WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

(Wholly owned by the Government of West Bengal)

Swasthya Sathi, GN-29, Sector-V, Salt Lake, Kolkata-700 091.

NOTICE INVITING TENDER DOCUMENTS FOR

Comprehensive Annual Operation & Maintenance Contract (with manpower & consumables) of 130 KLD STP at Malbazar SSH, Dist-Jalpaiguri.

(NIT Reference No. :- WBMSCL/NIQ-55/2022, Dated – 17/02/2022)

WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED

(Wholly Owned by the Government of West Bengal)

Registered Office: SwasthyaSathi, GN-29, Sector-V, Salt Lake, Kolkata-700091
Phone: 033-4034-0300 ◊ Email: info@wbmsc.gov.in ◊ website: www.wbmsc.gov.in

NIT Ref No. :WBMSCL/NIQ-55/2022 Dated : 17/02/2022

Managing Director, West Bengal Medical Services Corporation Limited, Swasthya Sathi, GN-29, Sector-V, Kolkata - 700 091, invites e-tender for the works detailed in the table below

(Submission of Bid through online)

Sl. No.	Name of the work	Earnest Money (Rs.)	Cost of Tender documents (Rs.)	Time of Completion	Name & address of the Office
01.	Comprehensive Annual Operation & Maintenance Contract (with manpower & consumables) of 130 KLD STP at Malbazar SSH, Dist- Jalpaigur	12,000/-	NIL	01 (One) year	Managing Director, West Bengal Medical Services Corporation Limited, Swasthya Sathi Building, GN29, Sector –V, Saltlake,
Eligibility of Contractor: Intending bidders having Trade license in similar nature of job should produce credentials of a similar nature of completed work of the minimum value of (i) Rs.3,00,000/-(Rupees Four Lacks) during last 5(Five) years prior to the date of issue of this tender notice or (ii) Two similar nature of completed work, each of the minimum value of Rs.2,00,000/-(Rupees Four Lacks)during last 5(Five) years prior to the date of issue of this tender notice or (iii) One single running work of similar nature which has been completed to the extent of 80% or more and value of which is not less than the Rs.3,00,000/-(Rupees Four Lacks).					

Note:

a) For contract value exceeding 2.5 lakh deductions of TDS on GST is mandatory.

b) Quoted rate must be inclusive of GST.

c) Work Order and Completion certificate must be submitted as credential. Completion Certificate should contain i) Name of work, ii) Name of Agency, iii) Amount put to tender, iv) Tender No, v) Percentage of completion vi) Date of completion, vii) Gross value of the work done certified. During Tender process bidder may be asked to produce original credential documents for verification.

d) The prospective bidders must have the credential(s) of satisfactory completion as a prime agency during the last 5(five) years from the date of issue of this Notice as mentioned in Eligibility criteria under authority of State/ Central Govt., State /Central Govt. undertaking/ Statutory Bodies Constituted under the Statute of the Central / State Govt./Private Sector.

e) Valid up to date clearance of Income Tax return / GST Registration Certificate/ Professional Tax Enrolment/latest Deposit Challan / P.T. (Deposit Challan) / Pan Card / License / Voter ID Card for self-identification to be accompanied with the Technical Bid Documents, Income Tax Acknowledgement Receipt to be submitted as per ITB Sec-1.

f) The contractors who have been delisted of debarred by any government department shall not be eligible in anyway.

g) Joint venture will not be allowed to participate in the above NIT.

h) A prospective bidder participating in a single job either individually or as partner of a firm shall not be allowed to participate in the same job in any other form.

i) A prospective bidder shall be allowed to participate in a single job either in the capacity of individual or as a partner of a firm. If found to have applied severally in a single job, all his applications will be rejected for that job.

j) Where there is a discrepancy between the unit rate & the line item total resulting from multiplying the unit rate by the quantity, the unit rate quoted shall govern.

k) Prevailing safety norms has to be followed so that LTI (Loss of time due to injury) is zero.

l) No mobilization /secured advance will be allowed.

m) Agencies shall have to arrange land for erection of Plant & Machineries, storing of materials, labour shed, laboratory etc. at their own cost and responsibility if required.

n) Constructional Labour Welfare Cess @ 1 % (one percent) of the cost of construction will be deducted from every bill of the selected agency. GST, Royalty & all other Statutory Levy / Cess will have to be borne by the contractor. As the rates in the Schedule of rate are inclusive of GST & Cess as stated above.

o) Payment will be made after getting the work done certificate & recommendation from the respective Site Engineer.

p) In connection with the work, Arbitration will not be allowed. The Clause No. 25 of 2911(ii) is to be considered as deleted clause vide gazette notification no 558/SPW-13th December, 2011.

q) The work is of URGENT in nature and agency entrusted for it shall have to complete the work within stipulated time without any failure.

r) Refund of EMD: The Earnest Money of all the unsuccessful bidders, deposited online, shall be refunded in accordance with the Memorandum of the Finance Department vide No. 3975-F(Y) dated 28th July, 2016.

s) Exemption of Payment of Earnest Money (EMD) for MSME is not applicable for Works Contracts as per Finance Dept. Notification no 4245-F(Y) dated 28/05/2013. **EMD to be furnished in case of MSME for participating in this Tender.**

t) Penalty for suppression / distortion of fact. Submission of false document by tenderer is strictly prohibited & if found action may be referred to the appropriate authority for prosecution as per relevant IT Act with forfeiture of earnest money forthwith.

u) The Earnest Money may be forfeited if ; -
   i) If the Bidder withdraws the Bid during the period of Bid validity.
   ii) In case of successful Bidder, if the Bidder fails to execute formal agreement within the stipulated time period.
   iii) During scrutiny, if it is come to the notice of tender inviting authority that the credential or any other document which were uploaded & digitally signed by the Bidder are incorrect /manufactured / fabricated.

v) The successful Bidder shall have to execute Formal Agreement with Managing Director, West Bengal Medical Services Corporation Limited within 7(Seven) days from the issuance of Provisional Work order.

w) Bank guarantee shall be accepted for the purpose of the security.

1. In the event of e–filing, intending bidder may download the tender documents from the website: http://https://wbtenders.gov.in directly with the help of Digital Signature Certificate. Necessary Earnest Money will be deposited by the bidder electronically online through his net banking enabled bank account, maintained at any nationalized bank by generating NEFT/RTGS challan from the e-tendering portal and also to be documented through e-filing.

   As per G.O. No. 1592 – F(Y) dated. 20.03.2014 of the Finance Dept. of Govt. of West Bengal, in case of e–tendering, EMD/Bid security will have to be submitted as soft copy (scanned copies of the originals) along with the tender for instruments and in case of deposit of money it should compulsorily be deposited on – line by the bidders. The L1 bidder will submit the hard copy of the documents to the tender inviting authority with his acceptance letter of the LOI within specified time as mentioned in the letter of acceptance. Failure to submit the hard copy with the acceptance letter within the time period prescribed for the purpose may be construed as an attempt to disturb the tendering process and dealt with accordingly legally including blacklisting of the bidder.

2. Both Technical bid and Financial Bid are to be submitted concurrently duly signed digitally in the website https://wbtenders.gov.in

3. Dully filled in copies of **Section – II (Forms I to IV)** , **FORM-V in Section- III & Annex-A:Mandate form for e-payment** in prescribed proforma with proper dated signature in the relevant spaces to be uploaded electronically.

   Documents in support of the information furnished in Forms Section-II (Form I to IV), must be attached/uploaded for evaluation and the file number & page number has to be indicated in the respective column of the Form.

4. i) On selection of RTGS/NEFT as the payment mode, the e-Procurement portal will show a pre-filled challan having the details to process RTGS/NEFT transaction.
   ii) The bidder will print the challan and use the pre-filled information to make RTGS/NEFT payment using his Bank account.
   iii) The EMD of the bidders disqualified at the technical evaluation will be refunded through an automated process to the respective bidder's bank accounts from which they made the payment transaction.

5. The Financial Offer of the prospective Tenderer will be considered only if the Tenderer qualifies in the Technical Bid. The decision of the **Managing Director, WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED** will be final and binding on all concerned and no challenge against such decision will be entertained.

6. In case of inadvertent typographical mistake found in the Specific Price Schedule of Rates i.e. Bill of Quantity (BOQ), the same will be treated as to be so corrected as to conform with the prevailing relevant Schedule of Rates and/or Technically Sanctioned Estimate.

7. Running payment for work may be made to the executing agency as per availability of fund. The executing agency may not get a running payment unless the gross amount of Running Bill stands at least **25% (twenty-five percent)** of the tendered amount. Provisions in Clause(s) 7, 8& 9 contained in W.B. Form No. 2911(ii) so far as they relate to quantum and frequency of payment is to be treated as superseded.

8. Bids shall remain valid for a period not less than 180 (one hundred twenty) days from the date of opening of the Financial Proposal. However, extension of bid validity may be suitably considered by the Tender Inviting Authority, if required, subject to obtaining a written confirmation of the contractor/bidder(s) to that effect

9. Important Information:

DATE AND TIME SCHEDULE:

Sl. No.	Particulars	Date & Time
1	Date of uploading of NIeT Documents (online)(Publishing Date)	21.02.2022 at 09.00 AM
2	Tender documents download start date (online)	21.02.2022 from 10.00 AM
3	Bid proposal submission start date (online)	23.02.2022 from 09.00 AM
4	Technical & Financial Bid proposal Submission end date(online)	26.02.2022 up to 04.00 PM
5	Bid opening date of Technical evaluation (online)	28.02.2022 from 02.00 PM
6	Bid opening date of Financial proposal	To be notified later

10. Cost of Tender Documents: **NIL** (As per Notification of the Secretary, Public Works Department, CRC Branch, Government of West Bengal vide No. 199-CRC/2M-10/2012 dated: 21/12/2012 communicated by the Technical Secretary, Public Works Department, Government of West Bengal that the intending tenderers shall not have to pay the cost of tender documents for the purpose of participating in e-tendering.)

11. Earnest Money: The amount of Earnest Money is to be submitted Online through his net banking enabled bank account, maintained at any nationalized bank by generating NEFT/RTGS challan from the e-tendering portal and also to be documented through e-filing. The process of deposit of earnest money through offline instruments like Bank Draft, Pay Order etc. will be stopped for e–tender procurement of this office w.e.f. 01.09.2016.

    Once the financial bid evaluation is electronically processed in the e-Procurement portal, EMD of the technically qualified bidders other than that of L1 and L2 bidders will be refunded through an automated process to the respective bidders' bank accounts from which they made the payment transaction. If the L1 bidder accepts the LOI and the same is processed electronically in the e-Procurement portal, EMD of the L2 bidder will be refunded through an automated process to his bank account from which he made the payment transaction.

    The earnest money of the successful bidder (being converted to security deposit) deposited, will remain under the custody of the department till satisfactory completion of the work in full including extended quantity if ordered for. Besides this, necessary percentages shall be deducted from the progressive bids **so as to make it 3% (Three percent) of the value of work billed for. [as per memorandum No. 201-F(Y), date 18th Jan'21]**

12. The Bidder, at his own responsibility and risk is encouraged to visit and examine the site of works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a

contract for the work as mentioned in the Notice Inviting Tender, before submitting the offer with full satisfaction. The cost of visiting the site shall be at his own expense.

13. The intending Bidders should clearly understand that whatever may be the outcome of the present invitation of Bids, no cost of Bidding shall be reimbursable by the Department. The Managing Director, WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED reserves the right to reject any or all the application(s) for purchasing Bid Documents and/or to accept or reject any or all the offer(s) without assigning any reason whatsoever and is not liable for any cost that might have been incurred by any Tenderer at the stage of Bidding.

14. The intending bidders are required to quote the rate online only. No offline tender will be entertained.

15. If more than one Bidder quoted same rate and which are found lowest at the time of opening, such similar multiple rates will not be entertained / accepted. Lowest offer will be ascertained by sealed bid amongst the lowest bidders.

16. Contractor shall have to comply with the provisions of (a) the contract labour (Regulation Abolition) Act. 1970 (b) Apprentice Act. 1961 and (c) minimum wages Act. 1948 and any other notification thereof or any other laws relating thereto and the rules made and order issued there under from time to time.

17. During the scrutiny, if it comes to the notice of the tender inviting authority that the credential(s) and/or any other paper(s) of any bidder is / are incorrect/ manufactured/fabricated, that bidder(s) will not be allowed to participate in the tender and that application will be rejected outright.

18. The Managing Director, WBSMCL reserves the right to cancel the N.I.T. or issue corrigendum notices to the NIT due to unavoidable circumstances and no claim in this respect will be entertained.

19. List of “Technically Qualified Bidders” will be published in the web portal only. Financial Bid will be opened within a short period after such publication. Therefore, Bidders are requested to view the tender status on a regular basis.

20. In case of any objection regarding prequalifying an Agency, that should be lodged to the Managing Director, WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED within 1(one) day from the date of publication of the list of qualified agencies and beyond that time schedule no objection will be entertained.

21. Before issuance of the work order, the tender inviting authority may verify the credential(s) and/or other document(s) of the lowest tenderer, if found necessary. After verification, if it is found that the document(s) submitted by the lowest tenderer is/are either manufactured or false, the work order will not be issued in favour of the said Tenderer.

22. If any discrepancy arises between two similar clauses on different notifications, the clause as stated in later notification will supersede former one in following sequence;-
    a) Notice Inviting Tender
    b) Special Terms and Conditions
    c) Financial Bid
    d) Schedule of Works (**as per Section III)**

    All works covered in the clause appearing hereinafter shall be deemed to form a part of the appropriate item or items of works appearing in the work schedule whether specifically mentioned in any clause or not and

the rates quoted shall include all such works unless it is otherwise mentioned that extra payment will be made for particular works.

Intending tenderers are required to submit online attested/self-attested photocopies of valid enlistment renewal certificate, valid partnership deed (in case of partnership firm), current Professional Tax Deposit Challan / Professional Tax Clearance Certificate, PAN Card, Trade License from the respective Municipality, Panchayet etc. (in case of S & P Contractors only), [Non statutory documents]

In case of Registered Unemployed Engineers' Co-operative Societies and Registered Labour Cooperative Societies, attested photocopies of documents of credentials showing satisfactory completion of a single work in any Government Department commencing on or after 01.04.2009 of value not less than 40% of the Estimated Cost of the work applied for, 'Certificate of Registration' from the respective Assistant Registrar of Co-operative Societies, Professional Tax Deposit Challan / Professional Tax Clearance Certificate, PAN Card, must be submitted online. Payment certificates in lieu of credentials will not be accepted. [Non statutory documents]

The intending tenderer is required to quote the rate in figures as well as in words as per the FORM V in SECTION III.

Conditional / incomplete quotation will not be entertained.
Issuance of work order as well as payment will depend on availability of fund and no claim whatsoever will be entertained for delay of Issuance of work order as well as payment, if any. Intending tenderers may consider this criterion while quoting their rates.

If any tenderer withdraws his offer before acceptance or refuse within a reasonable time without giving any satisfactory explanation for such withdrawals, he shall be disqualified from submitting tender to WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED for a minimum period of 1(one) year.

Tax and other deductions shall be made as below:

i) GST will be deducted as applicable.
ii) Cess @ 1% (One Percent) of the cost of construction works will be deducted from the bills of the contractors on all contracts awarded on or after 01.11.2006 in pursuance with G.O. No. 599A/4M-28/06 dated 27.09.2006.
iii) 2% (Two percent) Income Tax of the cost of construction work will be deducted from the bill.
iv) Security Money deposit @ 1% (One Percent) will be deducted from the progressive bills in addition to the earnest money to make a total deposit of 3%(Ten Percent) of the value of work executed.

