



Technical specification for Water Based Fire  
Protection System Design Engineering  
Software  
BHEL, R.C.Puram, Hyderabad

**PEMC-04170**

Rev No. 01

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**TECHNICAL SPECIFICATION FOR WATER BASED FIRE  
PROTECTION SYSTEM DESIGN ENGINEERING SOFTWARE**

Ref. Doc	Revisions :	Prepared :	Approved :	Date :
	Refer to record of revisions :	Praveen Kumar	Kumar Gunjan	15.01.14



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Protection System Design Engineering  
Software  
BHEL, R.C.Puram, Hyderabad

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Form No.


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Form No.		<p style="text-align: center;"> <b>Technical specification for Water Based Fire Protection System Design Engineering Software</b>  <b>BHEL, R.C.Puram, Hyderabad</b> </p>	<b>PEMC-04170</b>
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<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p><b>1.0 INTENT OF SPECIFICATION:</b></p> <p>1.1 This specification intends to lay down the minimum technical requirements of Software for design of Water Based Fire Protection System. This document provides specific scope details to be used as input by Bidder for submitting their offer.</p> <p>1.2 It is not the intent to completely specify all details of software. Nevertheless this software supply and installation shall conform to high standard of engineering and shall be capable of performing in continuous operation in a manner acceptable to the Purchaser.</p> <p><b>2.0 SPECIAL NOTES TO BIDDERS</b></p> <p>2.1 This specification shall be read in conjunction with all its enclosures. In case of any discrepancy arising between this job specification &amp; its enclosures, the most stringent of all (as determined by purchaser) shall be followed. Further, if a requirement in this specification or any of the enclosures, calls for a decision from the Purchaser, it shall be bidder's sole responsibility to clearly bring out/highlight the same distinctively in his pre-bid queries, so as to enable purchaser to furnish their decision/clarification. If such issues/requirements are not duly addressed by bidder during the pre-bid stage and if such issues/requirements have been observed later during order execution stage, it shall be binding on the bidder to comply with the final decision made by the purchaser subsequently, without any cost, delivery, or any other commercial implications.</p> <p>2.2 Any additional equipment, material, services etc., which are not specifically mentioned in this specification, but required to make the system complete in all respects, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.</p> <p>2.3 Any specific hardware/software/item/ etc. required as indicated in 2.2.0 above but not listed elsewhere in this specification or its enclosures, shall be deemed to be included in the basic price quoted by the bidder. Bidder, at no point of time, shall be eligible to raise any extra claim in this regard.</p> <p>2.4 The Bidder shall accept full responsibility for the completeness and for the faultless working of the system as a whole. These shall be executed on the basis of proven design principle and in accordance with the latest state of the art in such a manner that the purpose to be served by the software is fulfilled in every respect and a maximum of operational dependability are assured.</p> <p>2.5 By accepting the contract, the bidder shall be deemed to have accepted the obligation of supplying everything that is necessary for the purpose mentioned above, regardless of any omission in the specification for the fulfillment of complete software package.</p> <p>2.6 Even though, the requirements are specified in detail to the extent possible, bidder to apply good engineering practices in the design, selection of software, procurement, inspection &amp; testing, Installation of software etc., wherever same is not clearly spelt out.</p>		
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> <b>COPYRIGHT AND CONFIDENTIAL</b>            The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.         </p>		<p>2.7 Bidder shall quote strictly as per the scope of supply and requirements of this specification.</p> <p>2.8 Bidder offer shall be strictly as per these specification requirements. Unsolicited or Alternate offers from the bidders will not be entertained.</p> <p>2.9 In case bidder feels that it is necessary to exclude some components of scope of supply or some of the features of specification requirements due to any technical constraints, bidder shall bring the same to the notice of purchaser during pre-bid stage and take their prior approval before submission of their bid.</p> <p>2.10 All such clarifications required by the bidder shall be intimated to BHEL together as a single notice within a week of receipt of enquiry by bidder. In case no such clarifications are sought during pre-bid stage, it will be assumed that bidder has no comments or observations on BHEL's specification and no deviations to the specifications will be taken by the bidder.</p> <p>2.11 Bidder to quote strictly as per BHEL's price format. Failure to do shall make their offer liable for rejection. Any tampering/modification/change of the BHEL's price format is not allowed and is liable for rejection of bidders offer.</p> <p>2.12 Incase Bidder is unable to offer due to any specific requirement of specification, Bidder may bring out the same in their regret letter. Otherwise it will be considered that non participation by the bidder is attributable to reasons other than any specification requirements.</p> <p>2.13 The design information, specifications and annexures indicate the "Minimum" requirements and are intended to enable Bidders to ascertain the extent of the work involved. Bidders are expected to supplement the information included in this specification as required and submit a comprehensive bid.</p> <p><b>3 BIDDER'S SCOPE OF SUPPLY AND SERVICES :</b></p> <p><b>3.1 BIDDER'S SCOPE OF SUPPLY:</b></p> <p>The broad scope of work covers supply &amp; services of software and associated licenses at BHEL Hyderabad and subsequent maintenance and support.</p> <ol style="list-style-type: none"> <li>One software user license floating on network for designing of Water Based Fire Protection System.</li> <li>Provide documentation for licenses.</li> <li>Provide documentation for software support from OEM vendors.</li> <li>Operation and maintenance manual together with CD Rewritable Storage Media shall be submitted to the purchaser in accordance with the Contract requirement.</li> </ol> <p><b>3.2 BIDDER'S SCOPE OF SERVICES:</b></p>	
	Ref. Doc		<p>3.2.1 Software Installation</p> <ol style="list-style-type: none"> <li>System software under the Contract shall be installed initialized, started-up and debugged.</li> </ol>


