIRE TENDERS, FIRE JEEP &amp; FIRE SAFETY EQUIPMENT 3 X 660MW NORTHKARANPURA STPP</b>	VOLUME- IIB	
		REV. 0	DATE: 21.12.15
		SHEET	

## 1.0.0 SCOPE

### 1.1.0 SCOPE OF SUPPLY

- i) Fire water tender (1 no.) ,conforming to IS: 950:2012 & latest Type B, complete with all accessories and equipment's as specified herein & including those specified in **Annexure-I** , Section-D.
- ii) First fill of chemicals & consumables during performance demonstration.
- iii) Replenishment of consumables & chemicals consumed during performance demonstration of tenders.

### 1.2.0 SCOPE OF SERVICES

Performance demonstration of fire water tender at site and training of owner's personnel.

## 2.0.0 CODES AND STANDARDS

The design, material of construction, workmanship & finish, performance testing, accessories and equipments of fire water tender and foam tender specified herein shall comply with the requirements of codes/standard as follows:

Latest IS: 950 Type-B - Functional requirements for fire water tender, Type-B for fire brigade use.

## 3.0.0 DESCRIPTION OF FIRE WATER TENDER

### 3.1.0 VEHICLE CHASSIS

The chassis for carrying out fabrication work of fire water tender shall be of Make-TATA Chassis model no. 2516/ Ashok Leyland 2516/ equivalent chassis.

### 3.2.0 GENERAL REQUIREMENTS

**The vehicle shall be built conforming to IS 950: 2012**

3.2.1 The appliance shall incorporate a high and low pressure fire pump of **min. 2000** lpm capacity at 0.7 MPa and 300 lpm capacity at 3.5 MPa respectively. The appliance shall carry a water tank of min 4500ltr capacity. It shall carry an extension ladder and shall be capable of towing a trailer pump.

3.2.2 The water tender shall be fabricated in a manner so as to conform to the following characteristics:

- a) Gross vehicle weight not less than **25000 kg including crew, Water and equipment**
- b) Maximum speed on level road 80 km/h (fully laden)



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FIRE TENDERS, FIRE JEEP & FIRE  
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- c) Acceleration from a standing start through the gears (fully laden) 64 km/h in 55 seconds
- d) The appliance shall be capable of being started from rest on a gradient of 1 to 4.
- e) When travelling at 50 km/h on a level dry surface the foot brake shall be capable of stopping the vehicle within a distance of 15 m from the point at which the brake is applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
- f) The appliance shall have the following overall dimensions:
- |                |                       |
|----------------|-----------------------|
| Wheel base     | Not more than 4500 mm |
| Turning circle | Not more than 20 m    |
| Road clearance | Not less than 26 cm   |
| Overall width  | Not more than 2.50 m  |

Note: - The chassis shall meet the prevailing emission norms and shall totally comply with the Central Motor Vehicle Rules.

3.2.3 All parts, which shall form waterways or come into contact with water shall be of corrosion-resisting material or should be made of material duly treated for anti-corrosion. All metal parts exposed to atmosphere shall either be of corrosion-resisting material or treated.

3.2.4 Lubricating nipples shall be provided wherever necessary.

### 3.2.5 MATERIAL

3.2.5.1 The choice of material to be used in the construction of the appliance shall be made with a view to combining lightness with strength and durability. The following choice of materials shall be followed:

Pump casing and low pressure impeller: Lead tin bronze (Grade LTB2 of IS 318)

High pressure impeller: Phosphor-bronze or Stainless steel or Aluminum bronze (IS 617)

Impeller ring and impeller neck ring: Lead tin bronze (Grade LTB 2 of IS 318)

Pump shaft: Stainless steel (Grade 04Cr18Ni10 of IS 6603)

Pump panel: Aluminum sheets/chequered plates (IS 737) or Mild steel sheets (IS 513)

3.2.5.2 All parts which form water ways or come into contact with water shall be of stainless steel. All metal parts exposed to atmosphere shall either be of corrosion-resisting material or suitably treated to resist corrosion.

3.2.5.3 Lubricating nipples shall be provided, wherever necessary.

### 3.3.0 DESIGN AND CONSTRUCTION

#### 3.3.1 Engine

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- 3.3.1.1 The engine shall be of CI type with radiator cooling system to permit its continuous stationary running without overheating. Indirect cooling system shall be incorporated, if necessary, which shall be of the open circuit type discharging water to the waste. Arrangements shall be made to divert the cooling discharge water to water tank, if necessary.
- 3.3.1.2 The operating temperature of the engine cooling water shall preferably be thermostatically controlled.
- 3.3.1.3 The oil in the oil sump shall be prevented from overheating.
- 3.3.1.4 Suitable gauge for cooling water and glow lamp for lubricating system shall be provided in the driver's cab and on the pump panel. This shall be marked with operating temperature.
- 3.3.1.5 External filter shall be provided for the lubricating system and a tubular dip-stick to gauge the level of oil in the oil sump shall be provided.
- 3.3.1.6 The heat exchanger tank shall be made from minimum 1.22 mm thick mass sheet and the coil in the coolant tank shall be of copper for effective cooling. The design of the heat exchanger shall be such that the temperature of the engine shall not exceed for the operating temperature specified by the chassis manufacturer when the vehicle is being tested in stationary conditions.
- 3.3.2 **Electrical System**
- 3.3.2.1 A trickle type battery charge shall be provided for recharging the battery *in situ*. Battery will be automatically charged when engine is in operation. A red pilot lamp, indicating when the batteries are being charged from an external supply, shall be provided.
- 3.3.2.2 All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse-box located in an accessible position from driver's cab and fitted with means for carrying spare fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.
- 3.3.2.3 **Water Tank** - It shall have minimum capacity of 4500 litres **as per latest IS-950**.
- 3.3.2.4 A single tank shall be used with a capacity of 4500 liters. The tank body and baffles shall be of minimum 5 mm thick mild steel plates. The tank shall be mounted on the chassis and suitably baffled in a manner keeping in view the proper load distribution on the axles. The baffling provided in the tank shall be able to prevent surge when the vehicle is breaking, cornering or accelerating. The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purpose. The tank shall be mounted on minimum three cross members to counter act the stresses caused by chassis flexion and shall be so secured that it can be easily removed. The shape of the tank shall be rectangular with convex top and bottom. The tank shall be mounted on the vehicles using metacone mounting. U-bolts shall not be used in the vehicle. Suitable eyes shall be provided on the shell of the tank to enable it to be lifted from the vehicle for repairs/ replacement as and when required.



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- 3.3.2.5 The tank shall be fitted with a 100 mm bore overflow pipe. A 63 mm instantaneous hydrant connection, incorporating a strainer, shall be provided close to the pump panel control for filling the tank through 75 mm bore pipe work or feeding the hose reel equipment. Minimum 100 mm bore pipe line shall be taken from the tank to the suction inlet of the pump incorporating minimum 100 mm quick action spherical type valve. Separate valve(s) for performing the function given in 14.3.6 shall be provided to control the flow of water to the hose reel equipment. Drain plugs or drain cocks shall be provided, wherever necessary.
- 3.3.2.6 The tank shall be given adequate anti-corrosive epoxy treatment consisting of one coat of primer with two coats of finish paint after preparing the surface by shot blasting from inside and outside after fabrication if it is not galvanized. The open end of the overflow pipe should be taken down to a point well below the chassis without affecting the effective ground clearance when fully loaded and shall discharge away from the wheels.
- 3.3.2.7 Dial gauge water level indicator for the tank shall be provided preferably in the driver's cab (or a visual level gauge of the glass tube shall be provided at the control panel calibrated 1/4, 1/2, 3/4 and full (preferably calibrated in liters).
- 3.3.2.8 The tank shall have a bolted manhole of 450 mm diameter minimum and shall have a threaded ring and cap of 300 mm diameter for filling the water tank from the top. The manhole cover shall be made from 5 mm thick mild steel plate and epoxy coated from inside and outside. A cleaning hole of at least 250 mm diameter shall also be provided at the bottom. The manhole shall be located at top with ladder for access to bottom.
- 3.3.2.9 The tank shall be connected with the pump and hose reel and valve (s) shall be provided in such a way that any of the following operation are possible:
- a) Hydrant - tank,
  - b) Hydrant - reels,
  - c) Tank-pump-high and low pressure hose reel,
  - d) Hydrant- pump- high and low pressure hose reel, and
  - e) Tank-Pump-Monitor
  - f) Off.
- 3.3.2.10 The tank shall be connected to the pump and hose reel in such a manner that pressurization of water tank or water tank pump connection is not possible when pumping water from an outside source of supply.
- 3.3.2.11 The plumbing between pump and hose reel shall have a clear and unobstructed water way of not less than 25 mm throughout without any obstruction.
- 3.3.3 **Hose Reel**

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Two nos. hose reel (conforming to IS: 884) shall be provided at the rear of the appliance with 60 m lengths of 20 mm bore hose connected by screw 'C' type quick release couplings and terminating with a control branch and fog nozzle. The reel shall be fitted with over brake or locking device. The gun shall be of constant flow type and shall have a discharge capacity of 150 litre/min approximately. Provision shall be made in the gun controls to achieve combat mode (straight jet) or a fog shield in split second. The fog gun shall be made of stainless steel or aluminum alloy.

### 3.3.4 Pump

3.3.4.1 A centrifugal pump high and low pressure pump shall be mounted at rear/mid-ship side of the appliance. The low and high pressure sections of the pump may be either single-stage or multi stage type. Anti-friction bearings external to the casing be provided so as to avoid any bearings within the pump casing. The bearing used in the pump shall be of reputed make. The gland shall be of the mechanical self-adjusting type. The pump shall be provided with in-built filter assembly of easily removable type, which shall filter the water before entering into pressure stage impeller. A filter capable of filtering particle size up to 0.75 mm or less shall be used. This filter shall be of stainless steel and shall be easily accessible for cleaning.

The normal and high pressure impeller shall be mounted on a single shaft. The impeller(s) of the low pressure section shall be closed type and shall be dynamically balanced. The impeller(s) of the high pressure section shall be closed or regenerative type. A drain cock plug shall be provided at the bottom of the casing in a way to prevent the cock being opened due to vibrations. Studs, bolts etc., used in the pump casing coming in contact with the water shall be of stainless steel. The castings shall be without any blow holes, internal cracks, etc. The interior of the casting shall be smooth finished. The castings shall withstand the hydraulic pressure as specified against Cl. No. 14.5.5.

The bearing housing will be made of C.I. the delivery outlet, delivery valves and high pressure circuitry shall be made of Gun metal conforming to Gr.II of IS:318.

The pump shall be provided inbuilt (integrated in the pump outlet manifold) pressure relief valve which shall operate automatically and shall not allow the high pressure to increase beyond 45 Kg/cm<sup>2</sup>.

3.3.4.2 The pump shall be completely covered. However, all the controls on the panel and the gauges shall be uncovered.

The pump shall be coupled to the prime-mover of the chassis through a power take-off (PTO) capable of transmitting full torque of the engine used for the appliance. All propeller shafts and all fittings used for coupling the PTO, pump, etc., shall be of the same size and type as used by the chassis manufacturer for the drive line.

The PTO shall have a step up gear ratio of not less than 1:1.27. A cooling coil made of copper pipe shall be provided in the bottom of the PTO casing.

A control lever for engaging and disengaging the pump, with suitable locking devices, shall be provided in the driver's cab.



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3.3.4.3 The pump shall be designed to give its rated output with an engine and pump input at shaft speed safe enough to operate the engine. The pump shall give performance as detailed below when working with strainers (except basket strainer) at  $27 \pm 2$  °C.:

The pump shall be capable of delivering 2000 LPM @ 7 Kg/cm<sup>2</sup> and 300 LPM @ 35 Kg/cm<sup>2</sup> at 3 mtrs. suction lift at NTP condition.

The pump shall follow the following performance parameters:

Normal Pressure Output	: 2000 LPM @ 7 Kg/cm <sup>2</sup>
High pressure Output	: 300 LPM @ 35 Kg/cm <sup>2</sup>
Maximum Pressure in Normal Pressure mode	: 14 Kg/cm <sup>2</sup> (shut off pressure)
Maximum Pressure in High Pressure mode	: 45 Kg/cm <sup>2</sup>
Deep Lifting Capacity of Pump	: 30 m <sup>3</sup> /sec max. up to 7 M in 30 Sec. at NTP conditions

The above performance data shall be considered when working through 2.54 m lengths of specified suction hose.

The design of pump shall be such that the normal pressure and high pressure stages can be operated simultaneously. Simple mechanism shall be provided to change over from normal pressure to high pressure, preferably a single lever operation. However at any given pump/engine speed, the low pressure registered shall not exceed 1/4<sup>th</sup> (one quarter) of the registered high pressure.

The pump housing shall have provision to connect normal pressure hose reel and cooling water line.

The efficiency of the pump shall be such that the power and the RPM required shall not be more than that available with the engine.

3.3.4.4 The material of construction for pump & its control panel shall be as follows:

- |    |                                       |  |
|----|---------------------------------------|--|
| a) | Pump casing and low pressure impeller | Lead tin bronze(Grade LTB2 of IS:318 )                             |
| b) | High pressure impeller                | Phosphorous-bronze or stainless steel or aluminum bronze ( IS 617) |
| c) | Impeller ring and impeller neck ring  | Lead tin bronze (Grade LTB2 of IS: 318)                            |





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3.3.7.3 The primer shall be constructed of gun metal with stainless steel shaft and shall be fitted with suitable lubricated bearing depending upon the type of primer. The caps of primer and springs shall be properly secured. The primer lever shall be easily accessible from the operator(s) position.

3.3.7.4 In the case of reciprocating type, the primer shall be preferably designed with a view to primer when the pump is running at speed of 1000 to 1500 rpm. The primer shall disengage automatically at pump pressure of 1.5 to 2.0 bars without manual intervention.

### 3.3.8 **Water/Foam Monitor**

One water-cum-foam monitor shall be provided on the top at suitable location. The monitor shall conform to IS 8442.

### 3.3.9 **Control Panels**

3.3.9.1 Adequately illuminated control panel shall be provided and positioned as follows:

- a) Rear mounted pump - One control panel at the rear of the appliance.

3.3.9.2 The control panel(s) shall include the following:


- a) Throttle control for engine;
- b) Pressure gauge -0 to 2 MPa  
Pressure gauge – 0 to 5 MPa
- c) Compound gauge calibrated as under:  
Vacuum - 0 to 75 cm Hg, preferably in black;  
Pressure - 0 to 0.6 MPa preferably in black;
- d) Primer control (if the primer is not fully automatic)
- e) Gauge for cooling water and glow lamp for lubricating system;
- f) Cooling water circuit control.
- g) Control for using monitor.