- Modification in the West Bengal Form No.: 2911/2911(i)/2911(ii)Clause 17 of CONDITIONS OF CONTRACT of the Printed Tender Form shall be substituted by the following vide Govt. Notification No 5784-PW/PW/L&A/2M-175/2017 dated 12.09.2017:

'Clause 17 - If the contractor or his workmen or servants or authorized representatives shall break, deface, injure, or destroy any part of building, in which they may be working, or any building, road, road-curbs, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wires, trees, grass or grassland or cultivated ground contiguous to the premises, on which the work or any part of it is being executed, or if any damage shall happen to the work from any cause whatsoever or any imperfection become apparent in it at any time whether during its execution or within a period of three months or one year or three years or five years, as the case may be (depending upon the nature of the work as described in the explanation appended hereto) hereinafter referred to as the Defect Liability Period, from the actual date of completion of work as per completion certificate issued by the Engineer-in-Charge, the contractor shall make the same good at his

own expense, or in default, the Engineer-in-Charge may cause the same to be made good by other workmen and deduct the expense (of which the certificate of the Engineer-in-Charge shall be final and binding on all concerned) from any sums, whether under this contract or otherwise, that may be then, or at any time thereafter become due to the contractor from the Government or from his security deposit, either full, or of a sufficient portion thereof and if the cost, in the opinion of the Engineer-in-Charge (which opinion shall be final and conclusive against the contractor), of making such damage or imperfection good shall exceed the amount of such security deposit and/or such sums, it shall be lawful for the Government to recover the excess cost from the contractor in accordance with the procedure prescribed by any law for the time being in force.-

Provided further that the Engineer-in-Charge shall pass the "Final Bill" and certify thereon, within a period of thirty days with effect from the date of submission of the final bill in acceptable form by the contractor, the amount payable to the contractor under this contract and shall also issue a separate completion certificate mentioning the actual date of completion of the work to the contractor within the said period of thirty days. The certificate of the Engineer-in-Charge whether in respect of the amount payable to the contractor against the "Final Bill" or in respect of completion of work shall be final and conclusive against the contractor . However, the security deposit of the work held with the Government under the provision of clause 1 hereof shall be refundable to the contractor in the manner provided here under:-

(a) For work with three months Defect Liability Period:
   i) Full security deposit shall be refunded to the contractor on expiry of three months from the actual date of completion of the work.

(b) For work with one year Defect Liability Period:
   i) Full security deposit shall be refunded to the contractor on expiry of one year from the actual date of completion of the work.

(c) For work with three years Defect Liability Period:
   i) 30% of the security deposit shall be refunded to the contractor on expiry of two years from the actual date of completion of the work;
   ii) The balance 70% of the security deposit shall be refunded to the contractor on expiry of three years from the actual date of completion of the work;

(d) For work with five years Defect Liability Period:
   i) No security deposit shall be refunded to the contractor
   ii) for 1s t 3 years from the actual date of completion of the work;
   iii) 30% of the security deposit shall be refunded to the contractor on expiry of four years from the actual date of completion of the work;
   iv) The balance 70% of the security deposit shall be refunded to the contractor on expiry of five years from the actual date of completion of the work;

Explanation :

The word 'work' means and includes building work, road work, drain work, sanitary and plumbing work and/or any other work contemplated within the scope and ambit of this contract. For

i) The work of patch repair or patch maintenance, annual operation &maintenance in nature or a combination, thereof, the Defect Liability Period of the work shall be three months from the actual date of completion of the work.

ii) Thorough Bituminous Surfacing work with bituminous thickness less than 40 mm, Repair & Rehabilitation of any road / bridge / culvert / building / Sanitary & Plumbing work, the Defect Liability Period of the work shall be one year from the actual date of completion of the work;

iii) Extension of building / bridge / culvert, Construction of new flexible pavement up to bituminous level which has been designed for a period of 3 years or more, Widening and strengthening of flexible pavement designed for a period of 3 years or more, Improvement of riding quality /

Strengthening of flexible pavement designed for a period of 3 years or more; Providing only mastic asphalt layer over existing bituminous surface without providing bituminous profile corrective course / bituminous base course, the Defect Liability Period of the work shall be three years from the actual date of completion of the work;

iv) Construction of new building / new bridge / new culvert, Reconstruction of building / bridge / culvert including construction of approach roads for bridge / culvert, Construction of rigid pavement, Reconstruction of rigid pavement, Construction of new flexible pavement covered by mastic work which has been designed for a period of 5 years or more, Widening and strengthening of flexible pavement covered by mastic work which has been designed for a period of 5 years or more, Improvement of riding quality / Strengthening of flexible pavement covered by mastic work which has been designed for a period of 5 years or more, the Defect Liability Period of the work shall be five years from the actual date of completion of the work;

Successful Tenderers will be required to obtain valid Registration Certificate & Labour License from respective Regional Labour Offices where construction work by them are proposed to be carried out as per Clauses u/s 7 of West Bengal Building & other Construction Works' Act, 1996 and u/s 12 of Contract Labour Act.
Power of Attorney holders are not allowed to sign Tender Documents unless otherwise approved by the Government.

Clause-25 of the conditions of contract of the West Bengal Form No. 2911/2911(ii) may be treated to be omitted and there is no provision for arbitration for resolution of disputes that may arise out of the contracts to be entered into by the Department with the contractors for the purpose of carrying out execution of public works as per G.O No. 558/SPW dated 13-12-2011 of P.W.D.

Successful tenderers will be required to observe the following conditions strictly:

a. Employees' Provident Fund and Miscellaneous Provisions Act, 1952 and Employees State Insurance Act, 1948 should be strictly adhered to wherever such Acts become applicable.
b. Minimum wages to the workers shall be paid according to the rates notified and/or revised by the State Government from time to time under the Minimum Wages Act, 1948 in respect of scheduled employments, within the specified time as per law. Payment of bonus, wherever applicable, has to be made.
c. Adequate safety and welfare measures must be provided as per the provisions of the Building and other Construction Workers' (Regulation of Employment & Conditions of Service) Act, 1996 read with West Bengal Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2004.
d. All liabilities arising out of engagement of workers are duly met before submission of bills for payment.

If there is any violation of any or all the relevant above criterion during execution of the job, it will render the concerned agencies ineligible for the work then and there or at any subsequent stage
as may be found convenient.

Sd/-
Managing Director
West Bengal Medical Services Corporation Limited

INSTRUCTION TO BIDDERS

SECTION–I

1. General guidance for e-Tendering

Instructions / Guidelines for tenders for electronic submission of the tenders online have been annexed for assisting the contractors to participate in e-Tendering.

1. **Registration of Contractor**
   Any contractor willing to take part in the process of e-Tendering will have to be enrolled &registered with the Government e-Procurement system, through logging on to https://wbtenders.gov.in the contractor is to click on the link for e-Tendering site as given on the web portal.

2. **Digital Signature certificate (DSC)**
   Each contractor is required to obtain a class-I, class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders, from the approved service provider of the National Information's Centre (NIC) on payment of requisite amount details are available at the Website stated in Clause-2 of Guideline to Bidder DSC is given as a USB e- Token.

3. The contractor can search & download NIT & Tender Documents electronically from computer once he logs on to the website mentioned in Clause 2 using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.

4. **Participation in more than one work**
   A prospective bidder shall be allowed to participate in the job either in the capacity of individual or as a partner of a firm. If found to have applied severally in a single job all his applications will be rejected for that job.

5. **Submission of Tenders**
   General process of submission:- Tenders are to be submitted through online to the website stated in Cl. 2 in two folders at a time for each work, one in Technical Proposal & the other is Financial Proposal before the prescribed date & time using the Digital Signature Certificate(DSC). The documents are to be uploaded virus scanned copy duly Digitally Signed. The documents will get encrypted (transformed into non readable formats).

6. **Eligibility to Participate**
   i. Bidders must have valid trade license without which no bidder will be allowed to participate.
   ii) Bidder must have valid PAN, ESI, EPF registration without which no bidder will be allowed to participate.
   iii) Bidders not fulfilling the eligibility criteria need not to participate and in the event of their participation without being fulfilling the eligibility criteria, their bids will summarily be rejected.

A. Technical proposal

The Technical proposal should contain scanned copies of the following in two covers (folders)

A-1. Statutory Cover files Containing

i) Earnest money (EMD) as prescribed in the NIT against each of the serial of work in favour of the Managing Director, West Bengal Medical Services Corporation Limited.

ii) Tender form No. 2911(ii) & NIT (Properly upload the same Digitally Signed).The rate will be quoted in the BOQ. Quoted rate will be encrypted in the B.O.Q. under Financial Bid. In case of Quoting any rate in 2911(ii) the tender is liable to summarily rejected).

A-2. Non statutory / Technical Documents

i) Professional Tax (PT) deposit receipt challan for the financial year 2017-18, Professional Tax clearance certificate, Pan Card, Income Tax Return, Certificate of provisional registration of GSTIN and valid Trade License.
ii) Registered Deed of partnership Firm/ Article of Association & Memorandum
iii) Registration Certificate and Clearance Certificate issued by the Assistant Register of Cooperative Society (ARCS) bye laws are to be submitted by the Registered labour Co-Operative Society/ Engineer's Co operative Society.
iv) Requisite Credential Certificate for completion of at least one similar nature of work under the authority of State/ Central Govt. having a magnitude of at least 40(forty)percent of the Estimated amount put to tender during the last 3(three) years prior to the date of issue of this NIQ is to be furnished in applicable cases.
v) Valid Service Tax Registration should possess by the tenderer.
vi) Individual deposit Challan (up to date) of Employees' Provident Fund & Employees' State Insurance.

Note:- Failure of submission of any of the above mentioned documents will render the tender liable to be rejected for both statutory & non statutory cover.

THE ABOVE STATED NON-STATUTORY/TECHNICAL DOCUMENTS SHOULD BE ARRANGE IN THEFOLLOWING MANNER

Click the check boxes beside the necessary documents in the My Document list and then click the tab

"Submit Non Statutory Documents" to send the selected documents to Non-Statutory folder. Next Click the tab "Click to Encrypt and upload" and then click the "Technical" Folder to upload the Technical Documents.

Sl. No.	Category Name	Sub Category	Sub Category Description
A.	CERTIFICATES	1.CERTIFICATES pdf 2.GST_registration_ certificates.pfd	1. Valid PAN card in the name of Bidder/Organization 2. Latest professional tax payment certificate /P. Tax (Challan) 3. IT-Return for last three years 4. Valid GSTIN under GST Act & rules. 5. Valid Trade License
B.	Company Details	Company Details –I pdf	1. Proprietorship Firm (valid Trade License/ revalidation) 2.Partnership Firm (Partnership Deed, valid Trade License revalidation) 3.Society (Valid Society Registration certificate, valid Trade License/ revalidation) 4.For Companies (Incorporation certificate, Memorandum of Articles of ROC, List of current Owners/ Directors/ Board Members, valid Trade License/ revalidation)
C.	Credential of Work	Credential 1 pdf Credential 2 pdf	Documents of Credentials **For –1st call of NIeT** (i) Intending bidders having Trade license in similar nature of job should produce credentials of a similar nature of completed work of the minimum value of (i) Rs.3,00,000/-(Rupees Four Lacks) during last 5(Five) years prior to the date of issue of this tender

			notice or (ii) Two similar nature of completed work, each of the minimum value of Rs.2,00,000/-(Rupees Four Lacks)during last 5(Five) years prior to the date of issue of this tender notice or (iii) One single running work of similar nature which has been completed to the extent of 80% or more and value of which is not less than the Rs.3,00,000/-(Rupees Four Lacks). [Work Order and Completion certificate must be submitted as credential. Refer Notes c) & d) of NIT for details]
D.	Financial Credential	Payment certificate pdf	Only payment certificates not the TDS certificate. IT return of bidder in three FY, or Audited Profit & Loss Accounts statement of any three financial years within the zone of preceding five financial years whichever is available.

Opening of Technical proposal:-

i) Technical proposals will be opened by the **Managing Director, West Bengal Medical Services Corporation Limited** and his authorized representative electronically from the web site stated using their Digital Signature Certificate.

ii) Intending tenderers may remain present if they so desire.

Opening of Financial proposal:-

i) The financial proposal should contain the following documents in one cover (folder) i.e. Bill of quantities (BOQ): The contractor/Bidder is required to quote the financial offer/bid price or as item rate including all taxex (GST, Cess etc.) online through computer in the space marked for quoting rate in the BOQ of the quoted work.

ii) Only the downloaded sheet of the above document in excel format is required to be uploaded (virus scanned & Digitally Signed) by the contractor/bidder.

The eligibility of the Bidder will be ascertained on the basis of document submitted / uploaded &digitally signed in support of the minimum criterion as mentioned above. If any document submitted / uploaded by the Bidder is either manufactured or false the eligibility of Bidder will be out rightly rejected at any stage without prejudice and action will be taken as per stipulation of IT Rules in force.

Sd/-
Managing Director
West Bengal Medical Services Corporation Limited

SECTION–II

FORM–I

B.1. PRE-QUALIFICATION APPLICATION.

To
Managing Director,
West Bengal Medical Services Corporation Limited

Ref:-Tender for _____
_____work_____
_____
_____

N.I.T. No: WBMSCL/NIQ-55/2022, Dated- 17/02/2022 of West Bengal Medical Services Corporation Limited

Dear Sir,
Having examined the Statutory, Non statutory, Instruction to Bidders & NIT documents along with its Agenda & corrigendum, I /we hereby submit all the necessary information and relevant documents for evaluation

The application is made by me / us on behalf of _____

In the Capacity _____ duly authorized to submit the order.

The necessary evidence admissible by law in respect of authority assigned to us on behalf of the group of firms for Application and for completion of the contract documents is attached herewith. We are interested in bidding for the work(s)given in Enclosure to this letter. **We understand that:**

(a) Tender Inviting & Accepting Authority/Engineer-in-Charge can amend the scope & value of the contract bid under this project.
(b) Tender Inviting & Accepting Authority/Engineer-in-Charge reserve the right to reject any application without assigning any reason.

(c) **Enclo:- e-Filling:-**
(d) 1. Statutory Documents.
(e) 2. Non Statutory Documents.

_____

Date:-

Signature of applicant including title
and capacity in which application is made.

SECTION–III

FORM-II

B.3. STRUCTURE AND ORGANISATION.

B.3.1. Name of applicant:: _____

B.3.2. Office Address:: _____

_____

Telephone No.:: _____

Fax No. **::** _____

E-mail ID : : _____

B.3.3. Name & address of Bankers:: _____

_____

_____

B.3.4. Attach an organization chart showing the structure of the company with names of Key personnel and technical staff with Bio-data.

Note: Application covers Proprietary Firm, Partnership, Limited Company or Corporation,

_____

Date: **Signature of applicant.**
including title and capacity in which application is made.

SECTION–III

FORM –III

B.4. EXPERIENCE PROFILE.

B.4.1. Name of the Firm: _____

_____

B.4.2. LIST OF PROJECTS COMPLETED THAT ARE SIMILAR IN NATURE TO THE WORKS HAVING MORE THAN 40% OF THE PROJECT COST EXECUTED DURING THE LAST FIVE YEARS.