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<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	<ul style="list-style-type: none"> <li>b. The Installations shall configure a certain reports to be issued as specified. The supplier shall provide adequate paper for periodic reports.</li> <li>c. Documentation: It shall cover the software being installed that shall include description of point lists, printouts of all reports and graphics, application program listing, etc.</li> </ul> <p>3.2.2 Annual License Fee (ALF):</p> <ul style="list-style-type: none"> <li>a. The supplier shall grant right to use the software for the specified ALF period. Any updates/upgrades shall be delivered to BHEL Hyderabad by supplier during the ALF period. ALF shall starts after comprehensive installation of products and signing of the Service License agreement whichever ends later. ALF period shall be 5 years from the date of complete installation and handover of software.</li> <li>b. Annual Services (before the expiry of Maintenance Period) shall consists of following: <ul style="list-style-type: none"> <li>(i) Inspect the system and its operations, accuracy &amp; performances</li> <li>(ii) Inspect the performance &amp; accuracy of the installed software</li> <li>(iii) Inspection, checking, servicing, maintenance and repair including replacement;</li> </ul> </li> </ul> <p>3.2.3 Software Submittals/ Documentation</p> <ul style="list-style-type: none"> <li>a. Software submittals shall be detailed with description of sequences of operation, program listings, point lists and the design of graphics, reports and configuration to be furnished with the workstation software.</li> <li>b. Operation and maintenance manual together with CD Rewritable Storage Media shall be submitted to the supplier.</li> </ul> <p>3.2.4 Training</p> <ul style="list-style-type: none"> <li>a. Adequate training shall be provided to the operators for the day-today operation and future maintenance. It shall contain a comprehensive understanding of the software course materials covering workstation programming. Unless otherwise specified, the training should include courses with training handouts/manuals to the designated personnel, details as follows:-</li> <li>b. Sufficient training of handling/operation of equipment for the requisite number of personnel shall be arranged by the bidder. It shall consist of a minimum of 5 working days of hands-on instruction geared at the operation of the program/system. The cost of all such training shall be deemed to be included in the price quoted by the bidder. Bidder shall not be eligible to raise any extra claim in this regard.</li> <li>c. The training shall include minimum of the following:- <ul style="list-style-type: none"> <li>(i) System overview;</li> <li>(ii) System software and operation;</li> <li>(iii) Operation sequences including start-up, shutdown, adjusting and maintenance procedures;</li> <li>(v) Any other details, if any.</li> </ul> </li> </ul> <p>3.2.5 Arrange for services of manufacturer's installation / commissioning engineer at site during installation of software/systems. All the cost including that towards boarding, lodging, servicing, Insurance, Local Travel, Service charges etc. for arranging all the above visits shall be deemed to be included in the bidder's quoted price. Bidder shall not be eligible to raise any extra claim in this regard.</p>		
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<p style="text-align: center;"><b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>		<p>Note: Bidder to note that the above list is not exhaustive and any other service required as per the intent of this specification / project requirements /good engineering practice shall be deemed to be included in bidder's scope without any commercial implication to the purchaser.</p> <p><b>4 TECHNICAL REQUIREMENTS / FEATURES :</b></p> <p>4.1 Software tool shall be scalable, modular, multi-user capable, user friendly, integrates with existing system, and should be able to easily handle huge amounts of data. It should be able to design the following Sub-systems in the Water based Fire Protection system:</p> <ul style="list-style-type: none"> <li>• Fire Water Ring and all its components</li> <li>• Deluge systems</li> <li>• Sprinkler mist system</li> <li>• Foam solution systems</li> <li>• Foam Concentrate systems</li> <li>• High Velocity Water Spray system</li> <li>• Medium Velocity Water Spray system</li> </ul> <p>4.2 Software has to address all the hydraulic analysis requirements of virtually all National and International standards such as OISD, TAC, NFPA, all other applicable codes &amp; standards.