3.3.9.3 The following shall also be provided at a convenient position near the control panel(s):

- a) Water level indicator as described under cl.no. 14.3.4
- b) Control valve as described under cl.no. 14.3.6
- c) Hydrant connections.

### 3.4.0 **Body Work and Stowage**

3.4.1 Cabin

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3.4.1.1 Enclosed accommodation for six persons shall be provided in the driver cab-cum-crew compartment including the driver and the in-charge of the crew. Both the seats shall be independent. The driver's seat shall be adjustable and comfortable. The rear compartment of driver's cabin shall have one removable seat for full width of cab for 5 (five) crew members. The cab floor shall be covered with 3 mm thick aluminium chequered plate rigidly fixed to the frame cross members by means of nuts and bolts or riveting. Trap doors for topping up oil, etc, wherever necessary shall be provided.

One roof light shall be provided in the driver's cabin dwell vision and external rear view mirrors shall be fitted to the cab.

3.4.1.2 The driver-cum-crew cabin shall be provided with full four doors, one for driver, and one for officer and two at the crew compartment. The doors shall be generously sized for easy embarking/disembarking of crew members. All the doors shall be fitted on the super structural members, each hung upon three invisible coach type mild steel stout hinges and fitted with best quality handles.

3.4.1.3 The door handle on outside of driver seat shall have a locking arrangement. Other doors shall be lockable from inside. In addition to the door lock, aluminum tower bolt of 20 mm shall be provided for all the doors from inside, adequate grab rails shall be provided for easily boarding and alighting from the appliance. 5.11.1.5 The windscreen glass shall be provided in the two valves and shall be flat in shape. Each glass shall be fitted in E.P.D.M. rubber beading. The glasses shall be 5 mm thick toughened safety glass. The rubber beading used for fitting glasses and window frame shall be E.P.D.M. rubber.

#### 3.4.2 Seats

3.4.2.1 The driver seat shall be adjustable type vertically, forward and backward. The officer seat shall be fixed type. Both the seats shall be rigidly fixed to the flooring by means of nuts and bolts. The seat cushion shall be of latex foam rubber 75 mm thick upholstered in good quality foam leather cloth. The back seat shall be of latex foam rubber 50 mm thick upholstered in good quality foam leather cloth.


3.4.2.2 Below the crew seat, two lockers shall be provided. One locker for battery box to accommodate two 12 V 13 plates batteries and another for keeping accessories. The extra length of battery cable shall be provided by manufacturer.

3.4.2.3 The crew seat shall be rigidly fixed to floor by means of nuts and bolts, running full width of the vehicle suitable for sitting five fireman, covered with 75 mm x 50 mm cushion latex foam rubber upholstered in good quality foam leather of approved shade.

3.4.2.4 Below the crew seat, two lockers shall be provided, one for storage of batteries and another for keeping accessories. The extra length of battery cable shall be provided, if required.

#### 5.4.3 Rear Body

5.4.3.1 The rear body shall be fabricated in continuation and in line. The under frame crew members shall be fabricated from the rolled mild steel channel of 100 mm x 50 mm x 5 mm size. The mild steel runner of 100 mm x 50 mm x 5 mm size shall be provided over the chassis member for the uniform distribution of load over the chassis. Each cross

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members shall be secured to the chassis frame by 16 mm diameter 'U' clamps with aluminum packing block and self-locking unit. Balata packing of thickness 12 mm shall be provided in between the chassis frame and across members.

#### 3.4.4 Super Structure

3.4.4.1 The super structural of the cabin shall be constructed out of 2 mm mild steel 45 mm x 45 mm x 20 mm pressed 'Top Hat' sections. The super structure shall be strengthened specifically on the members with the lockers doors frames are to be fitted and also the other members by providing brackets and gussets of 2 mm mild steel plate securely welded. The details of super structure are as follows: Under frame cross : 100 mm x 50 mm members x 5 mm Floor longitudinal : 50 mm x 50 mm members x 6 mm Vertical members on even : 45 mm x 45 mm side x 20 mm Skirt member : 45 mm x 45 mm x 20 mm Waist member : 45 mm x 45 mm x 20 mm Top deck longitudinal : 45 mm x 45 mm x 20 mm

3.4.4.2 The cab and lockers shall be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible.

3.4.4.3 The structure/frame work shall be of welded constructions and made from 2 mm thick mild steel pressed sections and square tubes. The angles and channels used shall be of minimum 3 mm thickness. The complete structure material shall be treated for anti-corrosion by zinc plating. The plating thickness shall not be less than 20 microns. Two coats of epoxy paint shall be applied to the completely welded structure.


3.4.4.4 The structure shall be so designed so as to avoid any vibration/ratting/deformation in the intended usage of the vehicle.

3.4.4.5 The interior paneling shall be done from 1.22 mm thick aluminium sheets and the exterior paneling shall be done from 1.60 mm thick aluminium sheets.

3.4.4.6 The entire roof of the vehicle, cabin floor and locker floor shall be covered with minimum 1.60 mm thick aluminium chequered plates. All the lockers sides and complete rear of the vehicle shall be covered with minimum 1.22 mm thick aluminium chequered plates.

3.4.4.7 Lockers shall be provided for secure stowage of all equipment given in Annex B. The height of the lockers from the bottom to the top of the opening shall be not less than 600 mm and the depth shall be not less than 600 mm. All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cab.

3.4.4.8 All lockers above chassis floor shall be covered with aluminium roller shutters. The roller shutters shall be made from extruded aluminium sections with suitable roller, spring, guide channels, etc. All aluminium sections used shall be properly anodized. The roller shutters shall be rolled inwards underneath the roof giving unobstructed access to the equipment lockers and the fire fighting material. These roller shutters shall open in every position of the vehicle even in rough terrain. Guide rails shall support the shutters over entire length on both sides to make them absolutely torsion free. The roller shutters shall have a sturdy lock, preventing accidental opening during movement of vehicle. Roller shutters shall be made of hollow rectangular shaped aluminium links which shall be inter connected with rubber/plastic/PVC profiles sealing the roller shutter watertight when

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closed. These roller shutters shall be durable, maintenance free, weather and corrosion resistant.

3.4.4.9 Suitable storage space shall be provided to store four 2.5 m lengths of suction hoses in convenient location.

3.5 Miscellaneous

3.5.1 A suitable bumper shall be provided at the rear rigidly fixed to the super structural members by means of nuts and bolts, fabricated from 100 mm x 50 mm x 5 mm mild steel channel.

3.5.2 Two cat ladders made out of stainless steel round or square pipe of 25 mm diameter shall be provided.

3.5.3 Two numbers of 25 mm diameter aluminum pipe railing with sufficient number of aluminum double socket brackets shall be provided to the rear body over the deck.

3.5.4 A heavy duty towing hook shall be provided and fitted the rear bumper by means of nuts and bolts.

3.5.5 Quick removable type wire mesh guard made from 25 mm x 25 mm size mild steel wire mesh of 1.6 mm covered in mild steel angle frame shall be provided to all the glasses of driver-cum-crew cabin.

3.5.6 Provision for Stowage of Equipments For all water fittings like branch pipes, etc, quick release type couplings are provided which enables the operator to locate the desired equipment instantly and thereby save valuable time at the time of fire. These couplings also ensure that none of the item damage the internal paneling and thereby increase the life of the vehicle. Suitable clamps, brackets, holders, etc, are provided for all other items.

3.5.7 Cable Winch

An electrically operated cable winch of 6 t capacity shall be provided. The winch unit shall be complete with minimum 5.5 HP 12 V dc series wound electric reversible motor for increased pulling power, rope drum, and 27 m heavy duty galvanized EIPS wire rope with replaceable self-locking clevis hook and shall be mounted on the front bumper of the vehicle with suitable strong supports.

3.5.8 Telescopic Light Mast or Inflatable Emergency Lighting System

A compact, low profile, roof mounted lighting system, fitted with 4 x 1 000 W metal halide lamps, vertically elevated pneumatically up to 4.6 m shall be installed on the roof of the vehicle. Lighting shall be provided by a 12 V or 24 V dc with remote control, directional lighting system with rotation and tilt lamps to provide total coverage. The remote control unit shall allow a person to operate all the functions of the light mast or inflatable emergency lighting system and accurately aim for complete directional positioning. In addition auto show, a one button command, automatically retracts, turns out the lights and stows the entire system to the compact transport position shall also be included in the remote controller. The complete unit shall comprise of hand held remote control with cable, rotation and tilt positioner, mounting frame with built-in tilt system.



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- 3.5.9 **Alternator Unit**  
A 6.5 kVA capacity portable diesel engine driven generator unit shall be mounted at suitable location with all necessary connections and control panel for providing power to the light mast as well as other electrically operated tools.
- 3.5.10 **Ladder Gallows**  
Gallows shall be provided to carry a 10.5 m, aluminium trussed type extension ladder. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.
- 3.5.11 **Tool-Kit Container**  
A specially fitted recessed tray for the normal kit of tools, carried on the appliance, shall be provided.
- 3.5.12 **Stability**  
The stability of the appliance shall be such that when under fully equipped and loaded conditions (but excluding crew), if the surface on which the appliance stands is tilted to either side, the point at which overturning occurs is not passed at an angle of 30° from the horizontal.
- 4.0.0 INSTRUCTION BOOK, ACCESSORIES AND EQUIPMENT**
- 4.1.0 **Instruction Book or Books**  
Instruction book(s) for the guidance of the user(s), including both operating and normal maintenance procedure shall be supplied. The book(s) shall include an itemized and illustrated spare parts list giving reference numbers of all the wearing parts. Further refer IS 950:2012.
- 5.0.0 WORKMANSHIP AND FINISH**
- 5.1.0 All parts of the appliance shall be of good workmanship and shall have streamlined finish.
- 5.2.0 The appliance shall be painted fire red colour conforming to Shade No. 536 of IS:5. The paint shall conform to IS: 2932
- 6.0.0 Accessories**
- 6.1.0 The following accessories shall be provided in addition to those normally fitted on modern commercial vehicles:
- a) Fire bells - 250 mm diameter fire bell shall be mounted externally and shall be capable of being operated from within the driving compartment. The bell shall be of the hand-operated type.
  - b) Head lamps - Two.
  - c) Fog lamps - Two.
  - d) Reversing light - Lamp suitably situated to assist reversing.



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- e) Amber blinkers lights - Situated on the head of the driving compartment.
- f) Trafficators - Illuminated with indicating lights on instrument panel or in any other prominent position in driving compartment.
- g) Wind screen wipers electrically operated.
- h) Tools - All tools required for normal routine maintenance of the appliance, which are not included in the kit for the chassis.
- j) Siren - Battery operated.
- k) Search light - Adjustable to give flood or beam light, mounted in a convenient position but capable of being readily disconnected and mounted on a tripod away from the appliance, complete with tripod and with not less than 30 mm of TRS cable on a reel mounted on the appliance.
- m) Spot light - Adjustable, mounted in a convenient position on the near side of the driving compartment.
- n) Inspection lamp - Protected type on wander lead with plug. A socket shall be provided in the control panel in the driver's cab for plugging in the lamp.
- p) Tail lamps - Two of combined stop and tail.
- q) Rear reflectors
- r) Wind Screen Washer
- s) Cab, instrument panel and locker, light
- t) Public address system.

#### 7.0.0 **MARKING**

Each appliance shall be clearly and permanently marked with the following information:

- a) Manufacturer's name, or trade-mark, if any
- b) Serial number of the pump body and year of construction
- c) Capacity of pump, in l/min
- d) Capacity of water tank, in litre
- e) Nominal speed, in rev/min
- f) Transmission ratio of the pump gear

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- g) Working pressure, in kg/cm<sup>2</sup>
- h) Direction of rotation of the pump shall be indicated by an arrow and this shall be permanently marked on the pump body
- i) Lubrication points, drainage devices, etc, shall be colour coded.

#### 8.0.0 **ADDITIONAL ACCESSORIES** (over & above accessories mentioned against CI.17.0.0)

The additional accessories that are normally required to assist in operation of appliance are detailed in enclosed **Annexure-I (refer Section D)**. Bidder to include these accessories in their scope of supply.

#### 9.0.0 **ACCEPTANCE TESTS**

The following acceptance tests on various equipment shall be conducted to meet guaranteed parameters and shall be carried out in accordance with relevant IS Code.

- a) Pump test
- b) Primer test
- c) Road test
- d) Stability
- e) Any other test as specified in IS 950:2012 & latest.

Further to this bidder to refer Annexure-VIII for reference quality plan attached, for bare minimum test to be conducted during inspection in the present of BHEL and NTPC. Also, bidder to submit the quality plan for tendered project for approval from BHEL and NTPC, any additional test if required during document approval, to be accepted by bidder without any price implication to BHEL.



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FOAM TENDER**





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applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.

f) The appliance shall have the following overall dimensions:

Wheel base	not more than 4500 mm
Turning circle	not more than 20 m
Road clearance	not more than 260 mm
Overall width	not more than 2.50 m

3.4.0 The monitor shall employ the self-aspiration type of foam production system where aeration is done at the branch pipe. The expansion ratio of the foam produced shall not be less than eight times with the use of foam compound as prescribed in IS: 4989 (latest edition).

3.3.2 The foam induction shall be automatic if one branch is in operation, all further addition and remove of branches shall automatically adjust the rate of foam compound induction within variation of 0 percent, the induction ratio not exceeding 6 percent.

3.5.0 A hose reel service shall be provided on the appliance. In addition to water carried on it, it shall also be possible to use water from a hydrant.

3.6.0 The supplementary agent used for fire fighting shall be dry chemical powder (2x75 Kg capacity).

3.7.0 The unit shall be designed to be as compact as possible, compatible with ease of accessibility to a service parts. The pump and foam making equipment controls shall be so arranged that one man can operate foam or water lines from the pump control panel.

3.8.0 Lever type valve controls shall be preferred.

3.9.0 All parts, which shall form waterways or come into contact with foam solution, shall be of corrosion resisting materials suitably treated with corrosion resistant compound. All metal parts exposed to atmosphere shall either be of corrosion resisting material or treated suitably to resist corrosion.

3.10.0 Lubricating nipples shall be provided wherever necessary.

#### **4.0.0 DESIGN AND CONSTRUCTION**

##### **4.1.0 Engine**

4.1.1 The engine shall be provided with cooling system to permit its continuous stationary running without overheating. Indirect cooling system shall be incorporated which shall be of the open circuit type discharging water to the waste.