Name, Location & nature of work	Deptt. Concern	Engineer-in-Charge	Contract price in Indian Rs.	% of Participation of company	Original Time Schedule		Actual Time Schedule		Reasons for delay in completion (if any)
					Start Date	Completion Date	Start Date	Completion Date	

Note: a) Certificate from the Employers to be attached

b) Non-disclosure of any information in the Schedule will result in disqualification of the firm.

_____

Date: **Signature of applicant**

including title and capacity in which application is made.

SECTION–III

FORM –IV

[Print out in Agency's Letter head & upload the filled proforma with digitally signed as stated below]

DECLARATIONBYTHETENDERER

I/We have inspected the site of work and have made myself/ourselves fully acquainted with local conditions in and around the site of work. I /We have carefully gone through the Notice Inviting Tender and other tender documents mentioned therein along with the drawing attached. I/We have also carefully gone through the 'Priced schedule of Probable Items and Quantities'.

My/Our tender is offered taking due consideration of all factors regarding the local site conditions stated in this Detailed Notice Inviting Tender to complete the proposed work referred to above in all respects.

I/We promise to abide by all the stipulations of the contract documents and carry out and complete the work to the satisfaction of the department.

I/We declare that I/We in the capacity of individual/ as a partner of a firm not debarred in the last financial year.

I/We also agree to procure tools, plants and others as per requirement, at my/our cost required for the work.

Signature of Tenderer with **Date :**

Postal address of the Tenderer

Name of the Firm with Seal

INSTRUCTION TO BIDDER

SECTION–III

Detailed Scope of work and other terms & condition for the "Comprehensive Annual Operation & Maintenance Contract (with manpower & consumables) of 130 KLD STP at Malbazar SSH, Dist-Jalpaiguri"

1. The intending bidders are requested to visit the sites at their own cost to ascertain the cost of Annual Operation & Maintenance (with manpower & consumables) Contract. In case of any non-functional /breakdown of STP/ETP plant, the primary servicing cost has to be ascertain and have to be placed in the prescribed format. No travelling charges will be given to the agency for their site visit.
2. In case of the non-functional/breakdown of the STP/ETP plant, the bidders have to quote a rate separately for servicing of STP/ETP Plant to make these in working condition. If the system is in running condition then Rate as per Sl.1.2 of Form –V in this Section -III is not required to fill-up i.e. in case of non-fill-up of Sl.1.2 of Form-V , it is to be considered that the respective STP/ETP plant is in running condition and no additional charge except Quoted Total amount will be paid additionally.
3. The bidders have to place the direct quotation for annual operation & maintenance (with manpower & consumables) as per the prescribed format (Section III, Form V). Gross bided value will be considered as the summation of the amount of those two aforesaid quoted rate.
4. Then selected contractor should make the STP/ETP Plant in running condition within 15 days from date of Work order in case of non-functional/breakdown. No additional charge except Quoted Total amount will be paid. The AMC will be operational from the very first day of proper functioning of the said Plant after servicing (if and where required).
5. **Overall Scope of Work:**
    a. On day to day basis (24 X 7), the contractor must operate & maintain the entire (all electrical & mechanical equipment and other parts of the system) STP/ETP plant, regular scavenging of the plant room/rooms and the landscaping/gardening work at the surrounding area (at least upto 50m radius) of the plant for a period of 01 (One) year after which the AMC may be extended depending on the performance of the contractor or till finalization of the next tender. The intending bidder who wishes to quote are required to visit and examine the whole systems and satisfy themselves before submitting their offer and to apprise themselves about the plant and equipment's, accessories and parts of the complete systems.

    b. Contractor have to provide all necessary consumables i.e, all spare parts(pumps, Motors, clarifier, chlorination, electrical panels, fittings/fixtures etc.), chemicals (for example like:- Gear Oil, Sodium Hypochlorite, Poly electrolyte, Food Grade Soda, Bacteria, Alum, Liquid Chlorine etc). as required for the proper functioning of the plant as per requirements/guidelines of manufacturer during the

AMC period. The requirement of chemicals/consumables may differ from the mentioned above, thus need to be checked by themselves after inspecting the whole system. The intending bidder is requested to visit the sites at their own cost to ascertain the cost of chemicals and consumables. All spares parts and materials shall be genuine and of same make and type as installed wherever applicable and a minimum quantity of spares and materials for routine maintenance may be kept at site to minimize time of maintenance. The firm / agency / contractor has to keep all equipments well maintained for the Plant so as to give proper output at all times.

c. The contractor shall fulfill the requirement of various law enforcing agencies / local authorities, such as Pollution control Board, Panchayat, ZillaParishadetc by taking their approvals as and required. The contractor has to obtain NOC/or renewal of NOC from Pollution Control Board on behalf of competent authority. In case of any failure the 5% of the contract amount will be deducted from the final bill.

d. The firm/ agency/contractor will be responsible for the safety of their deputed staff during the performance of their duty at site.

e. The contractor shall be responsible for day to day basis operation & shall maintain the decorum, punctuality, discipline work output and cleanliness of the Plant and its surroundings (at least up to 50m radius).

f. The firm/ agency/contractor will be responsible for disposal of excess treated water or the excess untreated sludge (in case of any emergency breakdown). If required, arrangement should be done by their own.

6. **Operation & Maintenance Part**:

a. The day to day (24 hr X 7 days) operation work of the plant is to be done by the experienced and qualified personnel with a reasonable duty roster.

b. The contractor shall keep the equipment well maintained, neat and clean and adhere to the **Operation & Maintenance Manual given in the respective manual.** Upon placement of work order, they will prepare the maintenance schedule and dosing rate/schedule of required chemicals for STP/ETP Plant as per the manufacturer's specifications and approved the same from WBMSCL before implementation. This may be revised from time to time as per the requirement.

c. Proper care shall be taken to avoid major breakdown at the plant. In the event of any breakdown, the same will be rectified/attended immediately within 24 hours from the time of reporting of the fault. Similarly, if any breakdown takes place due to negligence of contractor (except force measured), the whole component has to replaced/ rectified to bring it to the original condition immediately (within 24 hours) by the contractor.

d. Any inconvenience caused so far as performance of STP/ETP System due to negligence in the part of the agency, if detected, will be liable to penalty. Quantum of penalty would be decided in EIC depending on the gravity of situation

e. In case of any problem with the equipment/system, the contractor shall inform Site Engineer of WBMSCL immediately.

f. The routine maintenance and periodical maintenance & routine checking of all the equipment is under the scope of this tender and is to be done with proper care. Necessary preventive maintenance, breakdowns if any is to be attended throughout the day, all 7 days a week, with experienced and qualified personnel.

g. The contractor shall operate the filter press of STP as and when required. The contractor shall provide and maintain bacteria culture of STP as and when required.

h. The disposal of excess treated water or the untreated sludge (in case of any emergency breakdown) is under the scope of the contractor. Sufficient arrangement must be done as per site condition and approval from WBMSCL's end. The treated water pump should be maintained properly and should be operated on regular basis in close coordination with WBMSCL.

i. The contractor should test the water (from STP/ETP plant) as per relevant IS Codes form NABL approved test centers on **monthly basis** and the analysis should be done as per APHA standard. The testing parameters are The result of the treated water should as per the parameter mentioned in the relevant IS Codes.

j. There must availability of special tools and tackles, testing apparatus (for SS, MSLSS, MLVSS, VSS, SVI, temp, hardness, pH value etc. as per the operation manual), measurement and inspection devices including diagnostics equipments etc at call centre/site office.

k. Precaution against any fire hazards, theft or other damages to Plant and equipment shall be arranged by the firm. WBMSCL shall remain indemnified by the contractor from any encumbrance /loss on this account.

l. Regular servicing & inspection of the system-equipments should be carried out at least twice in a month preferably during 1st & 3rd week of the month by the contractor. The contractor shall perform preventive maintenance to the system-equipments and its accessories as per service manual. The contractor shall also attend any breakdown & emergency call immediately.

m. Any type of system components installed in the network must be kept at site for easy and quick replacement of spares as well as rectification of defects.

n. Changing of all spares and machineries attached with the STP/ETP System are under the AMC contract.

o. Any changes in the STP/ETP System i.e. for new technical development on the system must be informed to user.

p. In circumstance such that the Contractor fails to attend the breakdown within four normal working hours after notification of the breakdown and where remedial work interrupted during normal working hours for purposes other than obtaining replacement parts, the employer reserves the right to order such action as may be necessary to expedite completion of remedial work which shall be at the Contractors expense without abrogation of the Contractors responsibilities.

7. Documents to be Maintained:

A. Printed & binded duplicate **LOG-BOOKs** (on daily/weekly basis) must be maintained for recording of **parameters** related to STP/ETP, **maintenance activities**, **running status of all equipments**, **chemical dosing schedule** & **servicing**. The format of the log-book must be approved by WBMSCL prior to implementation. One copy of those log-sheets are to be submitted to WBMSCL as and when asked to.

B. A **Register** should be maintained by the contractor for call login/site instructions and result/compliance thereafter. The Site Engineer/Technician should have common telephone no by which a user can communicate with him directly.

C. **Certificate for** satisfactory performance of the STP/ETP System should be submitted to the concerned SAE twice in a month and that has to be countersigned by the AE and to be submitted along with the bill.

D. All the **test reports** are to be submitted periodically and also to be submitted along with the bills.

8. MANPOWER:

A. The day to day (7 days in a week) operation of the plant is to be done by the experienced and qualified personnel.

B. The agency/firm/contractor shall provide one highly skilled/highly technically expert person for routine visit within every 15 days.

C. In case any of staff is not found upto the mark and not able to do work properly, he will have to be changed as per the instruction of WBMSCL and immediately replaced by another qualified staff.

D. The contractor should provide escalation matrix to WBMSCL to lodge complaint of breakdown of STP/ETP Plant. In the escalation matrix the contractor has to provide at least 02 mobile no. and e-mail ID. If any changes is made in mobile no. / e-mail ID the same should be notified to WBMSCL in written within 7 working days.

9. Payment Schedule:

A. No advance payment will be made at any circumstances.

B. On successful completion of every quarter, 3 (three) months (1st quarter, 2nd quarter, 3rd quarter and 4th quarter respectively), running account bills can be placed along with certified copies of service reports/check lists, log sheets, compliance register copy, water test reports, or any other work done as per the scope of work mentioned in the tender/contract duly certified by the Concerned Site-in charge of WBMSCL.

C. WBMSCL will make payment to the contractor within a reasonable period after receipt of the certified bills along with all supporting documents (as stated above) and after deduction of applicable taxes/TDS, Security deposit etc.

D. Payment will be made according to the availability of fund from the concerned source. No claim, whatsoever, for delay in payment if any will be entertained.

10. Penalty:

A. The contractor shall rectify/attend any breakdown/complains within 24 hours failing which penalty for non-performance for each @ Rs. 500/- per day of delay subject to a maximum of 10% of the contract price of the respective site/unit will be imposed and in the event of any damage to the property or life arising out of non-performance, contractor will be solely responsible.

B. Any inconvenience caused so far as performance of STP & WTP System due to negligence in the part of the agency, if detected, will be liable to penalty. Quantum of penalty would be decided in EIC depending on the gravity of situation.

C. The contractor has to obtain NOC/or renewal of NOC from Pollution Control Board on behalf of WBMSCL. In case of any failure the 5% of the contract amount will be deducted from the final bill.

11. The services required are for a period of One year. As per the willingness of the Contractor, the contract may be extended with same rate and terms & condition subsequently based on performance or till finalization of the next tender. The contract may be terminated at any stage solely at the option of WBMSCL with an advance notice of one month without assigning any reason.
12. WBMSCL authority reserves the right to terminate the contract against three months' notice for the non-satisfactory performance or other administrative reasons.
13. The rates shall be quoted as per the prescribed format of WBMSC (Section-III, Form V). The rates shall be all inclusive of all taxes, transportation charges and duties etc. No extra cost beyond the quoted rate will be admissible.
14. The rates at any stage once quoted shall not be withdrawn.
15. No addition / alteration / deletion in the tender document is allowed.
16. An agreement detailing the terms & conditions shall be executed with the service provider for entering into this contract.

SECTION–III

FORM –V

Sl No	Description of Item	Quantity	Unit	Rate (Rs/Unit)	Amount (Rs.)
Comprehensive Annual Operation & Maintenance Contract (with manpower & consumables) of 130 KLD STP at Malbazar SSH, Dist- Jalpaiguri					
1.1	Quotation for Comprehensive Annual Operation & Maintenance Contract (with manpower & consumables) of 130 KLD STP at Malbazar SSH, Dist- Jalpaiguri	4	Quarterly		
1.2	Quotation for servicing of non-functional/breakdown STP/ETP plant to make these in working condition. (if any required) (BOQ has to be submitted showing break up details)	1	L.S.		
				Total=	
In Figure:					

NOTE:

1. Rate/Rates should be inclusive of all taxes.
2. Rate should be quoted online in the Financial proposal/Bid.
3. In case of non-fill-up of 1.2 , it is to be considered that the respective STP plant is in running condition.

ANNEXURE-A
Mandate Form for e-Payment

To
The Managing Director,
WBMSCL, Swahstya Sathi,
Swasthya Bhawan Complex,
GN-29, Sev-V, Salt Lake,
Kolata - 700091

Subject: Payment through electronic mode.

Sir/Madam,
I/We am/are giving option for availing the facility of e-Payment. Kindly arrange to remit the amount to my /our Bank Account hereinafter. The details of my/our particulars are furnished below:

1. (a) Name of the claimant /Payee /Receipt: …….. (Capital Letters)

   (b) Address:……

   (c) Contact. Land Line: …….. Mobile: …….

   (d) Email Address:…….....

   (e) ID No.**……. Nature of ID**…….....

   (f) PAN No:……

2. (a) Name of Bank: ……. ...

   (b) Name of Bank Branch……..…….

   (c) Account Type: Saving /Current / Cash-Credit Account…….....

   (d) Bank Account No. (CBS allotted a/c no.):

   (e) Branch IFSC (11 digits):

   The Bank particulars furnished above is correct and true.

   I/We hereby declare that I /We and my/ our heirs and successors accept the liability of making good to Government the overpayment, if any, made to me /us under the scheme.

   I/WE hereby authorize …… Branch (name of the Branch) of the …….. Bank to receive amount on my / our behalf for credit to my/ our account as stated above and further authorize that the receipt of credit given by the bank for the amount for my /our account shall be treated as legal quittance.

Yours faithfully,

(Signature of the claimant /payee/recipient)

(To be accepted by the Head of Office)

Signature of the Head of Office
(Office Seal)

Date:

N.B. (a) ID No. & Nature of ID: ID No. (i) For Individual: It should be the Voter Card / Aadhar Card / PAN Card / Any other Identity card issued by State Government / Central Government / Government Autonomous Bodies /Local Bodies, (ii) For Autonomous Body /Firm/Company: Registration No./ PAN / TN Number or Trade License.

(b) Verification of Bank Particular: Copy of 1st Page of the Pass-Book along with a copy of cancelled cheque or certified by the concerned Bank Branch.

Chief Engineer
Housing Directorate
Govt. of West Bengal

Executive Engineer-I
Planning Division,
Housing Directorate
Govt. of W. B.

Superintending Engineer (Elec.)
Housing & Planning Works (P.W.D)

सुव्रत कुण्डु / S. KUNDU
वरिष्ठ उप महा प्रबंधक (सी)
Sr. Dy. General Manager (C)
राइटस लि॰ / RITES LTD.
कोलकाता / Kolkata

Assistant Architect
Planning Division
Housing Directorate
Govt. of West Bengal

Shapoorji Pallonji ENGINEERING & CONSTRUCTION

SHAPOORJI PALLONJI & CO. PVT. LTD.