</p> <p>4.3 This software shall perform pipe sizing &amp; pump selection calculations in steady state, calculates hydraulic loads for pipe stress analysis &amp; support design based on user requirement through several optional stages.</p> <p>4.4 Software tools shall allow users in Rapid Flow Analysis of Pipe Networks and all its components pertaining to Water Based Fire Protection system in Power plants, factories, Buildings &amp; all other assemblies.</p> <p>4.5 Software has to be flexible in offering a wide selection of units, user defined pipe schedules, nozzles, deluge valves and linings &amp; pump characteristics.</p> <p>4.6 The Pipe sizing by this software shall be done with any of the method: Hydraulically most remote hydrant/nozzle, Inlet pressure / Flow rate.</p> <p>4.7 The software shall create a complete Pipe Network system from inception to finish, and shall give control over every aspect of the design. Purchaser should be able to enter their own sizes to analyze an existing design, or purchaser should be able to do any combination of the two, where purchaser specify the Pipe sizes through tight areas where there is little room for Pipe network, and let the program calculate the sizes everywhere else in order to optimize the Pipe within stipulated areas.</p> <p>4.8 The software shall possess following General features:</p> <ul style="list-style-type: none"> <li>▪ Colours – Component coded according to data/results/user defined rules.</li> <li>▪ Bird's eye view, unlimited undo/redo, tool tips, pan &amp; zoo, font sizes.</li> </ul>	
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<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.		<ul style="list-style-type: none"> <li>▪ Isometric/orthogonal schematic grids, automatic creation of ranges with multiple items.</li> <li>▪ Tabulated data with copy/paste to virtually any spread sheet, global edit, sorting.</li> <li>▪ Extensive online help, online tutorials, user’s manuals and training manuals.</li> <li>▪ Import underlays in .dxf, .emf formats, copy/paste of sub-networks.</li> <li>▪ Extensive range of output formats including HPGL/2 for plotting.</li> <li>▪ Computes the complete bill of quantity for pipe schedule wise including the T-sections, Elbow joints etc.</li> <li>▪ The software shall allow to organize the layout structure of Pipe Network system and provides detailed engineering information on a section-by-section basis making revisions and updates easier.</li> </ul> <p>4.9 Software should have the min. following Technical features</p> <ul style="list-style-type: none"> <li>▪ Inputs – software has to accept isometric or orthogonal input, tabular input including copy &amp; paste from spread sheets.</li> <li>▪ Underlay – Import of drawings for use as underlays for schematic drawings.</li> <li>▪ Choice of calculation modes – Hydraulically most remote hydrant/nozzle, Inlet pressure/flow rate.</li> <li>▪ Choice of Hazen-Williams and D’arcy equations.</li> <li>▪ Choice of pipe or node elevations.</li> <li>▪ Output – Easy, readable outputs such as tables or display of data and results on the schematic.</li> <li>▪ Orifice plates – Diameter to be calculated or specified.</li> <li>▪ Pumps – Sizing of pumps or User defined pump curves &amp; Multiple pump scenarios</li> <li>▪ Fire hazards – Multiple fire scenarios.</li> <li>▪ Simulation – Block/Break of pipes to simulate closed valves &amp; burst pipes.</li> <li>▪ A virtually unlimited number of separate pipe network systems can be entered in a single project.</li> <li>▪ Provides comprehensive color reports which can be printed, previewed on screen and saved to disk.</li> <li>▪ Reports can optionally be generated as HTML file and RTF file (for Microsoft Word) or a PDF file (for Adobe Reader).</li> <li>▪ Uses either English / metric units.</li> <li>▪ Includes customizable toolbar and menu to fit work style.</li> </ul>	
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<p align="center"> <b>COPYRIGHT AND CONFIDENTIAL</b>  The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. </p>	<p><b>5 APPLICABLE GUIDELINES &amp; STANDARDS</b></p> <p>5.1 This software shall use the guidelines of TAC, OISD, NFPA and all other applicable National &amp; International codes &amp; Standards.</p> <p>5.2 In case of any contradiction between various referred standards/ specifications and statutory regulations, the most stringent of all shall be followed. Decision of purchaser in this regard will be final and will be binding on the bidder without any commercial or delivery implication to BHEL.</p> <p>5.3 Other international standards may also be acceptable subject to their being equivalent or superior to those listed above, with prior approval of purchaser.</p> <p>5.4 For provisions not covered by any of the codes &amp; standards, applicable good engineering practices and norms shall govern.