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- 4.1.2 The operating temperature of the engine cooling water shall preferably be thermostatically controlled.
- 4.1.3 The oil in the oil sump shall be prevented from overheating
- 4.1.4 Suitable gauge for cooling water and glow lamp for lubricating system shall be provided in the driver's cab and on the pump panel. This shall be marked with operating temperature.
- 4.1.5 External filter shall be provided for the lubricating system and a tubular dip-stick to gauge the level of oil in the oil pump shall be provided.

#### 4.2.0 Electrical System

- 4.2.1 A trickle type battery charger shall be provided for recharging the battery in situ. A red pilot lamp, indicating when the batteries are being charged from an external supply, shall be provided.
- 4.2.2 All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse box located in an accessible position in driver's cab and fitted with means for carrying spare fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.

#### 4.3.0 Water Tank

- 4.3.1 A water tank of not less than 2000 litres. Capacity shall be mounted on the chassis. It shall be fabricated out of mild steel sheet of minimum 3 mm thickness. The tank shall be treated for anti-corrosion with epoxy paint consisting of one coat of primer and two coats of finish after sand blasting of inside surface and shall be suitably baffled to prevent surge when the vehicle is braking, accelerating or cornering. The baffle shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purposes. It shall be mounted on the chassis in a manner keeping in view the proper load distribution on the axles and shall be so designed as to bring the centre of gravity as low as possible in the chassis. It shall be rectangular in shape and the mounting of the tank shall be flexible type to prevent the tank's distortion. Due to the chassis flexion. The mounting shall permit full contents of the tank to flow into the pump. The tank with its fittings shall withstand hydrostatic pressure of 0.3 bar.
- 4.3.2 Suitable eyes shall be provided on the shell of the tank to enable the tank to be lifted off the vehicle for repairs or replacement as necessary.
- 4.3.3 The tank shall be fitted with two filling orifices, a drain cock, a manhole and a cleaning hole. The filling orifice shall be of not less than 250 mm diameter and shall be fitted with a manhole cover of 45 cm diameter minimum and a filler cap clearly marked 'water' preferably cast in metal. In addition, a 63 mm instantaneous hydrant connection, incorporating a strainer, shall be provided close to the pump panel control for filling the tank through 75 mm diameter pipe or feeding the hose reel equipment. An 100 mm to pipe line shall be taken from the tank to the suction inlet of the pump incorporating an 100 mm quick action spherical type valve. Separate valve (s) for performing different functions shall be provided to control the flow of water. Drain plugs or cocks shall be provided wherever necessary cleaning hole of not less than 25 cm diameter shall be provided at the bottom of the tank and it shall be fitted with bolted cover.



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- 4.3.4 The tank shall be fitted with a 50 mm diameter overflow pipe. The distance ends of the overflow pipe shall be taken down to a point well below the chassis without reducing the effective ground clearance when fully loaded and shall discharge away from the wheels.
- 4.3.5 Dial gauge water level indicator for the tank shall be provided preferably in the driver's cab or a visual level gauge of the glass tube shall be provided at the control panel calibrated  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$  and ft. (preferably calibrated in litres).
- 4.3.6 The tank shall be connected to the pump and hose reel in such a manner that pressurization of water tank or water tank-pump connection is not possible when pumping water from an outside source supply.
- 4.3.7 The plumbing between the pump and the hose reel shall have a clear and unobstructed water way not less than 25 mm throughout without any obstruction.

#### 4.4 Hose Reel

- 4.4.1 One hose reel conforming to IS: 884 shall be provided at the rear of the appliance with 60 m length of 20 mm bore hose connected by screw 'C' type quick couplings and terminating with a con branch and 5 mm nozzle. The reel shall be fitted with over brake or locking device.

#### 4.5.0 Pump

The pump shall preferably be made of any suitable alloy, compatible with all types of synthetic protein foam compound, with stainless steel shaft suitable for use with brackish water. The pumps be capable of delivering not less than 1800 l/min. of water at a pressure not less than 8.5 kg/cm<sup>2</sup> pump shall preferably be of the single stage type. The pump shaft shall preferably be designed to on two deep-groove ball bearings lubricated by oil both to ensure long trouble-free service mechanical seal shall be provided which shall be capable of running dry for long periods with damage.

#### 4.5.1 PUMP TEST

The pump shall be run for a period of 4 hours non-stop delivering the rated output at 7 kg/cm<sup>2</sup> with the lift of 3 m. During the test the water shall not be replenished for the cooling system as the temperature of the engine oil should not exceed 150 deg. C or the engine manufacturers rated temperature for continuous working whichever is less. The engine should show no sign of stress during the stresses. The temperature of the cooling water (radiator water) shall not exceed 85 deg. C. The pump casing and impeller shall be subjected to a hydraulic pressure of 21 kgf/cm<sup>2</sup> to detect leakages, performance, etc.

- 4.5.2 The pump shall be preferably rear mounted. The pump control panel shall be located on the rear of the appliance.
- 4.5.3 The suction inlet and delivery outlets of the pump shall, as far as possible, be fitted on or near the pump control panel.
- 4.5.4 A removable strainer and blank cap shall be provided for the suction inlets(s) for the pump.



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4.5.5 The suction inlet shall be fitted with a standard round thread connection of 100 mm size conforming to IS:902.

4.5.6 The delivery outlets of the pumps shall terminate in 63 mm female instantaneous coupling incorporating a blank cap and means for relieving pressure between the valve and the cap. The 63 mm female instantaneous coupling shall be in accordance with IS:903-1988.

#### 4.6 Primer –

The primer may be semi-automatic in action and it shall dis-engage automatically as soon as the pump is primed. It shall be capable of lifting water at least through 7.0 m at a rate of not less than 30 cm per second.

#### 4.7.0 Foam Equipment

4.7.1 Compound Tank - foam compound tank of 500 ltrs. Capacity shall be mounted on the chassis in addition to the water tank and as a separate and distinct unit that can be removed separately for replacement.

4.7.1.1 The foam compound tank shall be of rigid type, and shall preferably be of stainless steel welded construction.

4.7.1.2 The tank shall have a filling orifice not less than 150 mm diameter with a removable strainer fitted to it. The strainer shall be of such material as shall not be affected by constant contact with foam compound and its total screening area shall be adequate to permit quick filling of foam compound into the tank. The filler cap shall be clearly marked 'FOAM' preferably by pressing, casting or embossing.

4.7.1.3 The tank shall have its top dished tunnelling arrangement and a trough provided to enable easy filling from 20 litre drums. Suitable sharp-edged tin opener may also be provided at the foam tank filling mount for puncturing the foam compound drum for facilitating quick filling of the foam compound directly from the drums into the tank. The tank shall be suitably baffled to prevent surge while the vehicle is in motion or standing on uneven ground or brakes are applied to the moving appliance. The design of the tank shall incorporate a removable sump fitted with a drain valve. The foam compound draw off tube shall be positioned in the centre of the sump in such a manner that foreign matter or sludge shall not pass into the compound line. The draw-off tube shall be fitted with a gauge strainer of suitable material, mesh, size, and adequate staining area. The tank top shall be removable and it shall be ensured that the joint between the top and the body of the tank is leak proof.

4.7.1.4 Means shall be provided for automatic venting of the foams compound tank when the foam is being produced or the tank is being filled. This shall not be incorporated with the cap. The device employee shall be as simple as possible and shall not get clogged easily during normal use of the appliance.

4.7.1.5 The draw-off tube shall be connected to the foam compound proportionator/inductor and pump as necessary, and automatic flow control valve shall be incorporated in it so as to maintain a constant induction rate of not more than 6 percent with varying foam output.

The plumbing for this purpose shall have a clear and unobstructed passage of not less than 50 mm throughout and shall:



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- a) be as short as possible;
- b) be capable of being easily dismantled for internal cleaning;
- c) be provided with means of thorough flushing after use;
- d) not form 'U' bend or abrupt angle at any portion and be capable of being drained easily without dismantling.

4.7.1.6 A suitable transfer pump shall be provided for transferring foam compound from drums to the foam compound tank without causing any frothing in the tank. Necessary connection shall also be provided for transferring the foam compound through this pump.

4.7.1.7 Provision shall also be made for drawing foam compound into the foam producing system from an external source through a pick-up tube while producing foam.

4.7.2 Foam compound proportionator or inductor automatic proportionating arrangement shall be provided where the induction ratio of foam compound /water solution and flow of water are automatically varied as desired merely by opening and closing the monitor or hand lines. This shall be achieved without any complex system of linkage that may be susceptible to distortion due to chassis flexion. The system shall be reliable and shall not require frequent calibration checks.

#### 4.7.3 Foam Monitor

4.7.3.1 Foam monitor shall be mounted on the top of the appliance in such a manner that it can be manually operated by a member of the crew. The monitor shall be capable of traversing through 360 deg. In a horizontal plane, elevating from horizontal to 45 deg and depressing from horizontal to not less than 15 deg and fully rotating in both directions.

4.7.3.2 The aggregate foam discharge shall be not less than 7000 L/min. through monitor.

4.7.3.3 The monitor shall be capable of projecting the foam discharge to an effective distance of not less than 35 m in still air when operated at the designed pressure in a straight jet pattern without dripping.

#### 4.8.0 Control panels

4.8.1 One (1) No. adequately illuminated control panel shall be provided and shall be positioned at the rear mounted pump controls.

4.8.2 The control panel shall include the following:

- a) Throttle control for engine;
- b) Throttle control for engine;
- c) Compound gauge calibrated as under;



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- (i) Vacuum - 0 to 75 cm Hg preferably in black
- (ii) Pressure - 0 to 0.6 M/Nmm<sup>2</sup> (6 kgf/cm<sup>2</sup>); preferably in black;
- d) Primer control (if the primer is not fully automatic);
- e) Gauge for cooling water and glow lamp for lubricating system;
- f) Cooling water circuit control.

4.8.3 The following shall also be provided at a convenient position near the control panel(s);

- a) Control for using monitor;
- b) Water level indicator;
- c) Hydrant connections;
- d) Control for using auxiliary foam compound pick-up tube;
- e) Control(s) for flushing out the foam making equipment and its plumbing;

#### **4.9.0 Body Work and Stowage**

- 4.9.1 Enclosed accommodation for six persons shall be provided in the driver cab-crew compartment including the driver and the in-charge of the crew. Two doors on each side shall be provided on the driver cab-cum-crew compartment. The doors shall be hinged opening outwards and shall be hung forward and shall have catch locks and flush type handles.
- 4.9.2 The cab and lockers shall be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. Pressed sections of sufficient strength shall be used for the superstructure.
- 4.9.3 Sufficient Nos. of lockers shall be provided for secure stowage of all equipment as detailed enclosed in appendix. The height of the lockers from the bottom to the top of the opening shall be not less than 600 mm and the depth not less than 600 mm.
- 4.9.4 All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cab. The doors of the side lockers shall not be hinged at the bottom.
- 4.9.5 Hose tunnels shall be provided to carry four 2.5 m lengths of suction hoses in convenient location. The tunnels shall be sloped in such a way so that these allow the water or contents left in the hose after use to flow out.
- 4.9.6 Ladder Gallows – Gallows shall be provided to carry a 10.5 m extension ladder at a suitable position in a manner that does not provide any obstruction to the working of monitor. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.



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4.9.7 Tool Kit Container – A specially fitted recessed tray for the normal kit of tools, carried on the appliance shall be provided.

4.10 **Stability** – The stability of the appliance shall be such that when under fully equipped and loaded conditions (but excluding crew), if the surface on which the appliance stands is tilted to either side, the point at which overturning occurs, is not passed at an angle of 30 degrees from the horizontal.

### 5.0.0 WORKMANSHIP AND FINISH

5.1.0 All parts of the appliance shall be of good workmanship and shall have streamlined finish.

5.2.0 The appliance shall be painted in fire red colour conforming to Shade No. 536 of IS: 5. The paint shall conform to IS: 2932-1974.

### 6.0.0 ACCESSORIES

6.1.0 The following accessories shall be provided in addition to those normally fitted on modern commercial vehicles.

- a) Fire bell - A 250 mm diameter fire bell shall be mounted externally and shall be capable of being operated from within the driving compartment. The bell shall be the hand-operated type.
- b) Hand Lamps - Two
- c) Fog lamps - Two
- d) Reversing Light - Lamp suitably situated to assist reversing.
- e) Amber blinker lights - Situated on the head of the driving compartment.
- f) Trafficators - Illuminated with indicating lights on instrument panel or in any other prominent position in driving compartment.
- g) Wind screen wipers
- h) Tools - All tools required for normal maintenance of the appliance that are not included in the kit for the chassis.
- i) Siren - Battery operated.
- j) Search light – Adjustable to give flood or beam light, mounted in a convenient position but capable of being readily disconnected and mounted on a tripod away from the appliance, complete with tripod and with not less than 30 m of TRS cable on a reel mounted on the appliance.
- k) Spot light - Adjustable, mounted in a convenient position on the near side of the driving compartment.



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- l) Inspection lamp – Protected type on wander lead with plug. A socket shall be provided in the control panel in the driver's cab for plugging in the lamp.
- m) Tail lamps - Two of combined stop and tail.
- n) Rear reflectors
- o) Wind screen-washer-Fitted in a suitable location with controls in driving compartment.
- p) Gas, instrument panel and locker, light.
- q) Public address system.

### 7.0.0 MARKING

7.1.0 The appliance shall be clearly and permanently marked with the following information:

- a) Manufacturer's name, or trademark, if any.
- b) Capacity of the pump in litres/minute, capacity of the water tank and foam tank in litres;
- c) Year of manufacturer
- d) Any other as required during detail engineering.

### 8.0.0 ADDITIONAL ACCESSORIES

The additional accessories that are normally required to assist in operation of appliance are detailed in enclosed **Annexure-II (refer Section D)**. Bidder to include these accessories in their scope of supply.

### 9.0.0 SUPPLEMENTARY EXTINGUISHING AGENT

- 9.1.0 The supplementary extinguishing agent shall be dry chemical powder.
- 9.2.0 The total quantity of supplementary agent shall be not less than 150 kg. Of dry powder and shall conform to IS: 4308.
- 9.3.0 The dry powder system shall comply with the following minimum requirement.
- 9.4.0 The dry powder system shall comprise of two self-contained units, each having a capacity of 75 kg of dry powder.
- 9.5.0 The expellant employed for the dry powder units shall be nitrogen. The capacity of the nitrogen cylinders employed for this purpose shall be adequate to ensure complete discharge of the dry powder contents at a rate of not less than 2.25 kg/s from each units. A well-designed pressure control system shall be provided to regulate the pressure of nitrogen gas and maintain a constant powder discharge pressure throughout of the unit.



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9.6.0 The dry powder unit shall have a discharge outlet fitted with not less than 22 m of minimum 25 mm bore hose terminating in a trigger control shut-off nozzle, capable of production either a straight jet or fan-spray pattern of discharge. The range of jet shall be not less than 12 m.