DESIGN & BUILD DIVISION

Contractor Building, 1st Floor,
Ramjibhai Kamani Marg, Ballard Estate
Mumbai - 400 038.
Tel/Fax: +91-22-66233500/533

PRINCIPAL CONSULTANT:

CONSULTING ENGINEERING SERVICE (INDIA PVT.. LTD.)
Kolkata- 700091

SUPPLER:

INVENIR TECH SYSTEMS PVT.LTD.

6, PARKSIDE ROAD, 2ND FLOOR, DESAPRIYA PARK, KOLKATA - 700 026
Phone No. - (033) 2465 5975 Tele Fax: (033) 2465 5976
Email: db@invenirtech.in; sk@invenirtech.in; akb@invenirtech.in; contact@invenirtech.in

CLIENT :

HOUSING CONSTRUCTION CIRCLE NO.II
HOUSING DIRECTORATE
(GOVERNMENT. OF WEST BENGAL)
P-11, CIT ROAD, 3RD FLOOR
KOLKATA-700014
TEL/FAX: +91-33-22651141/7850

PROJECT TITLE :

PROPOSED 5 STORIED TERTIARY HEALTHCARE HOSPITAL
AT MALBAZAR, WEST BENGAL

SITE: MALBAZAR	DOCUMENT TITLE : DESIGN & DATASHEET FOR 130 KLD STP	
BUILDING: HOSPITAL		
DATE : 08.10.2015	DOCUMENT NO : SP-STP-130KLD	REVISION 0

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

INVENIR TECH SYSTEMS PVT. LTD.

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	CONTENTS	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD	Project No. : C3825	Page – NIL	Rev.:	0

INVENIR TECH SYSTEMS PVT. LTD.

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	PROCESS WRITE UP		INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026		
Document No.:	SP-STP-130KLD-001	Project No. : C3825	Page – 1 OF 1	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : 001

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

INVENIR TECH SYSTEMS PVT. LTD. KOL 26

PROCESS WRITE UP

SEWAGE TREATMENT PLANT

1.0 Principles of Sewage Treatment Plant:

The technology for proposed sewage treatment plant is divided into three separate treatment steps.

a) Primary Treatment Process – In this process sewage is preliminary collected, homogenized and then pumped into the next stage after separation of large solid particles, grit and oil & grease.

b) Secondary / Biological Treatment Process – In this units main harmful component of the liquid waste ie, BOD & COD is being taken care of in the aeration tank followed by settling in tube settler.

c) Tertiary / Polishing Technology – Further polishing of trace solids, odour etc. is being taken care of in this treatment process. Mostly tertiary treatment is done for reuse of water for irrigation, landscaping, toilet flushing, car washing or for other process.

Beside these treatment processes, the sludge generated in the treatment process are also being processed and sludge cake, which is the final output of biological slurry is being disposed off and it is highly recommended to use as landfill.

2.0 Process Description:

Sewage from entire hospital area will flow by gravity through pipeline to *Bar Screen Chamber* of STP. In this chamber bigger size solid particles (>20 mm particle size) as well as leaves, twigs etc. will be separated. Laundry waste water will also be connected to STP after preliminary treatment (pH correction) in a small pit.

Screen Chamber

Screens in mild steel construction is installed prior to the EQT so that no bigger size solid should enter into the EQT, otherwise it will shock the transfer pump line.

Oil & Grease Chamber

It is a RCC tank with a baffle wall and usually provided to take care of the free floating oil & grease present in the waste water.

Equalization Tank

It is provided to prevent the shock load to the biological treatment in terms of flow and also in terms of organic matter content. Normally sewage is generated in the morning hours and also in late evening hours and hardly any sewage is generated during the night hours. Hence, the importance of EQT is very much required to homogenize the sewage. Usually it is a RCC Tank constructed underground. The detention time of EQT is usually between 3-4 hours with proper air distribution inside the tank.

The provision of aeration has been considered to prevent the septic condition inside the tank and to maintain the contents in a completely mixed condition.

Moving Bed Bio-Reactor (MBBR)

The entire Sewage Treatment Scheme is based on the principle of Moving Bed Bio-Reactor (MBBR) Process with diffused aeration system.

सुव्रत कुण्डु / S. KUNDU
वरिष्ठ उप महा प्रबंधक (सी)
Sr. Dy. General Manager (C)
राइटस लि॰ / RITES LTD.
कोलकाता / Kolkata

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

Superintending Engineer (Elect.)
Housing & Planning Works (PWD)

In MBBR Tank, main pollutants, ie, organic matter (in terms of BOD & COD) is reduced in presence of bacteria culture. The bio-reactions are carried out in controlled environment in presence of oxygen to synthesis the organic matter into harmless end product like CO_2 & H_2O. The bio-reactor consists of a RCC tank with coarse aeration diffuser network at the bottom of the tank for necessary aeration. Twin lobe air blower with a stand-by unit has been provided for necessary aeration & mixing inside the tank. The bacteria mass needs dissolved oxygen to multiply and to synthesis the organic matter. A PVC/ PP media is introduced inside the tank so that bacteria can grow inside the tank attached to the plastic media. A very large surface is available for the bacteria to grow with a minimum cross-sectional area and hence the size of the aeration tank is very less compared to other conventional treatment process. Due to constant aeration, the media is set in whirling motion, so that continuous mixing occurs. The bacteria layer growth on the media surface increases to a certain extent and then gets sloughed off after a certain period. This phenomenon is called 'sloughing' and it also creates new surface for the next bacteria culture. Sloughing takes place only after complete growth and subsequent dyeing – off of the bacteria layer and hence the sloughed off material is completely digested. This bacterial reaction occurs in two stage and so two tanks are provided with a partition wall. The tank volume is designed based on the flowrate and the BOD load to the system and the detention time of the tank usually varies between 2-2.5 hours per tank.

Tube Settler

The excess sloughed bio-mass should be removed from the system before water discharged from the STP. For this purpose Tube Settler is being provided with a tube pack media. In this tank heavy solids / bio-mass / dead bacteria is settled at the bottom of the tank and will be periodically removed by bottom sludge recirculation pump. A recirculation line is also being provided for recirculation of sludge back to the MBBR tank to maintain the bacteria culture, if required.

Filtration / Dis-infection

Dis-infection is usually done in Filter Feed Tank for reduction of e-coli/ pathogens before water is finally discharged and it is done by chemical dosing pump.

Tertiary Filtration System

Pressure Sand followed by Activated Carbon Filter has been provided for reduction of trace organics, colour and odour.

Treated Water Collection Tank

Finally treated water is being collected in a Treated Water Collection Tank from where it will be pumped by Irrigation Transfer Pump to the point of discharge.

Sludge Treatment

Sludge generated from the treatment process is being collected in a Sludge Holding Tank from where it will be pumped through a Filter Press for formation of sludge cake. The dried sludge will be utilized as manure as fertilizer for irrigation or for gardening or landscaping. The liquid or filtrate from the Filter Press will again be collected in a Sump Pit from where it will be recycled back to the EQT.

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
CA No.- 13562

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

INVENTIVE SYSTEMS PVT. LTD.

3.0 Salient Features of MBBR Technology:

- Compact design with less foot print area as the detention time of the aeration tank is only 5-6 hours compared to other conventional process.
- Minimum sludge generation.
- Project cost less as the tank volume is less.
- Minimum maintenance.
- Can withstand variation in flow and biological load.

4.0 Design Basis & Plant Capacity:

Inflow	-	130 KLD
Plant operation	-	Continuous for 24 hours
Average rate of flow	-	5.5 cum/hr based on 24 hours of operation
Peak flow rate	-	3 x 5.5 cum/hr = 16.5 cum/hr
Sludge generation	-	(12-13) kg/day
Tertiary Treatment	-	7.5 KLD for landscaping

5.0 Sewage Characteristics:

Sl. No.	Parameters	Inlet	Outlet / Treated
01	pH	6.5-8.5	6.5-8.0
02	BOD, mg/l	350-500	< 30
03	COD, mg/l	600-800	< 100
04	TSS, mg/l	100-400	< 15
05	Oil & Grease, mg/l	100	< 5
06	Temperature in deg C	25-40	25-40

SUBIR SAHA
B. Arch (J.U)
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IIA No.- 13562

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

WEINER TECH SYSTEMS PVT. LTD. KOL-26

6.0 Utilities

a) Chemicals - Special Bacteria Culture - 20 Lit (commissioning & stabilization only)

b) Manpower - Supervisor – 1 No. in General Shift
Operator – 1 No. per shift
Labour – 1 No. per day

c) Power Required – Connected – 27.23 KW
Operating – 11.02 KW/hr

d) Overall Area - 12 m Long x 8.0 m wide (Refer Layout Diagram Attached)

7.0 CIVIL UNITS

Sl. No.	Name of Unit	Qty	Description	M.O.C.
01	Bar Screen Chamber	01	Dimensions (l x w), m – 2.0 x 0.65	RCC
02	Oil & Grease Chamber	01	Detention Time – 40 mins Capacity – 3.6 Cum Dimensions (l x w), m – 2.0 x 1.2 x 1.5	RCC
03	Equalization Tank	01	Detention Time – 3.5 hours Capacity – 19 cum Dimensions (l x w x SWD), m – 3.1 x 3.0 x 2.1	RCC and Brickwork for House
04	MBBR Tank	02	Detention Time – 3.25 hours Capacity – 17.5 cum (each) Dimensions (l x w x SWD), m – 2.2 x 2.1 x 3.8	RCC
05	Tube Settler	01	Detention Time – 1.65 hours Capacity – 9 cum Dimensions (l x w x SWD), m – 2.2 x 1.4 x 3.0	RCC
06	Filter Feed Tank	01	Detention Time – 3.5 hours Capacity – 20 cum Dimensions (l x w x SWD), m – 2.4 x 2.2 x 3.8	RCC
07	Treated Water Tank	01	Detention Time – 3.5 hours Capacity – 20 cum Dimensions (l x w x SWD), m – 2.4 x 2.2 x 3.8	RCC
08	Sludge Holding Tank	01 No.	Detention Time – 10 days based on sludge volume/day Capacity – 12.8 cum Dimensions (l x w x SWD), m – 2.6 x 1.3 x 3.8	RCC
09	Common Foundation for electro-mechanical items	01 Lot	----------	PCC & Brickwork

NOTE:

a) Invert level at entry to Bar Screen Chamber has been considered as (-1.8) m below existing G.L.

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INVENIR TECH SYSTEMS PVT. LTD. KOL-26

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	INVENTORY LIST	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-002	Project No. : C3825	Page – 2 OF 2	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

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INVENIR TECH SYSTEMS PVT. LTD. KOL-26

INVENTORY LIST FOR 130 KLD STP

Sl. No.	Name of Unit	Qty	Description	M.O.C.
01	Coarse Bar Screen	01 No.	Dimensions (l x ht), m – 2.31 x 0.78	MSEP
03	Transfer Pumps	02 Nos.	Type – Drymotor Submersible Capacity – 8.5 Cum/Hr, Head – 11 MWC Power – 1 HP, Model – Eeternal 750 CW Make – Kirloskar	Casing-CI Impeller-CI
04	Air Blowers	02 Nos.	Type – Roots Blower Capacity – 150 Cum/Hr, Head – 4.5 MWC Power – 7.5 HP, Model – 53 AC Make – Kay/ Everest/ Subhas/ Usha/ Equv.	Casing-CI Lobe-CI
05	MBBR Media	09 Cum	Type – Black colour UV stabilized Diameter – 22 mm x Height – 16 mm Make - Invenir	PP
06	Coarse Bubble Diffuser Membrane (For EQT, SHT & MBBR)	86 Nos.	Type - Circular Disc, Diameter – 80 mm Make - PP Aqua/ Equv.	EPDM
07	Tube Pack for Tube Settler	04 Cum	Type – Hexavalent Chevron (Black) Straight Height – 750 mm Make – PP Aquatech/ Equv.	FRP
08	Sludge Re-circulation Pumps	02 Nos.	Type – Horizontal centrifugal Capacity – 6.5 Cum/Hr, Head – 10 MWC Power – 1 HP, Model – SP0, Make – Kirloskar	Casing-CI Impeller-CI
09	Filter Press Feed Pump	02 Nos.	Type – Rotary Screw Capacity – 2 Cum/Hr, Head – 45 MWC Power – 1.5 HP, Model – EH 164, Make – UT	Casing-CI Impeller-CI
10	Filter Feed Pump	02 Nos.	Type – Horizontal Monoblock Centrifugal Capacity – 7.2 Cum/Hr, Head – 30 MWC Power – 3 HP, Model – KDS 335+, Make –Kirloskar	Impeller-CI Casing-CI
11	Filter Press	01 No.	Type – Manual Plate & Frame Capacity – 10 Kg/Batch, No. of Plates – 12 (10+2) Make – Kaushik/ Orient/ Equv.	Casing-CI Plate-PP
12	Pressure Sand Filter	01 No.	Type – Cylindrical with torispherical head Capacity – 7.5 Cum/Hr Diameter – 800 mm, Overall Height – 1500 mm Valves – PP Multiport Frontal Pipeline – 40 NB uPVC	MSEP
13	Media for PSF	19 Cu.ft	Graded Gravel & Coarse Sand	--------
14	Activated Carbon Filter	01 No.	Type – Cylindrical with torispherical head Capacity – 7.5 Cum/Hr Diameter – 800 mm, Overall Height – 1500 mm Valves – PP Multiport Frontal Pipeline – 40 NB uPVC	MSEP
15	Media for ACF	4 Cu.ft	Graded Gravel & 250 Kg Activated Carbon	--------

Sl. No.	Name of Unit	Qty	Description	M.O.C.
16	Interconnecting Piping & Valves	01 Lot	Type of pipes – MS-ERW Class-B & uPVC for Filter Type of valves – CI & PVC for Filters	----------
17	MCC Panel	01 No.	Type – Compartmentalized, front open, non draw out No. of feeders – 15 (13 W + 1 Lighting + 1 spare) Make – Royco/Shree Jagannath/Syscon/Equv.	----------
18	Electrical cabling from Starter Panel to individual motor	01 Lot	Type – PVC sheathed PVC insulated Aluminium conductor aluminium armoured cable with 3 core, 4 sq.mm & 1100 V Make – Finolex/ Gloster/ Polycab/ Equv.	----------
19	Level Switch	02 Nos.	Type – Capacitance Unit – EQT & Filter Feed Tank Make – Levcon / Equv.	-------
20	Flowmeter	01 No.	Type – Electro-magnetic Unit – Outlet of Activated Carbon Filter Make – Aster Technologies / Equv.	-------
21	Chemical Dosing Pump	02 Nos.	Type – Electronic solenoid Pump Capacity – (0-4) LPH, Make – Etatron	PP
22	Chemical Dosing Tank	02 Nos.	Type – Circular Capacity – 100 Lit, Make – Patton	LDPE
23	Pressure Gauges	12 Nos.	Type – Bourdon Make – H.Guru / KI/ Equv.	-------
24	Irrigation Pumps	02 Nos.	Type – Horizontal Monoblock centrifugal Capacity – 2.5 Cum/Hr, Head – 20 MWC Power – 2 HP, Model – KDS 225++, Make – Kirloskar	Casing-CI Impeller-CI
25	Bacteria Culture for stabilization – Nature vel WW - 20 Lit			

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DESIGN CALCULATION SHEET	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-003	Project No. : C3825	Page – 3 OF 3	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

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Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

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INVENIR TECH SYSTEMS PVT. LTD.