</p> <p>5.5 In the event of any revision in the Codes and Standards which become effective from the date two weeks prior to the date of price bid/revised price bid submission, the cost effect on account of any additional requirements as per the revised codes and standard shall be borne by the bidder.</p> <p><b>6 OPERATION AND MAINTENANCE MANUAL</b>  Operation and maintenance manual together with CD Rewritable shall be submitted to the purchaser in accordance with the Contract requirement:-</p> <p>6.1 It shall contain all details necessary for operation, maintenance, replacement, installation and procurement for the system.</p> <p>6.2 It shall include specific part numbers and software versions and dates together with a complete list of annexures if any.</p> <p>6.3 It shall include a copy of all application software both in written form and on diskette.</p> <p>6.4 It shall include step-by-step system recovery procedures for system re-start up after fatal breakdown. Such procedures Representatives during the T&amp;C. Any special tools required for system re-start shall be supplied together with the System.</p> <p>6.5 It shall include all necessary passwords to initiate functioning of the software to initial start- up and to work after any modification or reprogramming.</p> <p><b>7 WARRANTY</b></p> <p>7.1 All items, equipment and software should have comprehensive onsite warranty for one year from the date of commissioning of the system.</p>			
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<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.		<p>7.2 In case the performance of any equipment fails to meet the contract specifications and not fulfill our requirements, then the vendor shall replace the equipment/systems free of cost during the warranty/guarantee period, within 15 days of reporting.</p> <p>7.3 In case of any defect or fault is reported during the warranty period, it shall be attended within 24 hours of reporting by a qualified engineer from the vendor.</p> <p>7.4 During the Maintenance Period, the bidder shall provide all services, materials and equipment necessary for proper operation of the system.</p> <p>7.5 Bidder shall be responsible for all necessary revisions to the software as required to provide a complete and operable system being consistent with the sequence of operations. All updates to the manufacturer s software shall bear no extra costs.</p> <p><b>8 PRICE BID FORMAT</b></p> <p>8.1 All the items included in the price bid format shall be quoted as per tender specification and subsequent tender stage correspondences, if any. Responsibility of ensuring correctness &amp; completeness of scope of supply as per spec. requirement solely lies with bidder.</p> <p>8.2 The software supplied shall be complete in all respects. The bidder shall not be eligible for any extra payment in respect of any other supporting software/hardware etc. if required for the reliable operation. Any additional software, etc., which are not specifically mentioned here, but are required to make the supplied software complete in all respect, in accordance with the intent of this technical specification, contractual agreement, statutory requirements, relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be in bidder scope only. It will be the bidder’s sole responsibility to specifically highlight any of the missing items required for the proper &amp; intended use of the software for Water Based Fire Protection System as a part of their offer. In case nothing is highlighted by the bidder, it will be assumed that all the major items are included in the bidder’s scope of supply for the desired operation of the software.</p> <p>8.3 All hardware/software/item/ etc. required as per tender specification or subsequent tender correspondences or for desired satisfactory operation of package or due to good-engineering practice or as prescribed by relevant/applicable code/standard, but not listed exclusively in this specification, shall be deemed to be included in the basic price quoted by the bidder. Also, all mounting hardware/ software etc. required for above the package shall be included in the basic price of respective item. Bidder, at no point of time, shall be eligible to raise any extra claim in this regard.</p> <p>8.4 Only main items shall be considered for price bid evaluation. Optional items (RO – rate only) shall not be considered for price bid evaluation</p> <p>8.5 Prices quoted by the bidder shall remain firm till the successful installation of this software to the Purchaser. Any request for upward revision of price during any intermediate stage before handing over the installation to the Purchaser will be summarily rejected by BHEL.</p>	
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**10 LIST OF ANNEXURES**