9.7.0 The hose and nozzle shall be stowed suitably in lockers on either side of the appliance to facilitate speedy run out on arrival at an accident.

10.0.0 **ACCEPTANCE TESTS**

The following acceptance tests on various equipment shall be conducted to meet guaranteed parameters and shall be carried out in accordance with relevant IS Code.

- a) Pump test
- b) Primer test
- c) Road test
- d) Stability
- e) Any other test as specified in latest standard IS 10460.

Further to this bidder to refer Annexure-VIII for reference quality plan attached, for bare minimum test to be conducted during inspection in the present of BHEL and NTPC. Also, bidder to submit the quality plan for tendered project for approval from BHEL and NTPC, any additional test if required during document approval, to be accepted by bidder without any price implication to BHEL.



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SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP  
SPECIFIC TECHNICAL REQUIREMENT**

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f) The appliance shall have the following overall dimensions:

Wheel base	not more than 4500 mm
Turning circle	not more than 20 m
Road clearance	not more than 230 mm
Overall width	not more than 2.50 m

#### **4.0.0 DESIGN AND CONSTRUCTION**

##### **4.1.0 Engine**

4.1.1 The engine shall be compression ignition type and provided with cooling system to permit its continuous stationary running without overheating. Indirect cooling system shall be incorporated which shall be of the open circuit type discharging water to the waste.

4.1.2 The operating temperature of the engine cooling water shall preferably be thermostatically controlled.

4.1.3 The oil in the oil sump shall be prevented from overheating

4.1.4 Suitable gauge for indicating temperature of water and for oil pressure shall be provided on the instrument panel in the driver's cab.

4.1.5 External filter shall be provided for the engine lubricating system and a tubular dipstick to gauge the level of oil in the oil sump shall be provided.

##### **4.2.0 Electrical System**

4.2.1 A trickle type battery charger shall be provided for recharging the battery in situ. A red pilot lamp, indicating when the batteries are being charged from an external supply, shall be provided.

4.2.2 All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse box located in an accessible position in driver's cab and fitted with means for carrying spare fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.

##### **4.3.0 Body Work**

4.3.1 The body shall provide enclosed accommodation for two persons including the driver. Both the seats will be independent. The cabin shall have two doors, one on either side. The door shall be hinged in front, opening outward and shall have double catch striking plates. The rear body shall provide accommodation for the dry powder vessels and the equipments mentioned in appendix A. The flooring of the rear body shall preferably be provided with light alloy chequered plates.



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- 4.3.2 In addition to the enclosed accommodation, riding position shall be provided for 2 persons on a platform at the rear of the appliance. Grab rails and non-skid steps shall be provided, wherever required, to assist the crew to mount and dismount.
- 4.3.3 Sufficient number of lockers for the stowage of the equipment, tools, and other items shall be provided. The locker shall be fitted with waterproof lining.
- 4.3.4 The cab and the locker shall be composite construction with sufficient rigidity and reinforcement shall be kept as light as possible. Pressed section of sufficient strength shall be used for the super structure.
- 4.3.5 All lockers shall be provided with internal automatic on-off lighting system with a master switch in the cab. The doors of the locker shall have efficient means for holding them closed by flush-fitting spring-loaded locks. The doors of the side lockers shall not be hinged at the bottom.
- 4.3.6 All light fittings at the rear shall be suitably protected by expanded metal to prevent damage due to movement of crew.
- 4.3.7 A suitably fitted recessed tray for the normal kit of tools carried on the appliance shall be provided.
- 4.3.8 Provision for wire less equipment shall be made and the control panel of the wireless equipment shall be located in the driver's cab.
- 4.3.9 A battery operated public address system, with amplifier and microphone in the cab, shall be provided.
- 4.4 Dry Powder fire Extinguishing Equipment**
- 4.4.1 A quantity of 2000 kg of dry powder of the foam compatible type, conforming to IS: 4308 shall be stored either in a single vessel or in two vessels of 1000 kg each. Each vessel shall be provided with a separate filling aperture with a cover, drain plug, safety valve, pressure gauge, isolation valve, etc, at suitable locations. Arrangement shall be provided to expel the powder through the monitor or 2 hose reels or both at a time. Where two vessels are used, a common manifold shall preferably be provided for discharge. The two vessels shall not have any interconnections. Each vessel shall be connected with a separate expellant gas supply and fitted with a pressure-reducing valve. The vessel have treatment for anti-corrosion on internal surface, either of lead-tin alloy (tin not less than 10 percent) having a minimum thickness of 0.12 mm, or of epoxy paint.
- 4.4.2 A long-range monitor shall be mounted on an independent platform just behind the drivers cab. The platform shall be adequately strengthened to avoid any vibration while the monitor is in use. There shall be proper and sufficient moving space around the platform for the movement of the operator.
- 4.4.3 The discharge rate of the powder shall be not less than 5 kg per second through each hose reel and through shall be not less than 10 m horizontally and 8 m vertically while working with both the lines. The discharge through the monitor shall be adjustable at 15, 25 and 40 kg per second at operating pressure. The throw of the monitor shall not be less than 40 m horizontally and 30 m vertically in still air.



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The total discharge of the powder shall not be less than 90 percent of the total contents. The vessel shall be provided with the arrangement for discharging the excess expellant gas in to the atmosphere even if the vessel is full with dry powder, the excess air should not affect the powder charge.

- 4.4.4 Efficient means shall be provided for flushing the monitor hose-reel and manifold with the expellant gas after use. The operating lever shall be located at the control panel. An additional connection shall be provided in the common manifold, with required valve connection, to flush out the powder in the monitor and the hose-reel using air from the outside source.
- 4.4.5 The expellant gas system shall preferably have nitrogen gas in cylinders of capacity not less than 50 litres each, having filling pressure of not less than 200 kgf/cm<sup>2</sup>. The gas shall be sufficient to discharge 2000 kg of dry powder through the long-range monitor and hose reel in accordance with the requirement of clause no. 4.4.3
- 4.4.6 Sufficient amount of the expellant gas shall be available in the cylinder to flush the monitor, hose reel and the manifold when the supply of powder is exhausted. Arrangement shall be made to prevent the back flow of the expellant gas.
- 4.4.7 The monitor shall be provided in such a manner so as to enable the operator to move it easily. The monitor shall rest on a clamp, properly secured, while not in use. The monitor shall have in built arrangement to regulate the powder discharge at 15, 25, or 40 kg/s by pushing or turning the operating lever. It shall be capable to work on any angle up to 360° horizontally and 100° vertically. Suitable control shall be provided near the grip of the handle to facilitate the operator to control and regulate the discharge of the powder.
- 4.4.8 Two hose reels, one on either side of the appliance, shall be provided at easily accessible locations so as to facilitate quick withdrawal. Arrangement shall be made to prevent the over running of the reels. Each reel shall be provided with 30 m long high-pressure rubber hose fitted with trigger type pistol grip nozzle capable of discharging 5 kg of powder per second at a pressure of 14 kgf/cm<sup>2</sup>.
- 4.4.9 Suitable device shall be provided or arrangement made to restore the fluidity of the powder to ensure its capability to flow through the fittings, valves and pipelines to the outlet.
- 4.4.10 All valves, discharge nozzles, pipes and fittings, pressure gauges, etc, shall be of approved type and of non-corrosive/non-reactive material compatible with the dry powder.

#### 4.5.0 Control Panel

- 4.5.1 Adequately illuminated control panel shall be provided at easily accessible position to operate the dry powder system. All controls/items of equipment shall be clearly marked or identified by fixing suitable labels to facilitate easy operation.
- 4.5.2 The control panel shall include the following:
- Pressure gauge for expellant gas cylinders;
  - Pressure gauge to indicate operating pressure;
  - Operating levers for:



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- 1) expellant gas valve,
  - 2) monitor valve,
  - 3) valves for hose reels,
  - 4) pressure release valve,
  - 5) flushing valve for monitor, and
  - 6) flushing valve for hose reels:
- d) Switches for lighting arrangement; and  
 e) Instruction plate for operation, with line diagram.

#### 4.6 Stability

The stability of the appliance shall be such that when under fully equipped and loaded conditions, excluding the crew, if the surface on which the appliance stands is tilted on either side, the point on which over turning occurs is not passed at an angle of 25° from the horizontal.

#### 5.0.0 WORKMANSHIP AND FINISH

- 5.1.0 All parts of the appliance shall be of good workmanship and shall have streamlined finish.
- 5.2.0 All metallic surfaces coming in contact with the dry powder shall be suitably treated against corrosion.
- 5.3.0 The appliance shall be painted in fire red colour conforming to Shade No. 536 of IS: 5. The paint shall conform to IS: 2932-1974.

#### 6.0.0 INSTRUCTION BOOK, ACCESSORIES AND EQUIPMENT

**6.1.0 Instruction Book(s)** – Instruction book(s) for the guidance of the user, including both the operating and normal operating procedures, shall be supplied.

#### 6.2.0 Accessories –

The following accessories shall be provided in addition to those normally fitted on modern commercial vehicles.

- a) Electrically operated siren - 1 number, working on the batteries of the appliance, with its switch in the drivers cab. The siren shall be fitted at a position where it is protected from damage due to weather conditions.
- b) Fog lamps - Two
- c) Reversing Light - Lamp suitably situated to assist reversing.
- d) Airfield obstruction marking lights – two. One of these shall be fitted in the front and the other at the rear of the appliance.
- e) Revolving beacon light – of blue colour, capable of throwing beams of blue light around 360o with beams including upwards, horizontally and downwards. It shall be mounted on cab's roof and shall be operated from the batteries of the appliance.
- f) Search light – Adjustable to give flood or beam light, mounted in a convenient position but capable of being readily disconnected and mounted on a tripod away from the



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appliance, complete with tripod and with not less than 30 m of TRS cable on a reel mounted on the appliance.

- g) Spot light - Adjustable, mounted in a convenient position on the near side of the driving compartment.
- h) Inspection lamp – Protected type on wander lead with plug. A socket shall be provided on the control panel in the driver's cab for plugging in the lamp.
- i) Tools - All tools required for normal maintenance of the appliance that are not included in the standard kit of tools for the chassis.
- j) Windscreen wiper – two, electrically operated.

6.3.0 **Equipment-** The appliance shall be provided with the equipment detailed in **Annexure-III**, Section-D. Bidders to include supply of these equipments in their scope.

### 7.0.0 MARKING

7.1.0 The appliance shall be clearly and permanently marked with the following information:

- a) Manufacturer's name, or trademark, if any.
- b) Year of manufacturer
- c) Any other marking as required during detail engineering.

### 8.0.0 ACCEPTANCE TESTS

The following acceptance tests on various equipment shall be conducted to meet guaranteed parameters and shall be carried out in accordance with relevant IS Code.

- a) Pump test
- b) Primer test
- c) Road test
- d) Stability
- e) Any other test as specified in latest standard IS 10993.

Further to this bidder to refer Annexure-VIII for reference quality plan attached, for bare minimum test to be conducted during inspection in the present of BHEL and NTPC. Also, bidder to submit the quality plan for tendered project for approval from BHEL and NTPC, any additional test if required during document approval, to be accepted by bidder without any price implication to BHEL.



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**FIRE JEEP WITH TRAILER PUMP**



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- |  |   |
|--|---|
| b) Axle                                    | Carbon steel or mild steel  |
| c) Pump casing                             | Aluminium alloy Grade 4600 A<br>of IS:617 or leaded tin bronze<br>(Grade II of IS: 318) |
| d) Impeller ring and<br>impeller neck ring | Leaded tin bronze (Grade II of<br>IS:318)   |
| e) Pump shaft                              | Stainless steel Grade 04 Cr. 18 Nilo<br>of IS:6603                                      |
| f) Engine cover and<br>pump panel          | Mild steel sheets (IS: 513<br>ordinary grade)   |

### 5.0.0 DESIGN AND CONSTRUCTION

5.1.0 **Engine** - The IC engine shall have not less than 4 cylinders and shall conform to IS: 1601. The brake horsepower development shall be at maximum working load. Engine shall have at least 5% power to work the pump at its rated output at 0.7 MN/m<sup>2</sup> (7 kgf/cm<sup>2</sup>) pressure and shall have sufficient reserve power. The engine shall also be provided with a generator/alternator for charging 12-volt battery with a capacity of 92 Ah at 10-hour rate. Hand cranking arrangement shall also be provided.


5.1.1 In case of water-cooled engine Indirect-cooling system of the open-circuit type in which water is discharged to waste shall be provided so that engine temperature is maintained in range of temperature recommended by engine manufacturers. This shall consist of header tank incorporating copper coils. Water for cooling in the tank shall be fed from the main centrifugal pump and after having circulated through the coils shall go to waste which shall not exceed 30 min. Drain plug shall be provided. Filter capable of being cleaned readily when the pump is in operation shall also be provided.

5.1.2 Lubricating system shall be provided with an accessible external filter and means to gauge with reasonable accuracy during running, the level of the oil in the sump, preferably by a tubed dipstick. The oil filter shall be so arranged as to permit oil to be replenished while the unit is running.

5.1.3 The engine exhaust shall be arranged so as to discharge as far as possible, away from the pump operation position.

5.1.4 The engine fuel tank and water tank shall be protected by a suitably designed cover so arranged as to give easy access to the engine for operational purpose without removing the whole cover. The engine cover should be louvered so as to permit adequate air circulation. The battery shall be easily removable and shall have covers and held properly so that it is not displaced during towing.

### 5.2.0 Fuel System

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<p>5.2.1 A fuel tank of adequate capacity for a minimum continuous run of 2 hours without refuelling and a graduated dipstick should be provided.</p> <p>5.2.2 The filling orifice of ample size shall be positioned away from the exhaust pipe and shall be accessible without removing the engine covers. The cap shall be clearly marked with type of fuel and shall incorporate an anti-flash device.</p> <p>5.2.3 There shall be one fuel pump which shall be mechanically operated. It shall be preferably provided with a drain plug.</p> <p><b>5.3.0 Pump</b></p> <p>5.3.1 The pump shall be of the centrifugal type. It shall be of single its characteristics should match with the engine ratings for continuous running Glands of suitable type shall also be provided. A drain plug shall be provided at the bottom of the casting.</p> <p>5.3.2 The impeller shall be dynamically balanced. The pump shall show no leakage when subjected to a hydraulic pressure of 25 kgf/cm<sup>2</sup>.</p> <p>5.3.3 The pump shall be tested for its performance duties as detailed in 5.3.4 and 5.3.5 at water temperature of 27 ± 2 deg. C and at a pressure of 760 mm Hg.</p> <p>The following allowances (deductions) shall be made:</p> <p>Allowance for Output:</p> <ol style="list-style-type: none"> <li>1 percent for every 2.5 deg C rise in water temperature.</li> <li>4 percent for every 300 m elevations above mean sea level.</li> <li>No allowance shall be made for humidity up to 75%. However deduction at the rate of 1 percent of every 5% change in humidity shall be made when humidity changes from 75 to 95% percent.</li> </ol> <p>Allowance for Lift</p> <ol style="list-style-type: none"> <li>30 cm for every 300 cm elevation above mean sea level, and</li> <li>1 percent for 2.5 deg. C rise in water temperature.</li> </ol> <p>5.3.4 The pump when tested in conditions as mentioned in 5.3.3 shall be capable of giving requirements given in Table 1 when running at not more than 4000 rev./min of impeller-shaft and working with all internal and external strainers (except basket strainer) fitted.</p> <p>5.3.5 The pump shall run continuously for a period of 4 hours delivering rated output at 3 m lift and at 0.7 MN/m (7 kgf/m<sup>2</sup>) pressure. During this test the water in the engine cooling system shall not be replaced and the temperature of engine lubricating oil shall not exceed the specified value.</p>			



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TABLE PERFORMANCE DUTIES OF TRAILER FIRE FIGHTING LARGE PUMP 1800-1/min.