[01] BAR SCREEN CHAMBER

Design Flow	:	130 Cum/day
Average Flow	:	5.417 Cum/hr. = 0.001504 Cu.m/sec
Peak Design Flow	:	16.25 Cum/hr. = 0.004513 Cu.m/sec
Velocity through screen	:	0.9 m/sec
Depth of Flow	:	0.1 m (assumption)
Width of chamber (Provided)	:	650 mm considering ease of installation of screen, plastering at side walls and invert level of 1.8 m below existing ground level.
Angle of inclination	:	60 deg
Dimension of Bar Screen Chamber, m	:	**2.0 (L) x 0.65 (W) x 2.3 (Ht)**

[02] OIL & GREASE TRAP

Flow (average)	:	130 cum/day
Average Flow	:	5.417 Cum/hr. = 0.001504 Cu.m/sec
Liquid Depth	:	1.5 m
Length of the Tank	:	2.0 m
Width of the Tank	:	1.2 m
The actual Volume of the Tank	:	(2.0 x 1.2 x 1.5) = 3.6 Cum
Hydraulic Loading Rate (< 2.5 m/hr, OK)	:	(5.42 / 2.0 / 1.2) = 2.25 m/hr
Actual detention time	:	40 min (Detention time > 30 min, O.K.)
Dimension of Oil & Grease Trap, m	:	**2.0 (L) x 1.2 (W)x 1.5 (SWD)**

[03] EQUALIZATION TANK

Flow (average)	:	130 cum/day
Average Flow	:	5.417 Cum/hr. = 0.001504 Cu.m/sec
Detention time (Assumed)	:	4.5 Hours based on average flow
Liquid Depth	:	2.1 m
Length of the Tank	:	3.1 m
Width of the Tank	:	3.0 m
The actual Volume of the Sump	:	(3.1 x 3.0 x 2.1) = 19 Cum
Actual Detention Time	:	3.5 Hours (O.K.)
Dimension of Equalization Tank, m	:	**3.1 (L) x 3.0 (W) x 2.1 (SWD)**

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[04] FAB-I & II

Flow (average)	:	130 cum/day
Average Flow	:	5.417 Cum/hr. = 0.001504 Cu.m/sec
BOD in to the FAB Tank (BODi)	:	350 mg/l (Max.)
BOD out from the FAB Tank (BODo)	:	30 mg/l
BOD treated	:	(350-30) = 320 mg/l
BOD treated	:	(130 x 320) = 41600 gm/day

Calculation Based on MBBR Loading Rate

Loading Rate of BOD + nitrification	:	3.5 gm/sq.m/day (Refer Page-13)*
Total Surface Area Required	:	(41600 / 3.5) = 11886 M^2
Loading Rate of MBBR media	:	400 (Refer MBBR Catalogue) M^2/M^3
Actual Volume of Media Require	:	(11866 / 400) = 29.72 M^3 (calculated)

Calculation Based on MLSS & F:M Ratio

Considering MLSS in MBBR	:	4000 mg/l
F:M considered	:	0.2
Volume of the MBBR Tank	:	(130 x 320) / (4000 x 0.2) = 52 Cum

The above calculated volume is valid for aeration tank without any media. However, considering MBBR media inside the tank a factor has been introduced to get the actual volume of MBBR Tank (ie, f-0.6)

Hence the volume of MBBR Tank is	:	52 x 0.6 = 31.2 Cum

Considering both the cases the actual volume of MBBR tank has been kept as **35 Cum**, which is also greater than the actual design value of MBBR (31.5 Cum) (Refer Table-4B, page-15)*

Actual Volume of the FAB Tank provided	:	35 Cum
Hydraulic detention time (Hr)	:	6.5 Hrs. (Refer Table-5B, page-17)
Oxygen required/ kg of BOD removal	:	2.0 Kg O2 per kg of BOD removal Including nitrification
Actual Oxygen required	:	(41.6 x 2) = 83.20 kg/day
Air required based on 100% efficiency	:	(83.2 / 24) = 3.47 kg/hr
Efficiency of Fine Bubble Diffuser	:	12% at 3.5 m SWD
Actual Air Required	:	[3.47/(1.203 x 0.21 x 0.12)] = 104 cum/hr
Total Volume of EQT & SHT	:	24+12 = 36 cum
Air requirement for EQT & SHT	;	(0.015 x 36 x 60) = 32.4 cum/hr
Actual Capacity of Air Blower provided	;	(104 + 32.4) = 136.4 cum/hr
Taking 10% extra total air requirement	:	150 cum/hr
Blower capacity considered	:	150 Cum/hr

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Total No. of Diffusers considered for FAB	:	36 Nos. (Refer Datasheet of Diffuser)
Airflow per diffuser for FAB Tank	:	(150/36) = 4.17 Cum/hr/diffuser (< 7 cum/hr/diffuser)
Liquid depth of the FAB Tank	:	3.8 m
Width of FAB Tank	:	2.1 m
Length of FAB Tank (Calculated)	:	35 / 3.8 / 2.1 m = 4.38 m
Considering two tanks of equal volume, the length of each tank = 2.19		
Actual detention time in each tank	:	(2.2 x 2.1 x 3.8) x 24 / 130 = 3.24 hour
Dimensions of FAB-I & -II, m	:	**2.2 (L) x 2.1 (W) x 3.8 (SWD) [Each]**

NOTE: (*) Refer MBBR System component Manual attachment

[05] TUBE SETTLER

Flow (average)	:	130 cum/day
Average Flow	:	5.417 Cum/hr. = 0.001504 Cu.m/hr
Peak Flow	:	16.251 Cum/hr
Type of Media	:	UV Stabilized Virgin PVC Base Inclined Settler Media
Structure	:	Hexagonal Chevron Self Supporting
Straight Height of Media	:	750 mm
Settling velocity	:	1.1 m/hr
Factor of Safety	;	0.7
Settling Area required	:	(16.251 / 1.1 / 0.7) = 21.1 sq.m
Specific Area / Plan Settling area of media	:	12 Sq.m/Cu.m
Media Quantity (calculated)	:	21.1 / 12 = 1.76 cu.m
Actual Volume of Tube pack media	:	2.5 cum
Inclination with horizontal	:	60 deg
Fitting Arrangement	:	Tongue and Groove
Slope of the hopper bottom of the Tank	:	(40-45) deg
Area of the Tank	:	2.56 Sq.m
Width of the Tank	:	1.4 m
Length of the Tank	:	(2.56 / 1.4) = 1.8 m
Weir Loading Rate	:	(130 / 7.2) = 18 cum/m/day (O.K.)
Space above Tube pack media	:	0.40 m
Space below Tube pack media	:	1.0 m
Hopper Angle	:	45 deg
Sludge Zone	:	0.6 x 0.6 m
Dimensions of Tube Settler, m	:	**2.2 (L) x 1.4 (W) x 3.0 m (SWD) (SWD including hopper bottom)**

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[06] SLUDGE HOLDING TANK & FILTER PRESS

Flow (average)	:	130 cum/day
BOD Treated	:	320 mg/l = 41.6 kg/day
Sludge generated/ kg of BOD Treated	:	0.3
Total Sludge wasted	:	41.6 x 0.3 = 12.5 kg/day
Consistency of sludge	:	1% = 10 Kg/Cum
Volume of waste sludge generated	:	1.25 cum/day
Capacity of Sludge Holding Tank	:	13 Cum
Detention time for sludge	:	(13 / 1.25) = 10.4 days
No. of Filter Press	:	01 No.
Capacity of Filter Press	:	10 Kg/batch
No. of batches/day	:	01 (approx.)
Dimensions of Sludge Holding Tank, m	**:**	**2.6 (L) x 1.3 (W) x 3.8 m (SWD)**

[07] FILTR FEED TANK

Flow (average)	:	130 cum/day
Detention time	:	3.75 hours based on average flow
Capacity of the Tank	:	20 Cum
Width	:	2.2 m
SWD	:	3.8 m
Actual Length provided	:	2.4 m
Dimensions of Filter Feed Tank, m	**:**	**2.4 m L x 2.2 m W x 3.8 m SWD**

[08] TREATED WATER TANK

Flow (average)	:	130 cum/day
Detention time	:	3.75 hours based on average flow
Capacity of the Tank	:	20 Cum
Width	:	2.2 m
SWD	:	3.8 m
Actual Length provided	:	2.4 m
Dimensions of Treated Water Tank, m	**:**	**2.4 m L x 2.2 m W x 3.8 m SWD**

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[09] PRESSURE SAND FILTER

Flowrate (average)	:	7.5 cum/hr
Surface Overflow rate	:	15 cum/sq.m/hr
Actual Diameter considered	:	0.8 m
Height of the media	:	1 m
Coarse sand height	:	800 mm
Gravel Height (1/2" – ¾")	:	150 mm
Gravel Height (1/4" – ½")	:	100 mm
Gravel Height (1/8" – ¼")	:	75 mm
Gravel Height (1/16" – 1/8")	:	75 mm
HOS	:	1.5 m
Dimensions of Pressure Sand Filter	:	**0.8 m Dia x 1.8 m HOS**

[10] ACTIVATED CARBON FILTER

Flowrate (average)	:	7.5 cum/hr
Surface Overflow rate	:	15 cum/sq.m/hr
Actual Diameter considered	:	0.8 m
Height of the media	:	1 m
Activated Carbon Media height	:	800 mm
Gravel Height (1/2" – ¾")	:	100 mm
Gravel Height (1/4" – ½")	:	100 mm
HOS	:	1.5 m
Dimensions of Activated Carbon Filter	:	**0.8 m Dia x 1.5 m HOS**

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INVENIR TECH SYSTEMS PVT. LTD. KOL-26

EHS SMART-Treat™
MOVING BED BIOFILM REACTOR (MBBR) SYSTEM
COMPONENT MANUAL FOR
PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS

Environmental / Health Products & Service
P. O. Box 21
Richfield, WI 53076

Phone: (262) 628-1300
E-Mail: ken-ehs@juno.com

Update Version 3: May 2012

SMART-Treat™ MBBR Tank Volume, Air, & Media Requirements

Aeration Reactor Characteristics: Goal of the SMART-Treat system, domestic septic tank eff. is ≤ 25 mg/l BOD and ≤ 30 mg/l TSS after settling, and nitrification of about 80 % if wastewater temperature is greater than 50 degrees F (10 degrees C). Organic loading to the SMART-Treat™ MBBR to achieve this degree of nitrification is based on 0.00072 pounds BOD/ ft^2/day (3.5 grams BOD/ m^2/day). This would be equivalent to about 215 ft^2 (20 m^2) surface area to treat the waste of 1 person. **For larger flows, this would be equivalent to a loading rate of about 0.72 # BOD_5/ 1000 ft^2/day (3.5 grams BOD/m^2/day). If only BOD removal was required (not nitrification) the loading rate could be increased to 1.44 # BOD/1000 ft^2/day (7.0 grams BOD/m^2/day). If BOD removal only, the surface area and the hydraulic residence time can be cut in half. Table 3 only shows typical BOD influent values. Table 4a shows tank size and biological surface area for BOD REMOVAL ONLY. Table 4b shows tank size and biological surface area for BOD REMOVAL + NITRIFICATION (ammonia removal @ 80% reduction).**

Table 3. Population Equivalents, Flow and Influent BOD loading (with nitrification) at 0.00072 pounds BOD/ft^2/day (3.5 grams BOD/m^2/day). Table 3 is based on Domestic Septic Tank Effluent as the SMART-Treat™ MBBR Influent. For BOD_5 higher than 300 mg/L, the population equiv. and wastewater flow must be based on 0.154 pounds BOD/day/PE.

To determine pounds of BOD/day/PE, use the following formula:
BOD Pounds/day/PE = mg/L BOD x 2.204623^{-6} lb/mg x 3.785412 L/gal x 75 gal/day/PE

Population Equivalents	Design Wastewater Flow		Influent BOD	
	Gallons/day	Liters/day	Pounds/day	Kilograms/day
6	450	1704	0.92	.42
10	750	2840	1.54	.70
12	900	3408	1.85	.84
15	1125	4260	2.31	1.15
20	1400	5300	3.09	1.4
30	2250	8520	4.63	2.1
40	2800	10600	6.17	2.8
50	3750	14195	7.71	3.5
60	4300	17040	9.25	4.2
70	5250	19870	10.79	4.9
80	5600	21200	12.33	5.6
90	6750	25550	13.87	6.3
100	7500	28390	15.41	7.0
125	9375	35485	19.26	8.8
250	18750	70970	38.52	17.5
500	37500	141940	77.04	35.0
750	56250	212900	115.56	52.5
1000	75000	283875	154.08	70.0
1333	100000	37500	205.3	93.3

Table 4b. ***BOD Reduction + Nitrification (approx. 80% ammonia removal).*** **SMART-Treat MINIMUM tank volume, depth, biofilm carrier elements (volume, % fill, surface area)**

Population Equivalents	Tank Volume Gallons (M^3)	Aerobic Reactor Water Depth, min, * FT	% Tank Fill of Media (M^2/m^3)	Media Bulk Volume, FT^3 (M^3)	Surface Area, FT^2 (M^2)
6	200 (0.75)	3.5	32 (160)	8.5 (0.24)	1285 (120)
10	200 (0.75)	3.5	54 (267)	14.2 (0.4)	2154 (200)
12	200 (0.75)	3.5	64 (320)	17.0 (0.48)	2570 (240)
15	250 (0.95)	3.5	63 (316)	21.3 (0.6)	3228 (300)
20	330 (1.25)	3.5	64 (320)	28.3 (0.8)	4308 (400)
30	500 (1.9)	3.5	64 (320)	42.5 (1.2)	6462 (600)
40	660 (2.5)	4	64 (320)	56.6 (1.6)	8616 (800)
50	830 (3.2)	4	64 (320)	70.8 (2.0)	10770 (1000)
60	1000 (3.8)	4	64 (320)	85.0 (2.4)	12924 (1200)
70	1170 (3.4)	4	64 (320)	99.1 (2.8)	15078 (1400)
80	1330 (5.0)	4.5	64 (320)	113.3 (3.2)	17232 (1600)
90	1500 (5.7)	4.5	64 (320)	127.4 (3.6)	19386 (1800)
100	1675 (6.3)	4.5	64 (320)	141.6 (4.0)	21540 (2000)
125	2100 (7.9)	5	64 (320)	177 (5.0)	26926 (2500)
250	4175 (15.8)	5	64 (320)	354 (10.0)	53852 (5000)
500	8350 (31.5)	6	64 (320)	708 (20.0)	107700 (10000)
750	12500 (47.3)	8	64 (320)	1062 (30.0)	161556 (15000)
1000	16500 (63.0)	10	64 (320)	1414 (40.0)	215400 (20000)
1333	20625 (78.8)	10	64 (320)	1885 (53.3)	287130 (26660)

***If tank unavailable w/ min. depth, or site restrictions may not allow tank w/ min. depth, up to 20% less tank depth is acceptable if air volume is increased 10%.**

Table 5b. ***BOD Reduction + Nitrification (approx. 80% ammonia removal).*** SMART-Treat Air requirements, Average & Maximum for peak loading, Aerobic Reactor Ave HRT. **EHS Recommends: Design for Peak or Maximum Air Flow, unless WW flow is 100% equalized.**

Population Equivalents *	Average Air. CFM (m^3/hr)	Maximum Air. CFM (m^3/hr)	Peak Flow Factor, Max Air @ Max WW Flow	Minimum Aerobic Reactor Tank Vol, gal Water Depth, Feet	Hydraulic Retention Time, hours @Daily WW Flow, (DWF)
6	1.3 (2.1)	6.4 (10.7)	4.8	200 / 3.5	10.6
10	2.2 (3.7)	10.6 (17.8)	4.8	200 / 3.5	6
12	2.6 (4.2)	12.8 (21.4)	4.8	200 / 3.5	5.3
15	3.3 (5.7)	15.9 (26.7)	4.8	250 / 3.5	5
20	4.4 (7.4)	21.0 (35.5)	4.8	330 / 3.5	5
30	6.5 (11.1)	21.0 (35.5)	3.2	500 / 3.5	5
40	8.7 (14.8)	27.8 (47.4)	3.2	660 / 4	5.3
50	10.3 (18.5)	33.0 (47.4)	3.2	830 / 4	5.3
60	13.1 (22.2)	41.9 (71.0)	3.2	1000 / 4	5.3
70	15.2 (25.9)	48.8 (82.9)	3.2	1170 / 4	5.3
80	20.0 (34.0)	50.1 (85.2)	2.5	1330 / 4.5	5.3
90	22.5 (38.3)	56.3 (95.7)	2.5	1500 / 4.5	5.3
100	25.0 (42.6)	62.6 (106.4)	2.5	1675 / 4.5	5.3
125	27.8 (47.3)	69.5 (118.2)	2.5	2100 / 5	5.3
250	55.6 (94.5)	139 (236.3)	2.5	4175 / 5	5.3
500	88.8 (191)	222 (377)	2.5	8350 / 6	5.3
750	84 (143)	210 (357)	2.5	12,500 / 8	5.3
1000	88.8 (150.9)	222 (377)	2.5	16, 500 / 10	5.3
1333	119	296	2.5	20,625 / 10	5.3

*** Interpolate air requirements based on proportioning between listed P E figures.**

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	**DATASHEET OF EQUALIZATION SUBMERSIBLE TRANSFER PUMP**	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 4 OF 4	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-01

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD.