Sl. No.	Description	Document No.	Remarks
1.	Pre-Bid query format	-----	Annexure-1
2.	Price Bid format	PEMC-04683	Annexure-2



TD-106-2

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Form No.



**PROJECT ENGINEERING & SYSTEMS DIVISION  
BHEL, HYDERABAD –32.**

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PRE-BID QUERRIES FROM SPECIFICATION

If the proposal submitted has got any Queries from the technical stipulations in the bidding document, the Bidder shall tabulate below the full particulars of such Queries and shall sign below. Additional sheets may be enclosed, if necessary. Queries are to be furnished with mention of specific clause numbers. Technical and commercial Queries to scope of supply and services shall be indicated separately.

SL.No.	Clause No.	Description as per specification	Queries by Bidder

We confirm that all the Pre-Bid Queries to the Technical Specification, Job Specification and enclosures including reference documents attached are listed in this Annexure only. No other Pre-Bid Queries even if mentioned elsewhere shall be considered for any technical/ commercial evaluation or for ordering.

Bidder's Signature.....

Date:.....

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## PRICE BID FORMAT FOR WATER BASED FIRE PROTECTION SYSTEM

## DESIGN SOFTWARE

SPEC NO. PEMC-04170

Sl. No.	Description	Qty.	Unit	PRICE		
				Supply Price (in Rs.) [X]	Installation Price (in Rs.) [Y]	Total Price [P]=[X+Y]
<b>A</b>	<b>Main Item</b>					
1	Lumpsum Price for Water based fire protection system design engineering software with Training & Five (5) years ALF. (Requirement as specified in BHEL Spec.)	1	Lot			
<b>B</b>	<b>Optional Item</b>					
2	ALF charges for next 5 year after completion of ALF period of 5 years as per Sl. No.01 above. (Refer Note: d)	RO	Year		NA	NA

NA: Not applicable

RO: Rate Only

**Notes:**

- Bidder to quote strictly as per BHEL's specification requirements, Doc No: PEMC 04170 Rev 00.
- Supplier to submit Un-priced Bid with "Quoted" in all the applicable fields above along with Total confirmation to Commercial Terms.
- Bidder to quote the base rates only. Applicable taxes and duties to be indicated separately.
- BHEL reserves the right to order / not to order for the ALF services from sixth year onwards, as per Sl. No.02 of Price bid format without assigning any reason whatsoever.
- Only main items shall be considered for price bid evaluation. Optional items (RO – rate only) shall not be considered for price bid evaluation.

BIDDER'S SIGNATURE

NAME:

DATE

COMPANY SEAL