(Clause 5.3.4)

OUTPUT	PRESSURE	LIFT (MEASURED VERTICALLY FROM WATER LEVEL TO SUCTION EYE)	CONDITIONS
(1)	(2)	(3)	(4)
1/min 1 800	MN/m <sup>2</sup> (kgfcm <sup>2</sup> ) 0.7 (7.0)	m 3.0	Working through 5 m, that is two 2.5 – m lengths of specified suction hoses.

---

5.3.6 The make round thrend suction eye shall be provided with a standard 100-mm suction connection conforming to IS: 992 with internal strainer and blank cap. The strainer shall be readily removable but shall be retained firmly in position when in use. There shall be two delivery valves conforming to IS: 4928 with 63-mm female instantaneous hose connection, and blank caps. Blank cap shall incorporate means for relieving pressure between the valve and the cap.

5.4.0 The primer shall be capable of lifting water at least 7.0 m (measured vertically from water level to the centre of suction eye of the pump) in not more than 24 seconds from the time it is engaged after 24 seconds and shall preferably be fully automatic

5.5.0 **Transmission** – The assembly of the pump and engine shall be as compact as possible as possible and preferably a clutch flexible couplings or any other suitable measure shall be incorporated between the pump and the engine. The engine and pump should be mounted on ant vibration mountings so as to reduce vibration to minimum.

5.6.0 **Control and Instruments** – The illuminated pump panel provided adjacent to the suction eye and delivery valve shall include the following:

- a) Ignition switch:
- b) Throttle control
- c) Ammeter
- d) Choke for petro engine
- e) Gauges
  - 1) Compound gauge calibrated as follows:



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Vacuum - 0 to 75 cmHg

Pressure - (0 to 5 kgf/cm<sup>2</sup>)

- f) Temperature gauge:
- g) Oil pressure gauge:
- h) Pump and pump panel light:
- i) Primer control (if primer is not fully automatic):
- j) Spot light adjustable switch:
- k) Fuel contents gauge:

### 5.7.0 Trailer

- 5.7.1 The trailer frame shall incorporate two semi-elliptic spring conforming to IS:1135 and axles. Cross country type pneumatic tyres of 6.00 x 16 size. 6 ply shall be used for the unit. The whole unit shall be compact and the pumping unit shall be so mounted as to bring centre of gravity as low as possible.
- 5.7.2 The centre of gravity of the whole unit shall be slightly forward of the wheel axle when the towing eye is 66 cm above the ground level. The trailer shall not tilt backward when resting on front leg. No part of the trailer shall have a clearance less than 23 cm when the trailer is tilted so as to raise the height of the eye 65 cm or to lower it to 45 cm. In towing position the height of the towing eye shall normally be 55 cm above ground level.
- 5.7.3 When the fully laden trailer is being towed at 20 km/h in cross country for 2 km and in normal traffic conditions on tar road for 10 km, the trailer shall hold the road well. The axle shall not distort and the alignment of the wheels is ensured.
- 5.7.4 Efficient brakes shall be provided on the two wheels, operation through compensating gear by over-run. A hand lever situated in an accessible position at the front of the trailer frame shall be provided for operating the brake when the trailer is disconnected from the towing vehicle. The 'OFF' position of the trailer frame shall be towards the front of trailer and there shall be ratchet or similar device to hold the brake in the 'ON' position.
- 5.7.5 Two handles (man-handling bars) of mild steel, each not less than 50 cm long and which can be folded and secured along the frame when not in use shall be provided at the front of the trailer frame. These handles shall be at least 15 cm above the level of the towing eye.
- 5.7.6 Two eyes for the attachment of drag ropes shall be provided in suitable position. Four slinging eyes shall be provided two of which may be drag eyes.
- 5.7.7 Two jacklegs in the rear and one in the front capable of being lowered into position and adequately secured to provide a suitable base for the unit, when pumping or standing unattached, shall be provided. The legs shall have 200 mm round mild steel plates, dished upwards, welded to the base of the pipe legs to prevent penetration into the earth when



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standing unattached. The legs shall be capable of being positively locked in the 'housed' position.

5.7.8 Provision shall be made on the trailer for carrying equipment detailed in Appendix – A.

5.8.0 **Stability** – The stability of the whole unit shall be such that under equipped conditions and with the front supported to produce the normal towing position, if the surface on which the appliance stand is tilted to either side to an angle of 25 degrees from the horizontal, the point at which the overturning occurs is not passed.

**5.9.0 Towing Eye and Draw-Bar**

5.9.1 The towing eye and draw bar shall be of substantial construction. The towing eye shall have an internal diameter of 75 mm and shall be of high quality forged steel of not less than (63 x 102 kgf/cm<sup>2</sup>) ultimate tensile stress or other suitable material capable of giving suitable performance. The shank shall be adequately machined with adequate radius at the shoulders.

5.9.2 To ensure that the housing will withstand shock loads inherent under towing condition, it is essential that the design of the eye and housing and the means of fixing the housing the trailer chassis frame will take care of a draw pull of (1100 kg) without being overstressed.

5.9.3 The shank of the towing eye shall be mounted in the housing so as to absorb shocks in both directions of movement for forward to cushion, the shock of taking the two load, and backward to regulate the rate of application of brakes. The compensation mechanism shall be such as to give a smooth tow at all reasonable speeds on average road surface.

5.10.0 **Mass** – The mass of the complete unit shall not exceed 1150 kg including water, fuel and oil but without equipments as mentioned in Annexure-IV.

**6.0.0 WORKMANSHIP AND FINISH**


6.1.0 All parts of the appliance shall have goods workmanship

6.2.0 The appliance shall be painted in fire red colour conforming to Shade No.536 of IS: 5. The paint shall conform to IS: 2932.

**7.0.0 ACCESSORIES AND EQUIPMENT**

7.1.0 Accessories - The following accessories shall be provided:

- a) Electric Taillight with number Plate - The electric cable from this light shall terminate in a plug at the front of the trailer.
- b) Tools – A kit of all essential tools required for normal maintenance of the appliance.
- c) Headlight – Headlight of not more than 150 mm diameter on the trailer pump.

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7.2.0 Equipment - The list of the equipments to be provided in the trailer is given in clause no. 9.0.0 and Annexure-IV. Bidders to include supply of these equipments in their scope.

### 8.0.0 MARKING

The trailer pump shall be clearly and permanently marked with the following information:

- a) Manufacturer's name and trade-mark:
- b) The output capacity of the pump in 1/min.: and
- c) Year of manufacture.
- d) Any other marking as required during detail engineering.

### 9.0.0

#### EQUIPMENT TO BE PROVIDED IN TRAILER PUMP

Sl. No.	EQUIPMENT	QUANTITY
1.	100-mm suction hose conforming to IS: 241 in 4.5 m lengths with 100-mm suction hose coupling conforming to IS: 902	2 No.
2.	Suction wrenches for 100-mm suction hose couplings conforming to IS: 4643.	2 No.
3.	Suction strainer for 100-mm suction hose conforming to IS: 907.	1 No.
4.	63-mm delivery hose conforming to IS: 4927 in 30 m lengths with instantaneous couplings conforming to IS:903.	4 No.
5.	Rope, manila – 15 m conforming to IS: 10841	1 No.
6.	Suction adopters 100-mm female to 63-mm instantaneous male.	1 No.
7.	Branch pipes 63 mm conforming to IS: 903.	2 No.

### 10.0.0 ACCEPTANCE TESTS

The following acceptance tests on various equipment shall be conducted to meet guaranteed parameters and shall be carried out in accordance with relevant IS Code.

- a) Pump test



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
FIRE JEEP & FIRE SAFETY EQUIPMENT.  
3X660 MW NORTH KARANPURA STPP**

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- b) Primer test
- c) Road test
- d) Stability
- e) Any other test as specified in latest standard IS 944.

Further to this bidder to refer Annexure-VIII for reference quality plan attached, for bare minimum test to be conducted during inspection in the present of BHEL and NTPC. Also, bidder to submit the quality plan for tendered project for approval from BHEL and NTPC, any additional test if required during document approval, to be accepted by bidder without any price implication to BHEL.



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP  
SPECIFIC TECHNICAL REQUIREMENT**

**SPECIFICATION No: PE-TS-405-550-A001**


**VOLUME: II B**

**SECTION : C.5**

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**SECTION: C.5  
FIRE SAFETY EQUIPMENT**

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	<b>SPECIFICATION FOR FIRE TENDERS, FIRE JEEP &amp; FIRE SAFETY EQUIPMENT. 3X660 MW NORTH KARANPURA STPP</b>	VOLUME- IIB	
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### 1.0.0 SCOPE

#### 1.1.0 SCOPE OF SUPPLY

Fire safety equipment as specified below, conforming to relevant IS standard & latest, complete with all accessories and equipment's.

#### 1.2.0 SCOPE OF SERVICES

Performance demonstration of equipment at site and training of owner's personnel.

### 2.0.0 CODES AND STANDARDS

The design, material of construction, workmanship & finish, performance and accessories for fire safety equipment as specified herein shall comply with the requirements of codes/standard as follows:

- a) Relevant IS code.

### 3.0.0 GENERAL REQUIREMENTS

#### 1) Four (04) Nos. of fire suits as per relevant IS code.

Fire entry suits complete with hood, mitts & boots constructed from multiple layers of glass insulations, aluminized glass & non-aluminized glass surfaces & shall be either single piece or in multiple pieces. In case of multiple pieces, all parts shall be manufactured by the same firm & forming part of the same set. The fire entry suit shall provide complete protection from conductive temperature (i.e. direct flame temperature) of 1000 deg. C or more for at least one (1) minute without spray or fog & radiant temperature of 1000 deg. C or more for a longer period. The suit shall be designed to be worn with self-contained breathing apparatus set. The fire suits shall be Indian Standard/European Standard/Country of origin approved.

#### 2) Ten (10) Nos. of breathing apparatus as per relevant IS code.

Breathing apparatus set with cylinder capacity of 1600 lit. at a working pressure of 300 bar for 45 minutes duration complete with all accessories such as facemask, demand valve, whistle warning unit (set at 68 bar), pressure reducing valve, supply Hoses, back Oplate, harness with all safety features etc. conforming to IS:10245/EN 137/BS 7004 & other international standards.

#### 3) Two sets of first aid kits as per relevant IS code.

#### 4) Two sets of telescopic ladders as per relevant IS code.


Heavy Duty Aluminium Alloy with Closed Height - 3.0mtrs. (Minimum) - 7.5mtrs.(Maximum) & Extended Height - 5.0mtrs.(Minimum)- 11.0mtrs. (Maximum).

#### 5) Ten (10) sets of fiber glass blankets as per relevant IS code.

Made out of Fiberglass or Graphite coated Fiberglass & of size 6 Feet x 6 Feet.

#### 6) Four (4) nos. multi-purpose nozzles.

Operating Pressure: 50psi (Minimum) – 100psi (Maximum)

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**7) One (1) no. portable thermal imaging camera.**

Application: Image Capturing in Smoke Filled Environment during Fire Fighting at High Temperatures.

**4.0.0 INSPECTION & TESTING**

Bidder to furnish the test certificates, internal reports and Certificate of Conformance to BHEL and NTPC for acceptance.



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**ANNEXURE-I**

**SCHEDULE OF EQUIPMENTS TO BE SUPPLIED WITH  
FIRE WATER TENDER**



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
FIRE JEEP & FIRE SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA STPP**

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**ANNEXURE-I**

List of equipments to be supplied with the fire water tender

S.No.	Equipment / Item	Quantity
1.0	Aluminium Extension ladder –10.5 m (IS 4571)	01
2.0	a) Rubber lined delivery hose according to Type-II of IS: 636 in 22.5m or 15 m length fitted with 63 mm delivery hose couplings (IS: 903)	180 m
	b) Unlined flax canvas hose according to IS 4927 in 30m lengths fitted with delivery hose coupling ( as per IS 903)	150 m
	c) Controlled percolating hose as per IS8423 in 30 m lengths fitted with delivery hose couplings ( as per IS 903)	150 m
3.0	a) Hose clamps (IS: 5612, part-1)	25
	b) Hose bandages (IS: 5612, part-II)	25
	c) Hose slings	20
	d) Hose straps	20
4.0	Suction hose of rubber of 100 mm internal Diameter in 2.5 m length (IS: 2410) fitted with 100 mm suction hose couplings (as per IS 902).	10 m
5.0	3 way suction collecting head 100 mm size (IS: 904)	01
6.0	Suction wrenches for 100mm suction coupling (IS: 4643)	02
7.0	Suction Strainer 100 mm size (IS: 907)	01
8.0	Basket strainer, cylindrical type (IS: 3582)	01
9.0	Dividing breeching with control instantaneous Pattern 63 mm (IS 5131)	1
10.0	Collecting breaching with control instantaneous Pattern 63 mm (IS 905)	01
11.0	a) Hydrant-stand pipe-two way (IS: 5714)	01
	b) Double female coupling (IS: 901)	02
	c) Hydrant connection, 63mm female instantaneous pattern delivery coupling at both end. (IS: 901)	02
12.0	Combined key for hydrant, hydrant cover and lower valve ( IS 910)	02
13.0	Fog nozzle with extension applicator with fog head (IS: 952)	01
14.0	Hand controlled branch for 63 mm size hose coupling	01
15.0	Branch pipe universal (IS: 2871)	02
16.0	Branch with revolving head (IS: 906)	01
17.0	Branch pipe (IS 903)	4
18.0	Nozzles of sizes 12 mm, 16 mm, 20 mm and 32 mm (two	10