EQUALIZATION SUBMERSIBLE TRANSFER PUMP

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-01
Date	30-09-2015	Rev	0

A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	2 Nos. (1 working + 1 Stand by)
2	Application		To transfer waste water and sewage from equalization tank to FAB Unit
3	Fluid		Waste water and Sewage with solids
4	Temperature	°C	Ambient
5	Specific Gravity	gm/cc	1.02
6	pH		6.0 - 7.0
7	Solids Size	mm	12
8	Capacity	Cu.m / hr	8.5 Cum/hr (142 LPM)
9	Suction pressure		Flooded
10	Total Head Offered	m	11 Mtrs
B	**PUMP DESCRIPTION**		
1	Make		Kirloskar
2	Model		**ETERNA 750CW**
3	Type		Dry Motor Submersible
4	Speed	rpm	2900 RPM
5	Suction x Discharge	mm x mm	50 mm
6	Seal Type		Mechanical Seal
7	Solid Handling Size	mm	20
8	Material Of Construction of		
	Casing / Cover		Cast iron
	Impeller		Cast iron
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	0.75 Kw / 1.0 HP
2	Speed	rpm	2900
3	Type of operation		Synchronous speed
4	Type of mounting		Flange Mounted
5	Power Supply		AC, 3 phase, 415V±10%, 50 Hz
6	Class of Insulation		Class - F
7	Degree of protection		IP 68
8	Make		Kirloskar
NOTE	**REFER CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD. 26

Eterna is brought to you by Kirloskar, a name trusted for over twelve decades. It is Kirloskar's dedication to the art and science of finding innovative ways of making water solutions available to mankind that is manifested in the Eterna range of pumps.

Enriching Lives

KIRLOSKAR BROTHERS LIMITED

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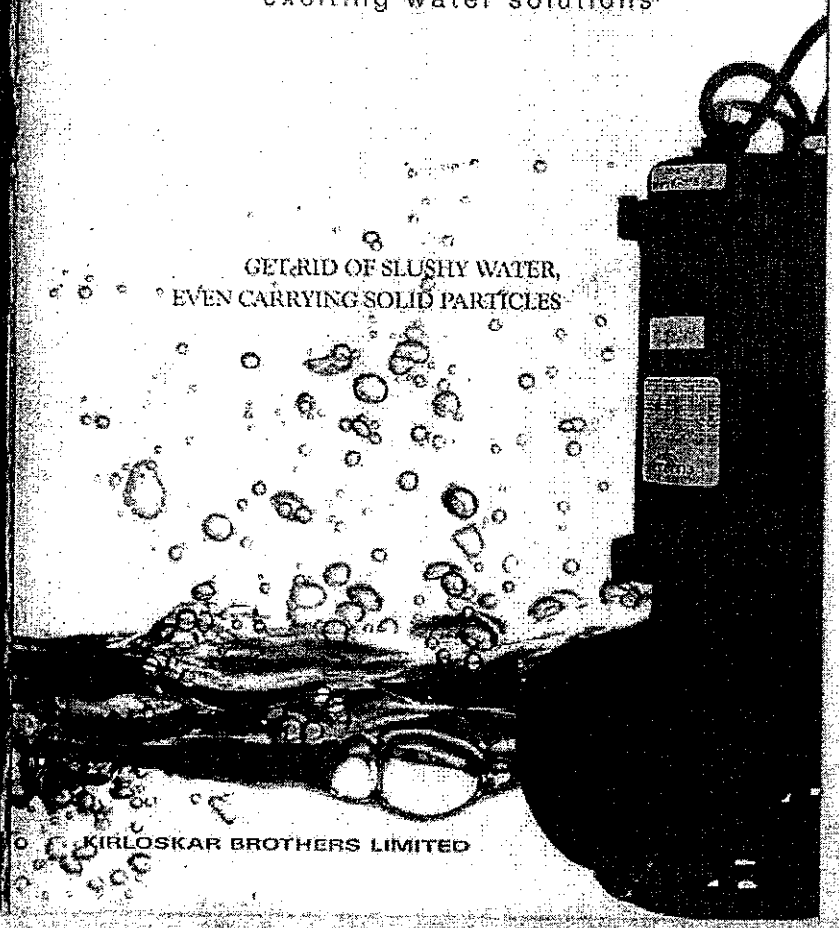
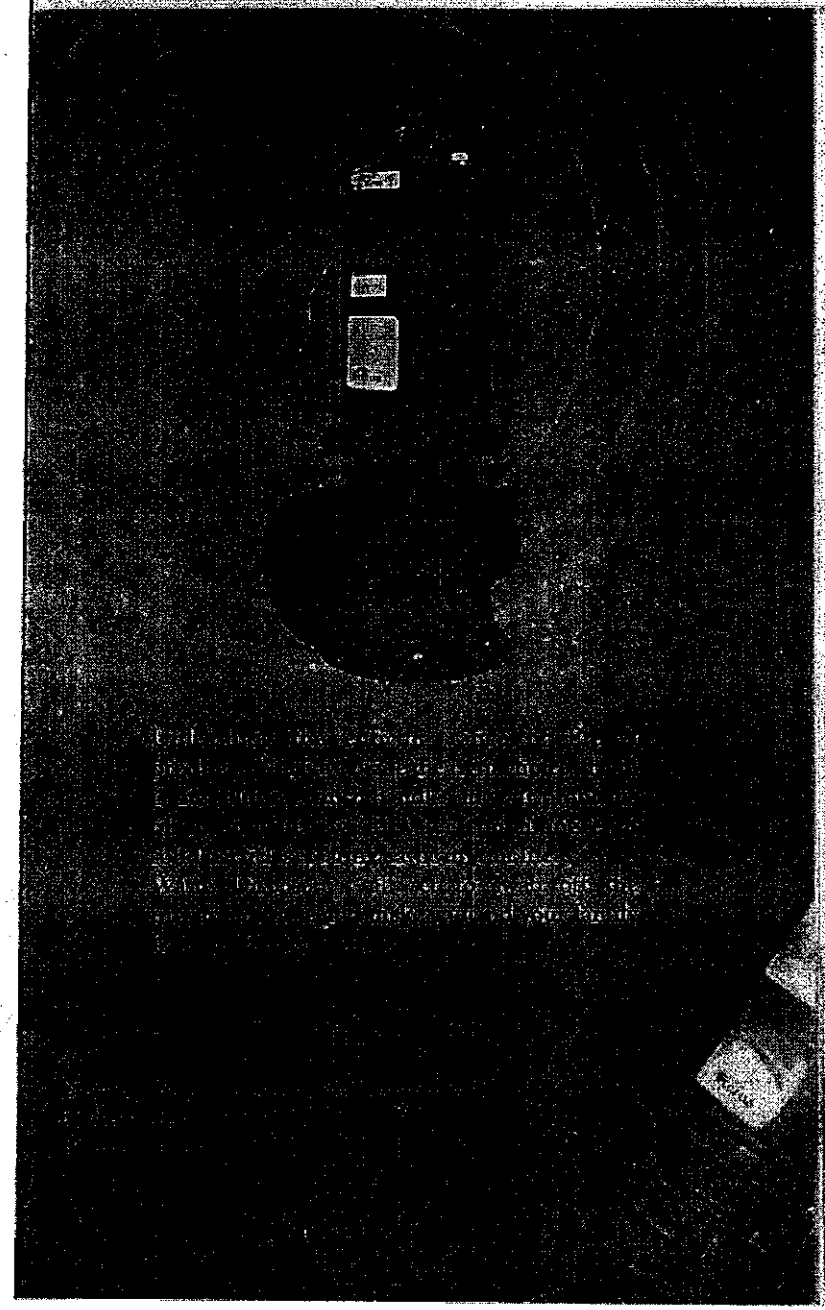
As we constantly endeavour to improve the performance of our products/ equipments, we reserve the right to make alterations from time to time, and so, our products/ equipments may differ from details in this publication. For latest information, you may get in touch with us.

eterna™
exciting water solutions





FEATURES

- In city planning projects
- Industrial constructions
- Hotels, hospitals, mines etc.
- Used for draining dirty water, rain water
- Urban life water containing particles and fibrous material

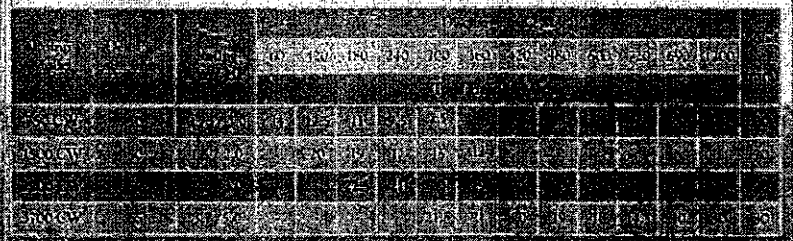
WORKING CONDITIONS

- Maximum ambient temperarure = 40° C
- Maximum density ≤1050 kg/m^3
- PH is between 6.5 and 7.5
- Consistency of medium shall be less than 1.2×10^3 Kg/m^3.

MATERIAL OF CONSTRUCTION

Impeller	- Cast Iron (CI)
Motor Body	- Cast Iron (CI)
Pump Housing	- Cast Iron (CI)

Performance under standard test conditions. Rated Voltage 415 V, 50 Hz, 3-phase, A.C. power supply.



WASTE DISPOSER SV

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-02

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOLKATA

RETURN SLUDGE PUMP			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-02
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	2 Nos. (1 working + 1 Stand by)
2	Application		To recirculate the water from tube settler to FAB reactor and to transfer sludge with water fractom Tube settler to Sludge holding tank
3	Fluid		Water with sludge
4	Temperature	°C	Ambient
5	Specific Gravity	grams/cc	1.2
6	pH		6.0 - 7.0
7	Solids Size	mm	12
8	Capacity	Cu.m / hr	6.5 Cum/hr (1.8 LPS)
9	Suction pressure		Flooded
10	Total Head Offered	m	10 Mtrs
B	**PUMP DESCRIPTION**		
1	Make		Kirloskar
2	Model		SP 0
3	Type		Horizontal Centrifugal
4	Speed	rpm	2900 RPM
5	Suction x Discharge	mm x mm	40 mm
6	Seal Type		Mechanical seal
7	Impeller Type	mm	Radial impeller (half-open)
8	Material Of Construction of		
	Casing / Cover		Cast iron
	Impeller		Bronze
9	Bearings		Ball Bearing
10	Lubrication		Grease
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	0.75 Kw / 1.0 HP
2	Speed	rpm	2760
3	Type of operation		Synchronous speed
4	Type of mounting		Flange Mounted
5	Power Supply		AC, 3 phase, 415V±10%, 50 Hz
6	Class of Insulation		Class - F
7	Degree of protection		IP 55
8	Make		Kirloskar/ Siemens/ ABB/ CGL/ BB
NOTE	**REFER CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

Kirloskar 'SP' Series Bare Shaft Non-Clog Pumps

Single Stage, Horizontal, Centrifugal, Self Priming, End Suction Coupled Pump.

Range

Head	:	6- 34 metres
Capacity	:	77.5-0.6 litres per second
Power Rating		
for motor drive	:	0.75 kW to 18.7 kW (1.0 HP to 25.0 HP)
for engine drive	:	4.0kW to 19.5kW. (6.0HP to 26.0HP)

Direction of Rotation

SP3L+, SP4L+, & SP4LA+ : Clock wise.

Other models : Anti-clockwise when viewed from suction side.

Material of Construction

Standard Supply

Impeller	:	Cast Iron.
Delivery Casing	:	Cast Iron.
Shaft	:	Carbon Steel.
Shaft Sleeve	:	Bronze.

Optional Supply

Impeller	:	Bronze.
Shaft	:	Stainless Steel.
Shaft Sleeve	:	Chrome Steel.

Approximate performance of 'SP' Series, Self Priming, Coupled Pumps, at rated speed :

PUMP MODEL	POWER RATING		PIPE SIZE (mm)		IMPELLER DIA. (mm)	TOTAL HEAD IN METRES																		SOLID HANDLING SIZE (mm)	RATED SPEED (RPM)
	kW	HP	SUC.	DEL		6	8	10	12	14	15	16	18	19	20	22	24	25	26	28	30	32	34		
Motor Coupled						CAPACITY IN LITRES PER SECOND																			
SP'0'	0.75	1.0	40	40	116	4.6	4.1	3.6	2.7	1.5	0.6													7.0	2760
SP'1H'	1.5	2.0	40	40	134			6.3	5.6	4.9	4.4	4.0	2.8	1.9	0.9									8.5	2900
SP'2H'	2.2	3.0	50	50	145			9.3	8.8	8.1	7.8	7.3	6.5	6.0	5.4	4.1	2.7	1.8	0.8					10.5	2900
SP'3A'	3.7	5.0	80	80	174										10.1	9.3	8.2	7.5	6.8	5.2	3.8	1.8		7.0	2900
SP'3'	5.5	7.5	80	80	174										16.4	16.2	15.5	14.8	14.0	12.5	10.2	8.0	5.5	14.5	2900
SP'3L+'	3.7	5.0	80	80	224			18.0	16.4	13.6	11.6	10.0	5.5											15.5	1450
SP'4LA+'	7.5	10.0	100	100	292			36.0	33.9	31.2	30.0	28.6	25.5	23.9	22.5	18.0	12.0							16.5	1450
SP'4L+'	9.3	12.5	100	100	292			41.5	39.5	36.6	35.3	33.6	30.5	28.3	26.2	22.0	17.0	14.0	10.0					23.0	1450
SP'6A'	15.0	20.0	150	150	296			66.3	63.4	59.8	57.5	55.0	48.8	45.5	42.5	34.2	23.8							34.0	1450
SP'6L'	18.7	25.0	150	150	296			75.0	72.5	68.7	65.2	64.0	58.5	55.5	52.0	45.0	34.0	27.5	20.0					40.0	1450
Engine Coupled																									
SP3L+	4.0	16.0	80	80	224				17.7	15.6	14.8	12.5	8.5	6.0	3.5									15.5	1500
SP 3L+	9.0	12.0	80	80	224						22.5	22.0	20.7	19.9	19.0	16.7	13.7	12.0	10.1	6.0				15.5	1800
SP'4LA+'	9.0	12.0	100	100	292				36.3	33.9	32.5	31.2	28.2	26.6	25.0	21.5	17.1	14.5	11.5					16.5	1500
SP'4L+'	10.5	14.0	100	100	292				41.2	39.1	38.0	36.5	33.9	32.0	30.5	26.4	21.5	18.5	16.0	9.9				23.0	1500
SP'6A'	16.5	22.0	150	150	296			68.0	66.1	63.0	62.0	59.0	53.5	51.7	48.9	41.0	32.8	28.4	22.5					34.0	1500
SP'6L'	19.5	26.0	150	150	296			77.5	75.0	72.0	71.0	68.0	63.0	62.0	57.0	51.0	42.5	38.0	32.5					40.0	1500

NOTE: Performance applicable to liquid of specific gravity 1 and viscosity as of water.

KIRLOSKAR BROTHERS LIMITED

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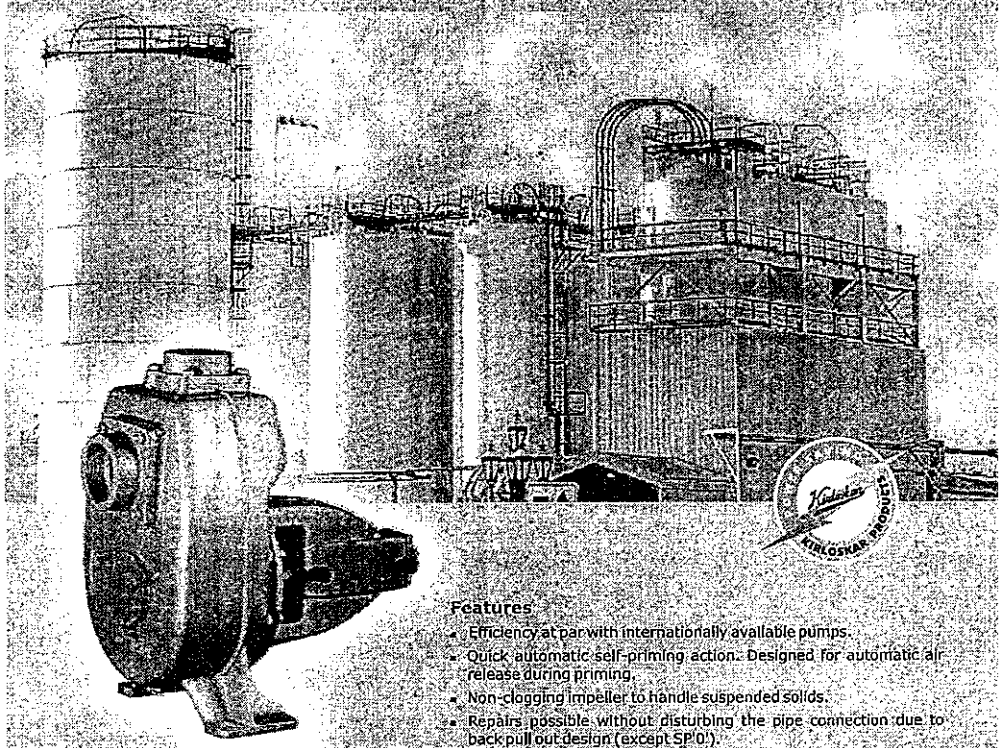
SP-080200

Kirloskar

Enriching Lives

SP

Self Priming Pump



Kirloskar Products

Features

- Efficiency at par with internationally available pumps.
- Quick automatic self-priming action. Designed for automatic air release during priming.
- Non-clogging impeller to handle suspended solids.
- Repairs possible without disturbing the pipe connection due to back pull out design (except SP'0').
- Portable, when fitted on trolley/trailer.
- Suitable for engine / motor.
- No need for foot valve.
- Long life - Due to replaceable wearing parts.
- Dynamically balanced rotating parts ensure minimum vibrations.
- Easy maintenance and spares availability.

Applications

- Marine: Pumping water from docks, ports, vessels.
- Industrial : Petroleum products, chemicals, effluents, sewage, ash-water etc.
- Civil construction : Dewatering foundation, trenches and pits.
- Mobile Machinery : Cooling water for marine engines and shovels.
- public utilities : Sewage pumping.

Industrial Products

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF FILTER FEED PUMP		INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026		
Document No.:	**SP-STP-130KLD-004**	**Project No. : C3825**	**Page – 6 OF 6**	**Rev.:**	**0**

PROJECT NAME : **PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL**

PRINCIPAL CONSULTANT : **CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA**

EPCC CONTRACTOR : **SHAPOORJI PALLONJI & CO. PVT. LTD.**

SUPPLIER : **INVENIR TECH SYSTEMS PVT. LTD.**

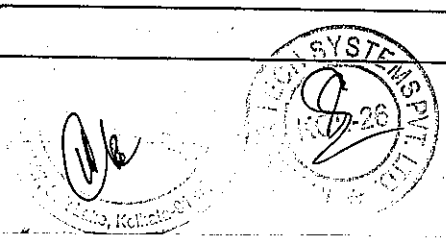
SUPPLIER PROJECT NO. : **C3825**

SUPPLIER DOCUMENT NO. : **SHP-130KLD-STP-03**

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

FILTER FEED PUMP

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-03
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	2 Nos. (1 working + 1 Stand by)
2	Application		To Pump water from Filter Feed Tank through PSF & ACF
3	Fluid		Clear Water
4	Temperature	°C	Ambient
5	Specific Gravity	grams/cc	1
6	pH		6.0 - 7.0
7	Solids Size	mm	12
8	Capacity	Cu.m / hr	7.2 Cum/hr (2 LPS)
9	Suction pressure		Flooded
10	Total Head Offered	m	30 Mtrs
B	**PUMP DESCRIPTION**		
1	Make		Kirloskar
2	Model		**KDS 335++**
3	Type		Horizontal Monoblock Centrifugal
4	Speed	rpm	2900 RPM
5	Suction x Discharge	mm x mm	50 x 40 mm
6	Seal Type		Mechanical seal
7	Impeller Type	mm	Closed
8	Material Of Construction of		
	Casing / Cover		Cast iron
	Impeller		Cast iron
9	Bearings		Ball Bearing
10	Lubrication		Grease
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	2.2 Kw / 3.0 HP
2	Speed	rpm	2900
3	Type of operation		Synchronous speed
4	Type of mounting		Flange Mounted
5	Power Supply		AC, 3 phase, 415V±10%, 50 Hz
6	Class of Insulation		Class - F
7	Degree of protection		IP 55
8	Make		Kirloskar
NOTE	**REFER CATALOGUE ATTACHED**		



South City, WTP. 2.

Kirloskar 'KDS+/KDS++' Series Three Phase Pumps

Single Stage, High Speed, Horizontal, Centrifugal, Monobloc with Volute Type Delivery Casing.

Range

Head : 6-76 metres.
Capacity : 37.0-2.0 litres per second.
Power Rating : 1.5 kW to 22 kW (2.0 HP to 30.0 HP)

Material of Construction

Standard Supply

Impeller : Cast Iron
Delivery casing : Cast Iron
Motor body : Cast Iron
Shaft : Carbon Steel
Shaft Sleeve : Bronze

Optional Supply

Impeller : Bronze
Shaft : Stainless Steel
Shaft Sleeve : Chrome Steel

Direction of Rotation

Anticlockwise, when viewed from suction side.

Approximate performance of 'KDS+/ KDS++' Series, 2 Pole, Monobloc Pumps, at rated Voltage, 50 Hz, Three Phase A.C. Power Supply:

PUMP MODEL	POWER RATING		PIPE SIZE (mm)		TOTAL HEAD IN METRES																RATED VOLTAGE (VOLTS)
	kW	HP	SUC.	DEL.	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	40	
					CAPACITY IN LITRES PER SECOND																	
KDS-216++	1.5	2.0	65	50		11.0	10.0	8.8	7.15	4.0												415
KDS-225++	1.5	2.0	50	40		5.3	5.18	4.9	4.75	4.5	4.25	3.9	3.56	3.1	2.25							415
KDS-314+	2.2	3.0	80	80	19.1	17.8	16.2	13.8	10.4													415
KDS-318++	2.2	3.0	80	65		13.4	12.6	11.7	10.7	9.2	7.5											415
KDS-325++	2.2	3.0	65	50			9.2	8.8	8.4	7.9	7.4	7.0	6.4	5.8	4.9							415
KDS-335++	2.2	3.0	50	40				5.0	4.9	4.8	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.2	2.7	2.0		415
KDS-515+	3.7	5.0	100	100	32.8	31.0	28.0	24.2	19.0	12.9												415
KDS-520+	3.7	5.0	80	80	24.0	23.0	22.0	20.8	19.5	17.9	16.0	14.0	11.0									415
KDS-527++	5.5	7.5	100	100						14.3	13.5	12.5	11.6	10.3	8.7	6.4						400
KDS-822++	5.5	7.5	80	65				27.3	25.6	24.0	22.2	20.1	17.6	14.5								400
KDS-830++	7.5	10.0	100	100						19.0	18.2	17.3	16.4	15.4	14.2	13.6	11.1					400
KDS-1030++	7.5	10.0	80	65				32.0	31.0	29.8	28.5	27.0	25.0	23.5	21.0	18.0						400
KDS-1040+							23.5	23.0	22.6	22.2	21.6	20.9	20.35	19.5	18.75	17.9	17.0	15.7	14.6	13.4	9.6	415
KDS-538+	3.7	5.0	65	50	18	20	24	28	30	32	36	40	44	48	52	54	56	60	64	68	72	76	415
KDS-550++	3.7	5.0	50	40		8.5	8.3	7.8	7.6	7.1	5.8											
KDS-837	5.5	7.5	65	65							4.1	3.7	3.3	2.7	2.0							400
KDS-844++	5.5	7.5	65	65			12.6	12.2	11.8	11.1	9.0											400
KDS-852++	5.5	7.5	65	50			10.7	10.3	9.9	9.5	8.4	7.1	4.7									400
KDS-1040+	7.5	10.0	80	65	21.6	20.9	19.5	17.9	17.0	15.7	13.4											400
KDS-1050++	7.5	10.0	65	65			12.9	12.5	12.3	12.0	11.4	10.7	9.6	8.1	6.0							400
KDS-1065++	7.5	10.0	65	50								7.8	7.4	6.9	6.4	6.1	5.8	5.1	4.3	3.0		400
KDS-1331+	9.3	12.5	100	100	33.4	32.0	29.0	23.8	19.8	12.5												415
KDS-1348+	9.3	12.5	80	65		19.6	18.9	18.2	17.8	17.3	15.8	14.3	11.9									415
KDS-1537+	11.0	15.0	100	100	36.8	35.9	33.0	30.0	28.0	25.0	17.5											415
KDS-1555+	11.0	15.0	80	65					19.4	19.2	18.5	17.4	16.0	14.5	12.2	10.5						415
KDS-1575+	11.0	15.0	65	50											8.1	7.9	7.7	7.4	6.9	6.4	5.8	4.9	415
KDS-2050+	15.0	20.0	100	80	33.8	33.2	31.8	30.4	29.7	28.8	27.2	25.0	22.8	19.4								415
KDS-2560+	18.7	25.0	100	80										24.5	22.0	20.5	18.6	13.0				415
KDS-3068+	22.0	30.0	100	80										28.0	26.5	25.6	24.5	21.5	17.5	10.0		415

All pumpsets except KDS-837+, KDS-1575+, KDS-2560+ and KDS-3068+ are ISI marked.
KDS-318++ can also be offered with pipe size 65X50 mm.
Above pumpsets except KDS-2560+ and KDS-3068+ can be supplied with stuffing box arrangement for GLAND PACKED or MECHANICAL SEAL against the requirement.
NOTE: Performance applicable to liquid of specific gravity 1 and viscosity as of water.

KIRLOSKAR BROTHERS LIMITED

Regd. Office : Udyog Bhavan, Tilak Road, Pune - 411 002.
Tel. : (020) 4444444. Fax : (020) 4444198.
Works : Ujjain Road, Opp. Railway Station, Dewas - 455 001.
Tel. : (07272) 27310-27312 Fax : (07272) 28747.
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ISO 9001 ISO 14001

As we are constantly endeavouring to improve the performance of our products / equipment, we reserve the right to make alterations from time to time, and so, our products/equipment may differ from that detailed in this publication. For latest information, you may get in touch with us.

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Estd. 1965

IMPEX MACHINERY CORPORATION
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E-mail : pkjain@cal2.vsnl.net.in

Enriching Lives

AUTHORISED DEALER OF KIRLOSKAR PRODUCTS

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PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-04

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOLKATA

IRRIGATION WATER PUMP			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-04
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	2 Nos. (1 working + 1 Stand by)
2	Application		To transfer clear water from treated water tank to outside of STP
3	Fluid		Water
4	Temperature	°C	Ambient
5	Specific Gravity	grams/cc	1.00
6	pH		6.5 - 8.5
7	Capacity	Cu.m / hr	2.5 Cum / hr (0.7 LPS)
8	Total Offered	m	20 m
B	**PUMP DESCRIPTION**		
1	Make		Kirloskar
2	Model		KDS 225++
3	Type		Horizontal Centrifugal (Monoblock)
4	Speed	rpm	2900
5	Suction x Discharge	mm x mm	50 mm X 40 mm
6	Seal Type		Mechanical
7	Impeller Type		Closed
8	Material Of Construction of		
	Casing / Cover		Cast Iron
	Impeller		Cast Iron
	Shaft		Carbon Steel
11	Base Frame (Fabricated)		MS Fabricated
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	1.5 KW / 2.0 HP
2	Speed	rpm	2900
3	Type of operation		Synchronous speed
4	Type of mounting		Flange Mounted
5	Power Supply		AC, 3 phase, 415V±10%, 50 Hz
6	Class of Insulation		Class - F
7	Degree of protection		IP 55
8	Make		Kirloskar
NOTE	**REFER CATALOGUE ATTACHED**		

South City, WTP. ↑.

Kirloskar 'KDS+/KDS++' Series Three Phase Pumps

Single Stage, High Speed, Horizontal, Centrifugal, Monobloc with Volute Type Delivery Casing.

Range

Head	:	6-76 metres.
Capacity	:	37.0-2.0 litres per second.
Power Rating	:	1.5 kW to 22 kW (2.0 HP to 30.0 HP)

Material of Construction

Standard Supply

Impeller	:	Cast Iron
Delivery casing	:	Cast Iron
Motor body	:	Cast Iron
Shaft	:	Carbon Steel
Shaft Sleeve	:	Bronze

Optional Supply

Impeller	:	Bronze
Shaft	:	Stainless Steel
Shaft Sleeve	:	Chrome Steel

Direction of Rotation

Anticlockwise, when viewed from suction side.