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
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	each) (IS: 903)	
19.0	a) Adopter for 100 mm suction female screw Coupling and 63 mm male instantaneous b) Adopter double female instantaneous pattern 63 mm c) Adopter double male instantaneous pattern 63 mm	02 02 02
20.0	Nozzle spanners (IS: 903)	02
21.0	Portable electric box lamp with rechargeable accumulator.	02
22.0	Hand lamp (torch – 4 cells)	02
23.0	Flame proof lamp (useable in the presence of inflammable gases and vapours.	02
24.0	Self-contained breathing apparatus (compressed air type) complete with spare cylinder and tool kit.( IS 10245 Part 2)	1 set
25.0	Portable fire extinguisher, dry powder type, 2 kg (IS: 2171)	01
26.0	Foam making branch FB-4 with pick up tube (IS 2097)	01
27.0	Lowering Line: 50 mm hemp or terylene 40 m long having two ends spliced in and one end with a running noose (IS: 1084)	01
28.0	Long line, 50mm manila, 30 m long (IS 1084)	01
29.0	Short line, 50mm manila, 15 m long (IS 1084)	01
30.0	Canvas buckets	02
31.0	First aid box for 10 persons	01
32.0	Insulated plier (IS3650) with rubber gloves pair (IS4770) tested to 20000 volts	2 nos.
33.0	Asbestos gauntlets	1 pair
34.0	Axe large (IS: 703)	01
35.0	Spade	01
36.0	Pick Axe (IS: 273)	01
37.0	Crow Bar (IS: 704)	01
38.0	Sledge Hammer (IS: 841) –6.5 Kg	01
39.0	Carpenter saw 60 cm (IS: 5098)	01
40.0	Spanner – adjustable, 30 cm length handle (IS: 6149)	01
41.0	Door breaker	01



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42.0	Hydraulic jack –7.5 tonnes	01
43.0	Fire Hook (IS 927)	1
44.0	Tool kit	01
45.0	Grease gun	02
46.0	Oil feeder	01
47.0	Can oil – 2 litres	01
48.0	Oil can – 10 litres	01
49.0	Funnel for oil or fuel filing – 250 mm	01



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**ANNEXURE-II**

**SCHEDULE OF EQUIPMENTS TO BE SUPPLIED WITH  
FOAM TENDER**



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
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**ANNEXURE-II**

List of equipments to be supplied with the foam tender

S.No.	Equipment / Item	Quantity
1.0	Extension ladder-10.5 meter (IS: 4571 or IS: 930)	1
2.0	Armoured suction hose complete with round thread couplings to suit the pump inlet-2.5 m long (IS: 2410 and IS: 902)	4 lengths
3.0	Delivery hose, 63 mm, rubber lined in 30 m lengths (type II of IS: 636) complete with instantaneous couplings (IS: 903)	10 lengths
4.0	Suction strainers for item 2.0 (IS: 907)	1
5.0	Basket strainers for item 2.0 (IS: 3582)	1
6.0	Dividing breaching made of light alloy (IS: 905)	2
7.0	Collecting breaching made out of light alloy (IS: 905)	2
8.0	Suction wrenches (IS: 4643)	1 pair
9.0	Long lines, 50 mm circumference, 30 m long (IS: 1084)	2 lengths
10.0	Short lines, 50 mm circumference, 15 m long (IS: 1084)	2 lengths
11.0	Hose, bandages, rubberised (IS: 5612)	12
12.0	Hose clamps (IS: 5612)	6
13.0	Hydrant valve key and bar (IS: 910)	1 set
14.0	Protective clothing for fire men complete with suitable face shield made out of material capable of reflecting at least 95% of radiant heat temperature around 1500 to 2000 degree C and afford some protection against direct flame. The suit will be of sufficient size to accommodate a breathing apparatus to users.	2 sets
15.0	Fog nozzle (IS: 952) with extension applicator to fog head.	1
16.0	Hand controlled branch for 63 mm size hose coupling.	1
17.0	Branch pipe universal (IS: 2871)	1
18.0	Branch with revolving head (IS: 906)	1
19.0	Branch pipes (IS: 903)	4
20.0	Nozzle of size 12 mm, 16 mm, 20 mm and 32 mm (two each) (IS: 903)	10
	a) Adaptor for 100 mm suction female screw coupling and 63 mm male instantaneous.	2
	b) Adaptor double female instantaneous pattern 63 mm.	2 2
	c) Adaptor double male instantaneous pattern 63 mm.	
21.0	Nozzle spanners (IS: 903)	2
22.0	Portable electric box lamp with rechargeable accumulator.	2
23.0	Hand lamp (torch-4 cells)	2
24.0	Flameproof lamp (usable in the present of inflammable	2



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	gases of vapours)	
25.0	Self-contained breathing apparatus (compressed air type) complete with spare cylinder and tool kit.	1 set
26.0	First aid box for ten persons.	1
27.0	Rubber gloves (in case) (IS: 4770)	1 pair
28.0	Asbestos gauntlets (in case)	1 pair
29.0	Axe, large (IS: 703)	1
30.0	Spade	1
31.0	Pick axe (IS: 273)	1
32.0	Crow bar (IS: 703)	1
33.0	Sledge hammer, 6.5 kg (IS: 841)	1
34.0	Carpenter's saw, 60 cm (IS; 5098)	1
35.0	Hydraulic jack-7.5 tonne.	1
36.0	Fire hook (IS: 927)	1
37.0	Tool kit	1



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**ANNEXURE-III**

**SCHEDULE OF EQUIPMENTS TO BE SUPPLIED WITH  
DCP TENDER**



TITLE

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**ANNEXURE-III**

List of equipments to be supplied with the DCP tender

S.No.	Equipment / Item	Quantity
1.0	Fireman's axes (IS: 926)	2
2.0	Axe, large (IS: 5505)	1
3.0	Axe, hand (IS: 5505)	1
4.0	Shove (IS: 274)	1
5.0	Spare expellant gas cylinders, each of 50 litres capacity, filled with gas.	4



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**ANNEXURE-IV**

**SCHEDULE OF EQUIPMENTS TO BE SUPPLIED WITH  
FIRE JEEP WITH TRAILER PUMP**



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
FIRE JEEP & FIRE SAFETY EQUIPMENT  
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**ANNEXURE-IV**

List of equipments to be supplied with the Trailer Pump

S.No.	Equipment / Item	Quantity
1.0	63 mm unlined delivery hose or controlled percolating hose 30 m length with male and female couplings.	10 No.
2.0	Aluminium extension ladder, 7.5 m	1 No.
3.0	63 mm rubber lined delivery hose 30 m length with male and female coupling.	10 No.
4.0	Hose bandages.	6 No.
5.0	Double female couplings 63 mm.	2 No.
6.0	Rubber washers for 63 mm couplings.	40 No.
7.0	Dividing breaching, with control, 63 mm instantaneous	1 No.
8.0	Collecting breaching, 63 mm instantaneous	1 No.
9.0	Hydrant standpipe, double outlet.	1 No.
10.0	Branch with revolving head (with branch pipe) for 63 mm size instantaneous hose couplings.	1 No.
11.0	Branch pipes for 63 mm size instantaneous hose couplings	1 no.
12.0	Nozzles a) 6 mm b) 12 mm c) 20 mm d) 25 mm	2 No. 2 No. 2 No. 2 No.
13.0	Torch flash light, 3 cells	2 No.
14.0	Fire extinguisher, carbon-dioxide type, 2 kg capacity	1 No.
15	Fire extinguisher, dry powder type, 2 kg	1 No.
16.0	First aid box for 10 persons.	1 set
17.0	Rubber gloves	1 pair
18.0	Fireman's axe, large	1 No.
19.0	Shovels	2 No.
20.0	Pick axe, 1 kg weight	1 No.
21.0	Crow bar with chisel and claws 1 m length	1 set
22.0	Hand rip saw 65 mm	1 No.
23.0	Spanner, adjustable, 30 cm	1 No.
24.0	Fire hook	1 No.
25.0	Asbestos gauntlets, 40 cm	2 No.
26.0	Foam compound for producing mechanical foam 20 litres drum	2 No.
27.0	Foam making branch pipe FB5	1 No.
28.0	Head collecting three ways 100 mm	1 No.
29.0	Branch pipe universal	1 No.
30.0	Key hydrant	1 No.
31.0	Rope manila-30 m	1 No.
32.0	Hose clamp	1 No.
33.0	Shears or bolt clippers 60 cm	1 pair
34.0	Jack screw, lifting 4 tonnes	1 No.
35.0	Hand tool bag (leather)	1 No.
36.0	Grease gun	1 No.
37.0	Oil can (2 litres)	1 No.
38.0	Petrol can (9 litres)	1 No.
39.0	Oil filling funnel	1 No.
40.0	Petrol filling funnel	1 No.
41.0	Sledge hammer 6.5 kg	1 No.



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**ANNEXURE-V**

**MASTER DRAWING LIST WITH SCHEDULE OF  
SUBMISSION**

<b>ANNEXURE-V</b>					
<b>MDL FOR FIRE TENDERS, FIRE JEEP &amp; FIRE SAFETY EQUIPMENT FOR 3 X 660MW NORTH KARANPURA STPP</b>					
<b>S.N</b>	<b>DRWG NO</b>	<b>DRWG TITLE</b>	<b>CATEGORY</b>	<b>SCHEDULED SUBMISSION (NO. OF WEEKS FROM LOA DATE / PO DATE) or AS SPECIFIED IN NIT, WHICHEVER EARLIER.</b>	<b>RESUBMISSION AFTER COMMENTS INCORPORATION</b>
1	PE-V0-405-550-A001	T.D.S & GA OF WATER TENDER	A-CUST	4	WITHIN 1 WEEK
2	PE-V0-405-550-A002	TDS & G.A OF FOAM TENDER	A-CUST	4	WITHIN 1 WEEK
3	PE-V0-405-550-A003	T.D.S & GA OF FIRE JEEP	A-CUST	4	WITHIN 1 WEEK
4	PE-V0-405-550-A004	T.D.S & GA OF DCP TENDER	A-CUST	4	WITHIN 1 WEEK
5	PE-V0-405-550-A005	T.D.S & GA OF FIRE SAFETY EQUIPMENTS	A-CUST	4	WITHIN 1 WEEK
6	PE-V0-405-550-A006	MQP FOR WATER TENDER	A-CUST	4	WITHIN 1 WEEK
7	PE-V0-405-550-A007	MQP FOR FOAM TENDER	A-CUST	4	WITHIN 1 WEEK
8	PE-V0-405-550-A008	MQP FOR FIRE JEEP	A-CUST	4	WITHIN 1 WEEK
9	PE-V0-405-550-A009	MQP FOR DCP TENDER	A-CUST	4	WITHIN 1 WEEK
10	PE-V0-405-550-A010	Sub Vendor List with Inspection Category	A-CUST	4	WITHIN 1 WEEK
11	PE-V0-405-550-A011	O & M MANUAL	A-CUST	8	WITHIN 1 WEEK

Note:

Drawing / Document shall be uploaded by the successful bidder on WRENCH /DMS. Procedure for the same will be informed after award of contract.



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**ANNEXURE-VI**

**FORMAT FOR OPERATION AND MAINTENANCE  
MANUAL**



**TECHNICAL SPECIFICATION FOR  
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Project name :  
Project number :  
Package Name :  
PO reference :  
Document number :  
Revision number :

Sl.no. & Sections	Description	Tick ( √ )if included in Manual			Remarks
		Yes	No	Not Applicable	
<b>1.</b>	<b>COVER PAGE</b>				
<b>1.1</b>	Project Name				
<b>1.2</b>	Customer/consultant Name				
<b>1.3</b>	Name of Package				
<b>1.4</b>	Supplier details with phone, FAX ,email address , Emergency Contact number				
<b>1.5</b>	Name and sign of prepared by , checked by & approved by				
<b>1.6</b>	Revision history with approval Details				
<b>2.0</b>	<b>INDEX</b>				
<b>2.1</b>	showing the sections & related page nos All the pages should be numbered section wise				
<b>3.0</b>	<b>DESCRIPTION OF PLANT/SYSTEM</b>				
<b>3.1</b>	Description /write up of operating principle of system equipment/ associated sub-systems & accessories/controls system , operating conditions, performance parameters under normal , start up and special cases				
<b>3.2</b>	Equipment list and basic parameter with Tag numbers				
<b>3.3</b>	Data sheets approved by Customer/for information and catalogues provided by original manufacturer				
<b>3.4</b>	Associated other packages and Interface /terminal points				
<b>3.5</b>	P&ID & Process Diagrams				
<b>3.6</b>	GA Layout drawings, As-built drawings , Actual photograph of items/system (Drawings of A2 & bigger sizes are to be attached in the last)				
<b>3.7</b>	Single line/wiring diagrams				
<b>3.8</b>	Control philosophy /control write-ups				



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Sl.no. & Sections	Description	Tick ( √ )if included in Manual			Remarks
		Yes	No	Not Applicable	
<b>4.0</b>	<b>COMMISSIONING ACTIVITIES (IF NOT COVERED IN SEPARATE DOCUMENT I.E. ERECTION MANUAL, COMMISSIONING MANUAL)</b>				
<b>4.1</b>	Pre-Commissioning Checks				
<b>4.2</b>	handling of items at site				
<b>4.3</b>	Storage at site				
<b>4.4</b>	Unpacking & Installation procedure				
<b>5.0</b>	<b>OPERATION GUIDELINES FOR PLANT PERSONAL/USER/OPERATOR</b>				
<b>5.1</b>	Interlock & Protection logic along with the limiting values of protection settings for the equipment along with brief philosophy behind the logic, drawings etc. to be provided.				
<b>5.2</b>	Start up, normal operation and shut down procedure for equipments along with the associated systems in step by step mode. Valve sequence chart, step list, interlocks etc. with Equipment isolating procedures to be mentioned.				
<b>5.3</b>	Do's & Don't of the equipments.				
<b>5.4</b>	Safety precautions to be taken during normal operation. Safety symbols, Emergency instructions on total power failure condition/lubrication failure/any other condition				
<b>5.5</b>	Parameters to be monitored with normal values and limiting values				
<b>5.6</b>	Trouble shooting with causes and remedial measures				
<b>5.7</b>	Routine operational checks, recommended logs & records				
<b>5.8</b>	Changeover schedule if more than one auxiliary for the same purpose is given				
<b>5.9</b>	Painting requirement and schedule				
<b>5.10</b>	Inspection, repair , Testing and calibration procedures				
<b>6.0</b>	<b>MAINTENANCE GUIDELINES FOR PLANT</b>				



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Sl.no. & Sections	Description	Tick ( √ )if included in Manual			Remarks
		Yes	No	Not Applicable	
	<b>PERSONAL</b>				
6.1	List of Special Tools and Tackles required for Overhaul/Trouble shooting including special testing equipment required for calibration etc.				
6.2	Stepwise dismantling and re-assembly procedure clearly specifying the tools to be used, checks to be made, records to be maintained, clearances etc. to be mentioned. Tolerances for fitment of various components to be given.				
6.3	Preventive Maintenance & Overhauling schedules linked with running hours/calendar period along with checks to be given				
6.4	Long term maintenance schedules especially for structural, foundations etc.				
6.5	Consumable list along with the estimated quantity required during commissioning, normal running and during maintenance like Preventive Maintenances and Overhaul. Storage/handling requirement of consumables/self-life.				
6.6	List of lubricants with their Indian equivalent, Lubrication Schedule, Quantity required for each equipment for complete replacement is to be given				
6.7	List of vendors & Sub-vendors with their latest addresses, service centres ,Telephone Nos., Fax Nos., Mobile Nos., e-mail IDs etc.				
6.8	List of mandatory and recommended spare parts list				
6.9	Tentative Lead time required for ordering of spares from the equipment supplier				
6.10	Guarantee and warranty clauses				
7.0	<b>Statutory and other specific requirements considerations.</b>				
8.0	<b>List of reference documents</b>				
9.0	<b>Binding as per requirement</b>				



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME : II B**

**SECTION : D**

**REV 00**

**DATE: 21/12/2015**

**ANNEXURE-VII**

**LIST OF MAINTENANCE TOOLS & TACKLES**



TITLE

**SPECIFICATION FOR FIRE TENDERS,  
FIRE JEEP & FIRE SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA STPP**

DOCUMENT NO.: PE-TS-405-550-A001

VOLUME - IIB

SECTION D

DATE 21.12.15

SHEET

**ANNEXURE-VII**  
List of Maintenance Tools & Tackles

Sl. No	ITEM	QUANTITY
1.	DE spanner set 6.25 mm	1 set
2.	Ring spanner set 6.25	1 set
3.	Adjustable wrench 200 mm	1 No.
4.	Pliers cutting	1 No
5.	Pliers round nose 150 mm	1 No
6	Pipe wrench 300 mm	1 No
7	Screw driver 150 mm	1 No
8	Screw driver 250 mm.	1 No
9	File half round smooth 150 mm	1 No
10	Hammer ball pen ½ kg.	1 No
11	Grease gun.	1 No
12	Oil feeder.	1 No
13	Carpenter saw 450/500	1 No



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME : II B**

**SECTION : D**

**REV 00**

**DATE: 21/12/2015**

**ANNEXURE-VIII  
REFERENCE QUALITY PLANS**

MANUFACTURING QUALITY PLAN												
ITEM : DCP TENDER SUB-SYSTEM: FIRE TENDERS					QP NO.:9464-108-01FS-PVM-Q028 REV.NO.: 01. DATE:- 20.11.2010 PAGE: 01 OF 02.							
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD			REMARKS
					M	C/N			M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			11.
1	Chassis	Make, Engine No. Chassis no.	Major	Correlation	100%	Vehicle Mfgr's Documents	Vehicle Mfgr's Documents		P	V	V	
2	<u>Raw Material</u> MS plate for DCP tank.	Chemical & Mech property.	Major	Chemical & Mech property.	1/Lot	Approved drg./DS/IS 10993	Approved drg./DS/IS 10993	T.C.	P	V	V	
	Final Inspection of Complete DCP Fire Truck. Digitally signed by Srikrishna DN: cn=Srikrishna, c=IN, o=Ntpc, ou=CW Eng, email=drsrikrishna@ntpceoc.co.in Date: 2010.12.13 16:43:55 +05'30'	1. Leakage Test of DCP Pipe Line & Valves. 2. Road test & Braking Test. 3. Control panel operational check.	Major	Visual.	100%	Approved drg./DS/IS 10993.	Approved drg./DS/IS 10993.	IR	P	V	V	
			Major	Visual	100%	Approved drg./DS/IS 10993.	Approved drg./DS/IS 10993.		P	W	W	
			Major	Operational	100%	Approved drg./DS/IS 10993.	Approved drg./DS/IS 10993.		P	W	W	

MANUFACTURER/ SUB-SUPPLIER		SIGNATURE		DOC. NO.:		REV..... CAT.....	
MAIN-SUPPLIER							
<b>LEGEND:</b> * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'				FOR NTPC USE		APPROVED BY	
				REVIEWED BY		APPROVAL SEAL	







**MANUFACTURING QUALITY PLAN**

BHEL QAP. NO. PE-VO-374-550-A005  
 REV NO. 2  
 DATE :  
 PAGE NO. 1

SR.NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1.0	<b>MATERIAL AND COMPONENTS</b>											
A	M.S. PLATE FOR WATER TANK	CHEMICAL PROPERTY	MINOR	CHEMICAL PROPERTY	LOT	IS : 2062	IS : 2062	T.C	-	2	1/3	
B	G.M. (PUMP CASING)	CHEMICAL PROPERTY	MAJOR	CHEMICAL PROPERTY	LOT	IS : 318 GR.2	IS : 318 GR.2	T.C	-	2	1/3	
C	S.S. FOR PUMP SHAFT	CHEMICAL PROPERTY	MAJOR	CHEMICAL PROPERTY	LOT	SS 304	SS 304	T.C	-	2	1/3	
D	G.M. (IMPELLER)	CHEMICAL PROPERTY	MAJOR	CHEMICAL PROPERTY	LOT	IS : 318 GR. 2	IS : 318 GR. 2	T.C	-	2	1/3	
1-A	<b>CHASSIS &amp; ENGINE (ASHOK LEYLAND)</b>	MAKE, TYPE	MINOR	CHASSIS DOCUMENT	LOT	CHASSIS DOCUMENT	CHASSIS DOCUMENT	CHASSIS DOCUMENT	-	2	1/3	
2.0	<b>IN PROCESS INSPECTION</b>											
A	(STRUCTURAL) FABRICATION OF WATER TANK	VISUAL & DIMENSION INCL. THICKNESS	MINOR	DIM. (VISUAL)	100%	AS PER GA/WT/FT DRAWING	AS PER GA/WT/FT DRAWING	AS PER GA/WT/FT DRAWING	2	-	1/3	
B	HYDRO TEST OF WATER TANK	HYDRO TEST	MAJOR	HYDRO TEST 0.3 BAR	100%	AS PER SPECIFICATION	NO LEAKAGE	I.R.	2	1/3	-	
C	PUMP CASING	HYDRO TEST	MAJOR	21KG/ CM. SQ.	100%	AT 21KG/CM SQ.	NO LEAKAGE	I.R.	2	-	1/3	
D	IMPELLER	DYNAMIC BALANCING	MAJOR	—	100%	BALANCING CERTIFICATE	BALANCING CERTIFICATE	T.C	2	-	1/3	
3.0	<b>COMPLETE ASSEMBLY INSPECTION</b>											
A	PUMP (PRIMER) ASSEMBLY	VISUAL CHECK	MAJOR	COMPLETENESS / VISUAL	100%	AS PER SPECIFICATION	AS PER SPECIFICATION	I.R.	2	-	1/3	
B	HOSE REEL ASSEMBLY	VISUAL CHECK	MINOR	-DO-	100%	AS PER SPECIFICATION	AS PER SPECIFICATION	I.R.	2	-	1/3	
4.0	FINAL INSPECTION OF COMPLETE WATER TENDER	PERFORMANCE TEST OF PUMP FOR 4 HOURS & DEEPLIFT TEST OF PRIMER, STABILITY TEST, ROAD TEST TILTING TEST	MAJOR	PERFORMANCE TEST AND VERIFICATION OF LIST OF EQUIPMENT AND ACCESSORIES AS PER DATA SHEET	100%	APPROVED DATASHEET, APPROVED DRAWING AS PER IS: 10460 AND PO NO.	APPROVED DATASHEET, APPROVED DRAWING AS PER IS: 950 AND PO NO.	I.R.	2	1/3	-	

MANUFACTURER SIGNATURE  
 LEGEND :  
 \*\*1. BHEL, 2 manufacturer, 3 CUSTOMER  
 W: WITNESS  
 P: PERFORMAR  
 V: VERIFIER  
 I.R = INSPECTION REPORT  
 T.C. = TEST CERTIFICATE

**MANUFACTURING QUALITY PLAN**

ITEM : TFP  
SUB-SYSTEM:

QP NO.:9464-108-01FS-PVM-Q030  
REV.NO.: 02.  
DATE:- 29.11.2010  
PAGE: 01 OF 03.

MAIN-SUPPLIER:BHEL

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N			M	C	N			
1.	2.	3.	4.	5.	6.	7.	8.	9.	D*	**	10.	11.		
1.	Fabricated Items													
a)	TFP Chassis.	1. Properties of Plates 2. Channels	Major	Physical & Chemical	1/Batch	Approved drg/DS/IS 944	Approved drg/DS/IS 944	TC	✓	P	V	V		
b)	Fire water Pump (Vijay Make)	1) Raw material for casing, impeller & shaft. 2) Balancing of impeller. 3) Hydrotest of casing. 5) Performance test	Major	Physical & Chemical	1/heat 1/batch for shafts	Approved drg/DS/IS 944	Approved drg/DS/IS 944	TC	✓	P	V	V		
			Major	Dynamic Balancing	100%	Balancing certificate	Balancing certificate	TC	✓	P	V	V		
			Major	Hydro Test	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	IR	✓	P	V	V		
			Major	Head & capacity	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	IR	✓	P	V	V		
		4) Sub surface defects on shaft dia > 50 mm		UT	100%	ASTM A 388	Note 1							
c)	Primer Pump (Vijay Make)	Performance Test	Major	Head & Capacity	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	IR	✓	P	V	V		

**LEGEND:** \* RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.  
 \*\* M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC  
 P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE,  
 CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'

DOC. NO.: \_\_\_\_\_ REV..... CAT.....

FOR NTPC USE

REVIEWED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_ APPROVAL SEAL \_\_\_\_\_

1/2

Format NO.: QS-01-QAI-P-09/F1-RI

ENGG. DIV./QA&I


Note 1: when Back Wall Echo (BWE) set to 100% Full Screen Height (FSH) , a defect echo > 20% FSH is not acceptable. Also loss of BWE > 20% is not acceptable.

MANUFACTURING QUALITY PLAN											
ITEM : TFP SUB-SYSTEM:		QP NO.:9464-108-01FS-PVM-Q030 REV.NO.: 02. DATE:- 29.11.2010 PAGE: 01 OF 03.									
MAIN-SUPPLIER:BHEL											
d)	Diesel Engine (Simpson make)	Review of Mfg. Test certificate.	Major	BHP, Specific fuel consumption	100%	Mfg's Documents Approved drg/DS	Mfg's Documents IR	✓	P	V	V

Digitally signed by  
Srikrishna  
DN: cn=Srikrishna,  
c=IN, o=Ntpc,  
ou=CW Eng,  
email=drsrikrishna  
@ntpceoc.co.in  
Date: 2010.12.13  
16:07:17 +05'30'

MANUFACTURER/ SUB-SUPPLIER		SIGNATURE		REVIEWED BY		APPROVED BY		REV..... CAT.....	
MAIN-SUPPLIER		Srikrishna NTPC		FOR NTPC USE		APPROVAL SEAL		ENGG. DIV./QA&I	
<b>LEGEND:</b> * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'									
<b>FORMAT NO.:</b> QS-01-QAI-P-09/F1-RI <span style="float: right;">1/3</span>									

MANUFACTURER'S NAME AND		MANUFACTURING QUALITY PLAN					MAIN-SUPPLIER:BHEL				
ITEM : TFP SUB-SYSTEM:		QP NO.:9464-108-01FS-PVM-Q030 REV.NO.: 02. DATE:- 29.11.2010 PAGE: 01 OF 03.									
2	Final Inspection of Complete Trailer Fire pump.	Major	Visual	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	✓	P	W	W	
	1. Leakage Test of Pipe Line & Valve at maximum pressure of TFP.	Major	Visual	100%	By running the trailer and operation of hand brake	Satisfactory Performance	✓	P	W	W	
	2. Road test & Braking Test.	Major	4 hour run test as per IS 944.	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	✓	P	W	W	
	3. Pump Running Test & Performance.	Major	Operational	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	✓	P	W	W	
	4. Priming Performance Test.	Major	Operational	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	✓	P	W	W	
	5. Control panel operational check.	Major	Operational	100%	Approved drg/DS/IS 944	Approved drg/DS/IS 944	✓	P	W	W	

MANUFACTURER/ SUB-SUPPLIER		SIGNATURE		FOR NTPC USE		DOC. NO.:		REV..... CAT.....	
<b>LEGEND:</b> * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, <b>CHP:</b> NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'									
<b>FORMAT NO.:</b> QS-01-QAI-P-09/F1-RI								<b>ENGG. DIV./QA&amp;I</b>	



# MANUFACTURING QUALITY PLAN

**ITEM : FOAM TENDER**  
**QP NO.:9464-108-01FS-PVM-Q028**  
**REV.NO.: 02.**  
**DATE:- 29.11.2010**  
**PAGE: 01 OF 03.**

**MAIN-SUPPLIER:BHEL**

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N			M	C	N			
1.	2.	3.	4.	5.	6.	7.	8.	9.	D*	**	10.	11.		
1	Chassis	Make, Engine No. Chassis no.	Major	Correlation	100%	Vehicle Mfgr's Documents	Vehicle Mfgr's Documents			P	V	V		
2	<u>Raw Material</u> MS plate for water tank. SS plate for foam tank.	Chemical & Mech property Chemical & Mech property	Major Major	Chemical & Mech property Chemical & Mech property	1/Lot 1/Lot	Approved drg./DS/IS 10460 Approved drg./DS/IS 10460	Approved drg./DS/IS 10460 Approved drg./DS/IS 10460	T.C. T.C.	✓ ✓	P P	V V	V V		
(c)	Raw material for pump casing, impeller and shaft	Chemical & Mechanical		Chemical & mechanical property	1/heat 1/batch for shaft	-----Approved drg/DS-----		T.C	✓	P	V	V		
3	<u>Inprocess Inspection</u> Fabrication of water and foam tank. Leak test of water and foam tank. Pump casing. Impeller	Visual & Dimension incl. Thickness. Leak test. Hydro test. Dynamic balancing sub-surface defects	Minor Major Major Major	Dimensional (visual) Leak test (0.3 bar) 21 kg/cm.Sq UT	100% 100% 100% 100%	Approved drg./DS/IS 10460 Approved drg./DS/IS 10460 at 21 kg/cm2 for 30 min ISO 1940 gr 6.3 ASTM A 388	Approved drg./DS/IS 10460 No Leakage No leakage. ISO 1940 gr 6.3 as per note 1	IR IR IR balancing report UT report	✓ ✓ ✓ ✓	P P P P	V V V V	V V V V		
e	Ultrasonic test on shaft for dia > 50 mm			UT	100%				✓	P	V	V		

**LEGEND:** \* RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.  
 \*\* M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC  
 P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'

<b>MANUFACTURER/ SUB-SUPPLIER</b>	<b>MAIN-SUPPLIER</b>	<b>DOC. NO.:</b>	<b>REV..... CAT.....</b>
<b>SIGNATURE</b>		<b>FOR NTPC USE</b>	<b>APPROVAL SEAL</b>

**FORMAT NO.: QS-01-QAI-P-09/F1-RI**      **1/3**      **ENGG. DIV./QA&I**

Note 1: when Back Wall Echo (BWE) set to 100% Full Screen Height (FSH), a defect echo > 20% FSH is not acceptable. Also loss of BWE > 20% is not acceptable.



MANUFACTURER'S NAME AND		MANUFACTURING QUALITY PLAN					MAIN-SUPPLIER:BHEL				
ITEM : FOAM TENDER		QP NO.:9464-108-01FS-PVM-Q028 REV.NO.: 02. DATE:- 29.11.2010 PAGE: 01OF 03.									
SUB-SYSTEM: FIRE TENDERS											
8. Electrical Function Test.	Major	Functional	100%	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	✓	P	W	W	
9. Determination of Actual pay load.	Major	Visual	100%	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	✓	P	W	W	
10. Static Stability test.	Major	Visual	100%	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	✓	P	W	W	
11. Completeness of Equipment.	Major	Verification of various accessories.	100%	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	✓	P	W	W	
12. Painting Quality (both internal & external)	Major	DFT, Paint Shade.	100%	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	Approved drg./DS/IS 10460	✓	P	V	V	

Notes:

1) Manufacturer TC for Foam Monitor, Foam Compound Proportioner, Foam Branch pipe and Hose shall be produced for Verification during final inspection.

**/coupling/ nozzle**

MANUFACTURER/ SUB-SUPPLIER		SIGNATURE		FOR NTPC USE		DOC. NO.:		REV..... CAT.....	
<b>LEGEND:</b> * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION, AS APPROPRIATE, <b>CHP:</b> NTPC SHALL IDENTIFY IN COLUMN "N" AS 'W'									
<b>REVIEWED BY</b>				<b>APPROVED BY</b>		<b>APPROVAL SEAL</b>			

FORMAT NO.: QS-01-QAI-P-09/F1-RI

1/3

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**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME: III**

**REV. 00**

**DATE: 21/12/2015**

**VOLUME III**



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP &  
FIRESAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME : III**

**SECTION : 1**

**REV: 00**

**DATE: 21/12/2015**

**SHEET 1 OF 1**

**BIDDER SHOULD SUBMIT THE SIGNED AND STAMPED COPY OF THE FOLLOWING DOCUMENTS ALONG WITH TECHNICAL BID:**

1. Compliance cum confirmation certificate (Section-2 of Vol-III)
2. Pre bid clarification schedule (Section-3 of Vol-III)
3. No deviation certificate(Section-4 of Vol-III)
4. Un priced format (Section-5 of Vol-III)
5. List of Recommended Spares (Section-6 of Vol-III)
6. Equipments to be supplied with Fire water tender (Annexure-I)
7. Equipments to be supplied with Foam Tender (Annexure-II)
8. Equipments to be supplied with DCP Tender (Annexure-III)
9. Equipments to be supplied with Trailer Pump (Annexure-IV)
10. List of Maintenance Tool & Tackles (Annexure-VI)
11. Unpriced copy of price format.

Please note that all the schedules shall be submitted even though they may not be applicable. Under such circumstances it shall be clearly mentioned across such schedules that these are not applicable. (E.g. in case of there are no technical deviation, it shall be mentioned in the deviation schedule that 'THERE ARE NO DEVIATIONES TO THE TECHNICAL SPECIFICATION').

Name:  
Signature:  
Designation:  
Company:  
Date:

Bidder Stamp



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME: III**

**SECTION: 2**

**REV. NO. 00**

**DATE:21 /12/15**

**SHEET: 1 OF 2**

**COMPLIANCE CUM CONFIRMATION CERTIFICATE**

The bidder shall confirm compliance with following by signing / stamping this compliance certificate (every sheet) and furnish same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions, other than those mentioned under "exclusion and those resolved as per 'Schedule of Deviations', with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL / CUSTOMER approval & customer hold points for inspection / testing shall be marked in the QP at the contract stage. Inspection / testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This is within the contracted price without any extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets / calculations etc. submitted along with the offer shall not be taken cognizance off.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified / intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre-bid discussions, otherwise BHEL / Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.

- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL / CUSTOMER approval in the event of order.
- h) Guarantee for plant/equipment shall be as per relevant clause of GCC / SCC / Other Commercial Terms & Conditions
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities within the scope of work as tender specification. This clause will apply in case during site



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENT  
3 X 660 MW NORTH KARANPURA  
STPP**

**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME: III**

**SECTION: 2**

**REV. NO. 00**

**DATE:21 /12/15**

**SHEET: 2 OF 2**

commissioning, additional requirements emerges due to customer and / or consultant's comments. No extra claims shall be put on this account

- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's / Customer's / Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.
- k) As built drawings shall be submitted as and when required during the project execution.
- l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.
- m) Successful bidder shall furnish detailed erection manual for each of the equipment supplied under this contract at least 3 months before the scheduled erection of the concerned equipment / component or along with supply of concerned equipment / component whichever is earlier.
- n) Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.
- o) In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.



**TECHNICAL SPECIFICATION FOR  
FIRE TENDERS, FIRE JEEP & FIRE  
SAFETY EQUIPMENTS  
3 X 660 MW NORTH KARANPURA  
STPP**

SPECIFICATION No: PE-TS-405-550-A001

VOLUME: III

SECTION: 3

REV. NO. 00

DATE: 21/12/15

SHEET: 1 OF 1

**PRE-BID CLARIFICATION SCHEDULE**

S. NO.	SECTION/CLAUSE/PAGE NO.	STATEMENT OF THE REFERRED CLAUSE	CLARIFICATION REQUIRED

The bidder hereby clarifies that above mentioned are the only clarifications required on the technical specification for the subject package.

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Company: \_\_\_\_\_

Date: \_\_\_\_\_

Company Seal

## SECTION-IV

**DEVIATION SHEET (COST OF WITHDRAWL)**



**PROJECT:- 3 x 660MW NORTH KARANPURA STPP**

**PACKAGE:- FIRE TENDERS, FIRE JEEP & FIRE SAFETY EQUIPMENT**

**TENDER ENQUIRY REFERENCE:-**

**NAME OF VENDOR:-**

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
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**TECHNICAL DEVIATIONS**


**COMMERCIAL DEVIATIONS**


**PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE**

NAME	DESIGNATIONS	SIGN & DATE	

**NOTES:**

1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
14. In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.



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**SPECIFICATION No: PE-TS-405-550-A001**

**VOLUME : III**

**SECTION : 5**

**REV 00**

**DATE: 21/12/2015**

**SUGGESTIVE PRICE FORMAT**

**PROJECT : 3 X 660 MW NORTH KARANPURA STPP**

**SUGGESTIVE PRICE FORMAT FOR FIRE TENDERS, FIRE JEEP & FIRE SAFETY EQUIPMENT**

S.No.	Description	Unit	Qty	Unit Ex- Works Price (INR)	Total Ex-works Price (INR)	ED	Customs Duty	Sales TAX/VAT/any other tax on finished product (INR)	Freight Charges incl. service tax (INR)	F.O.R site Price (INR)	Price of Performance Demonstration (P.D) at site (INR)	Service Tax for P.D (INR)	Total Performnace Demonstration charges (INR)	Total Price (F.O.R Site + Performance demonstration) (INR)
1	2	3	4	5	6	7	8	9	10	11=(SUM OF 6 TO 10)	12	13	14=13+12	15=14+11
<b>1.0.0</b>	Total lumpsum firm price inclusive of all taxes and duties and other levies as applicable for design, engineering, manufacturing, inspection and testing at manufacturer's work , painting, supply/delivery, duly packed at project site including freight, performance demonstration at site in line with drawings/documents, test procedures approved by BHEL/NTPC with all accessories as specified including maintenance tools and tackles for fire tenders, Flre jeep & Flre safety equipment as per total scope defined in technical specification no. PE-TS-405-550-A001 taking into account all clarification, confirmation & agreements till date.													
<b>Notes:</b>														
<b>a)</b>	Bidder to note that the total price considered in 1.0.0 above shall be considered for evaluation and shall be complete in all respect.													
<b>b)</b>	Any item not included in the price quoted above and shown separately will not be taken into cognizance of and the offer shall be liable to rejection.													
<b>c)</b>	Bidder to note that prices indicated in column 14 ( price for Performance demonstration and service tax) shall be minimum 5 % of the total price indicated in column 15.													
<b>d)</b>	Bidder must submit prices in this format duly filled in , signed and stamp on every page . The price shall be written against each item. Term such as "refer covering letter" etc. are not acceptable.													
<b>e)</b>	Price format shall not be changed by the bidder													
<b>Break up of prices given in clause 1.0.0</b>														
<b>1.1.0</b>	Total lump sum price for Fire water tender including chassis as specified, comprising of design & engg. Manufacture, inspection & testing at manufacturer's works / his sub-vendor's works, painting at manufacturer's works / his sub-vendor's works, transportation, delivery to site, carrying out performance demonstration at site with complete accessories, Tools & tackles, Fill of chemicals & consumables (i.e. Dry chemical powder for extinguishers etc.) & replenishment of consumables & chemical exhausted during performance demonstration, with all taxes and duties in line with requirements of technical specification no. PE-TS-405-550-A001	Lot	1											

Break up of prices given in clause 1.1.0															
1.1.1	Supply price for Fire water tender with complete accessories as per IS: 950	No.	1										NL		
1.1.2	Supply price for the items to be supplied with Fire Water Tender as listed in enclosed Annexure-I of specification no. PE-TS-405-550-A001.	Lot	1										NIL		
1.1.3	Price for performance demonstration of Fire water tender at site.	Lot	1	NIL											
1.2.0	Total lump sum price for Foam tender including chassis as specified, comprising of design & engg. Manufacture, inspection & testing at manufacturer's works / his sub-vendor's works, painting at manufacturer's works / his sub-vendor's works, transportation, delivery to site, carrying out performance demonstration at site with complete accessories, Tools & tackles, Fill of chemicals & consumables (i.e. First fill of foam & Dry chemical powder for extinguishers etc.) & replenishment of consumables & chemical exhausted during performance demonstration, with all taxes and duties in line with requirements of technical specification no. PE-TS-405-550-A001.	Lot	1												
Break up of prices given in clause 1.2.0															
1.2.1	Supply price for Foam tender with complete accessories as per IS: 10460	No.	1										NL		
1.2.2	Supply price for the items to be supplied with Foam Tender as listed in enclosed Annexure-II of specification no. PE-TS-405-550-A001.	Lot	1										NIL		
1.2.3	Price for performance demonstration of Foam tender at site.	Lot	1	NIL											
1.3.0	Total lump sum price for DCP tender including chassis as specified, comprising of design & engg. Manufacture, inspection & testing at manufacturer's works / his sub-vendor's works, painting at manufacturer's works / his sub-vendor's works, transportation, delivery to site, carrying out performance demonstration at site with complete accessories, Tools & tackles, Fill of chemicals & consumables (i.e. First fill of DCP & Dry chemical powder for extinguishers etc.) & replenishment of consumables & chemical exhausted during performance demonstration, with all taxes and duties in line with requirements of technical specification no. PE-TS-405-550-A001	Lot	1												
Break up of prices given in clause 1.3.0															
1.3.1	Supply price for DCP tender with complete accessories as per IS: 10993	No.	1										NL		
1.3.2	Supply price for the items to be supplied with DCP Tender as listed in enclosed Annexure-III of specification no. PE-TS-405-550-A001.	Lot	1										NIL		
1.3.3	Price for performance demonstration of DCP tender at site.	Lot	1	NIL											

1.4.0	Total lump sum price for Fire Jeep with trailer pump including chassis as specified, comprising of design & engg. Manufacture, inspection & testing at manufacturer's works / his sub-vendor's works, painting at manufacturer's works / his sub-vendor's works, transportation, delivery to site, carrying out performance demonstration at site with complete accessories, Tools & tackles, Fill of chemicals & consumables & replenishment of consumables & chemical exhausted during performance demonstration, with all taxes and duties in line with requirements of technical specification no. PE-TS-405-550-A001.	Lot	1											
<b>Break up of prices given in clause 1.4.0</b>														
1.4.1	Supply price for Fire Jeep with complete accessories.	No.	1									NL		
1.4.2	Supply price for Trailer pump with complete accessories as per IS: 944	No.	1									NIL		
1.4.3	Supply price for the items to be supplied with Trailer pump as listed in enclosed <b>Annexure-IV</b> of specification no. PE-TS-405-550-A001.	Lot	1									NIL		
1.4.4	Price for performance demonstration of Trailer pump at site.	Lot	1	NIL										
1.5.0	Supply price for maintenance tools and tackles (as per enclosed <b>Annexure -VII</b> ) of specification no. PE-TS-405-550-A001.	Lot	1											
1.6.0	Fill of chemicals & consumables (i.e. Foam concentrate, Dry chemical powder etc.) & replenishment of consumables & chemical exhausted during performance demonstration of foam tender and fire water tender at site.	Lot	1											
1.7.0	Total lump sum price for Fire safety equipment as specified, comprising of design & engg. Manufacture, inspection & testing at manufacturer's works / his sub-vendor's works, painting at manufacturer's works / his sub-vendor's works, packaging, transportation, delivery to site, carrying out performance demonstration at site with complete accessories, Tools & tackles with all taxes and duties in line with requirements of technical specification no. PE-TS-405-550-A001.													
1.7.1	Fire Suits	Nos.	4											
1.7.2	Breathing Apparatus	Nos.	10											
1.7.3	First aid kits	Set	2											
1.7.4	Telescopic ladders	Set	2											
1.7.5	Fiber glass blankets	Nos.	10											
1.7.6	Multi-purpose nozzles	Nos.	4											
1.7.7	Portable thermal imaging camera	No.	1											



**TECHNICAL SPECIFICATION FOR  
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**SPECIFICATION NO. PE-TS-405-550-A001**

**VOLUME : III**

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**SECTION 6**

**LIST OF RECOMMENDED SPARES**