Approximate performance of 'KDS+/ KDS++' Series, 2 Pole, Monobloc Pumps, at rated Voltage, 50 Hz, Three Phase A.C. Power Supply:

PUMP MODEL	POWER RATING		PIPE SIZE (mm)		TOTAL HEAD IN METRES																		RATED VOLTAGE (VOLTS)
	kW	HP	SUC.	DEL.	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	40		
					CAPACITY IN LITRES PER SECOND																		
KDS-216++	1.5	2.0	65	50		11.0	10.0	8.8	7.15	4.0													415
KDS-225++	1.5	2.0	50	40		5.3	5.18	4.9	4.75	4.5	4.25	3.9	3.56	3.1	2.25								415
KDS-314+	2.2	3.0	80	80	19.1	17.8	16.2	13.8	10.4														415
KDS-318++	2.2	3.0	80	65		13.4	12.6	11.7	10.7	9.2	7.5												415
KDS-325++	2.2	3.0	65	50			9.2	8.8	8.4	7.9	7.4	7.0	6.4	5.8	4.9								415
KDS-335++	2.2	3.0	50	40				5.0	4.9	4.8	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.2	2.7	2.0			415
KDS-515+	3.7	5.0	100	100	32.8	31.0	28.0	24.2	19.0	12.9													415
KDS-520+	3.7	5.0	80	80	24.0	23.0	22.0	20.8	19.5	17.9	16.0	14.0	11.0										415
KDS-527++	3.7	5.0	80	65						14.3	13.5	12.5	11.6	10.3	9.7	6.4							400
KDS-822++	5.5	7.5	100	100				27.3	25.6	24.0	22.2	20.1	17.6	14.5									400
KDS-830++	5.5	7.5	80	65						19.0	18.2	17.3	16.4	15.4	14.2	13.0	11.1						400
KDS-1030++	7.5	10.0	100	100				32.0	31.0	29.8	28.5	27.0	25.0	23.5	21.0	18.0							400
KDS-1040+	7.5	10.0	80	65			23.5	23.0	22.6	22.2	21.6	20.9	20.35	19.5	18.75	17.9	17.0	15.7	14.6	13.4	9.6		400
KDS-538+	3.7	5.0	65	50	18	20	24	28	30	32	36	40	44	48	52	54	56	60	64	68	72	76	415
KDS-550++	3.7	5.0	50	40		8.5	8.3	7.8	7.6	7.1	5.8												415
KDS-837	5.5	7.5	65	65							4.1	3.7	3.3	2.7	2.0								400
KDS-844++	5.5	7.5	65	65			12.6	12.2	11.8	11.1	9.0												400
KDS-852++	5.5	7.5	65	50			10.7	10.3	9.9	9.5	8.4	7.1	4.7										400
KDS-1040+	7.5	10.0	80	65	21.6	20.9	19.5	17.9	17.0	15.7	13.4												400
KDS-1050++	7.5	10.0	65	65			12.9	12.5	12.3	12.0	11.4	10.7	9.6	8.1	6.0								400
KDS-1065++	7.5	10.0	65	50								7.8	7.4	6.9	6.4	6.1	5.8	5.1	4.3	3.0			415
KDS-1331+	9.3	12.5	100	100	33.4	32.0	29.0	23.8	19.8	12.5													415
KDS-1348+	9.3	12.5	80	65		19.6	18.9	18.2	17.8	17.3	15.8	14.3	11.9										415
KDS-1537+	11.0	15.0	100	100	36.8	35.9	33.0	30.0	28.0	25.0	17.5												415
KDS-1555+	11.0	15.0	80	65					19.4	19.2	18.5	17.4	16.0	14.5	12.2	10.5							415
KDS-1575+	11.0	15.0	65	50											8.1	7.9	7.7	7.4	6.9	6.4	5.8	4.9	415
KDS-2050+	15.0	20.0	100	80	33.8	33.2	31.8	30.4	29.7	28.8	27.2	25.0	22.8	19.4									415
KDS-2560+	18.7	25.0	100	80										24.5	22.0	20.5	18.6	13.0					415
KDS-3068+	22.0	30.0	100	80										28.0	26.5	25.6	24.5	21.5	17.5	10.0			415

All pumpsets except KDS-837+, KDS-1575+, KDS-2560+ and KDS-3068+ are ISI marked.
KDS-318++ can also be offered with pipe size 65X50 mm.
Above pumpsets except KDS-2560+ and KDS-3068+ can be supplied with stuffing box arrangement for GLAND PACKED or MECHANICAL SEAL against the requirement.

NOTE: Performance applicable to liquid of specific gravity 1 and viscosity as of water.

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AUTHORISED DEALER OF KIRLOSKAR PRODUCTS

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

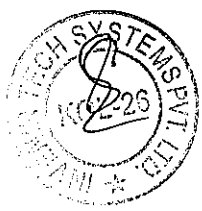
EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-05

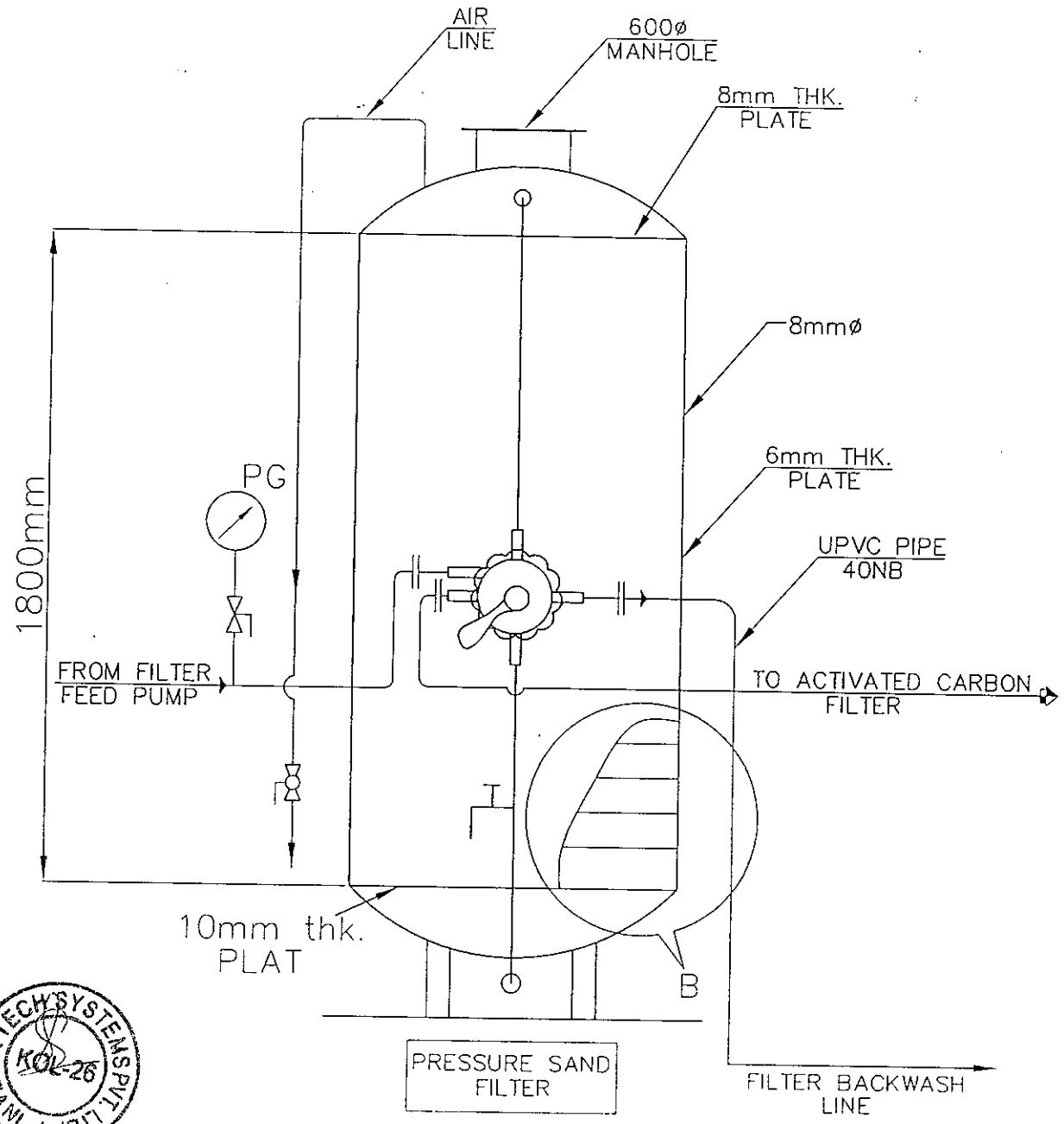
0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**



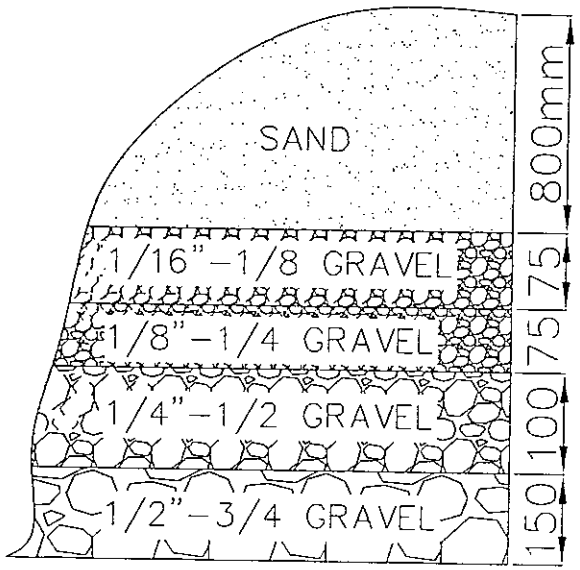
PRESSURE SAND FILTER

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-05
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	Make		Invenir
2	Filter dimensions (Diameter)	mm	800 mm
3	Height on Straight	mm	1800 mm
4	Capacity	cu.m / hr.	7.5 Cum/hr
5	Thickness of the shell	mm	6 mm
6	Thickness of the Dish	mm	8 mm
7	Thickness of the Bed Plate	mm	10 mm
8	Design Code		IS: 2825-1969
9	M.O.C of Shell and Dish		IS: 2062
10	Inlet / Outlet nozzle size		40 NB
11	Working Pressure	K.SC	3 kg/cm2
12	Test pressure	K.SC	6 kg/cm2
13	Internal Protection		Black Bitumin paint
14	Bolts and Nuts		Cadium Coated
15	Gaskets		Provided
16	**Media details**		
	Gravel / Pebbles		
	1/2" - 3/4" Pebbles & 150 mm Ht.	CFT	3 cft
	1/4" - 1/2" Gravels & 100 mm Ht.	CFT	2 cft
	1/8" - 1/4" Gravels & 75 mm Ht.	CFT	2 cft
	1/16" - 1/8" Gravels & 75 mm Ht.	CFT	2 cft
	Coarse sand (1-1.5 mm & 800 mm Ht)	CFT	15 cft
17	**Frontal Piping**		
	Pipe Size		40 NB
	MOC		MS ERW Class - B
	Standards		IS:1239
	Valve Type		Butterfly
	MOC		C.I.
	Sampling cock		Provided
18	Initial charge of media		Provided
NOTE	**REFER GA DRAWING ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD. KOL-26



G.A DRAWING OF PRESSURE SAND FILTER



DETAIL-B
DIFFERENT LAYER OF GRAVEL

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-06

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

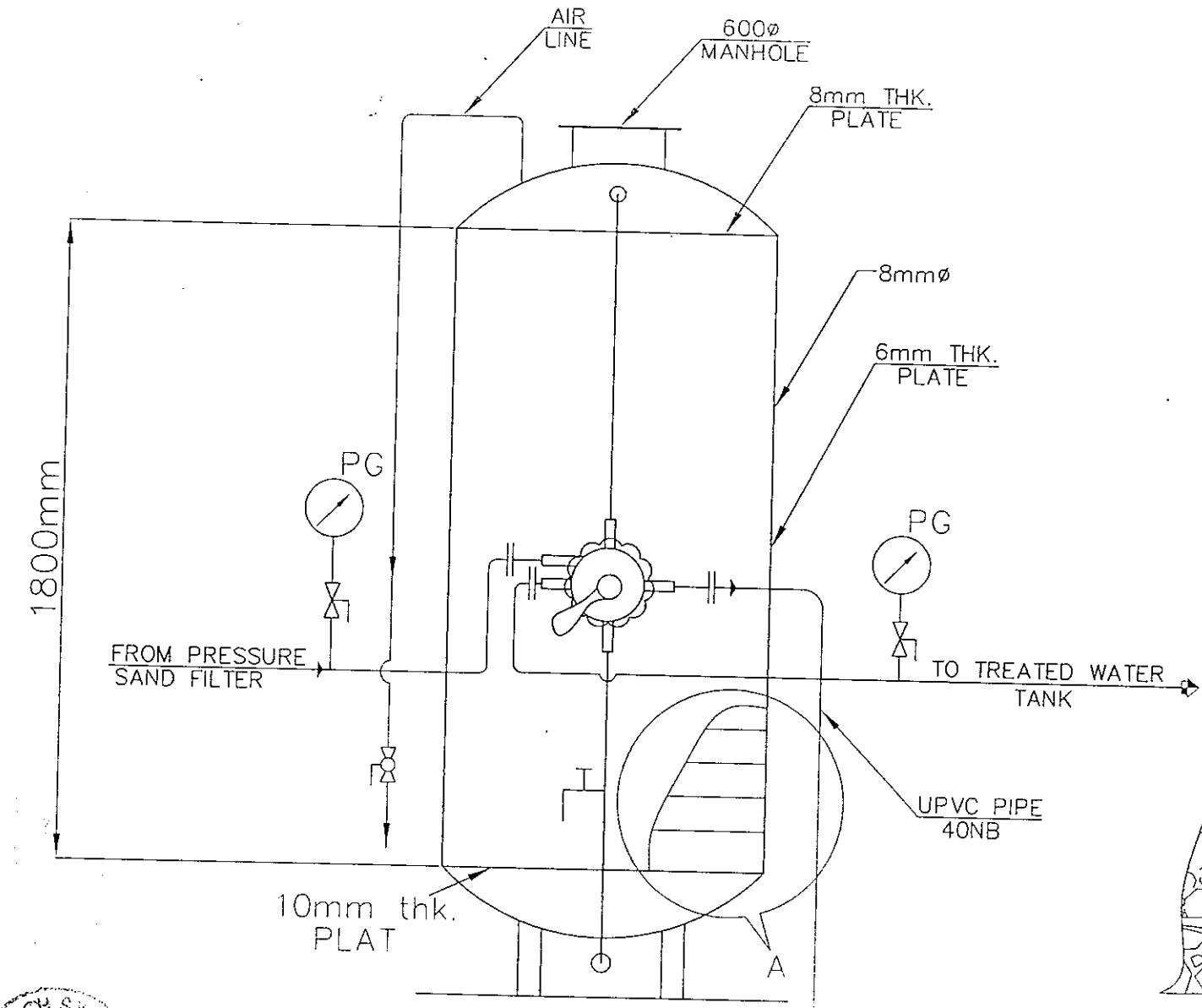
INVENIR TECH SYSTEMS PVT. LTD. KOLKATA-26

ACTIVATED CARBON FILTER

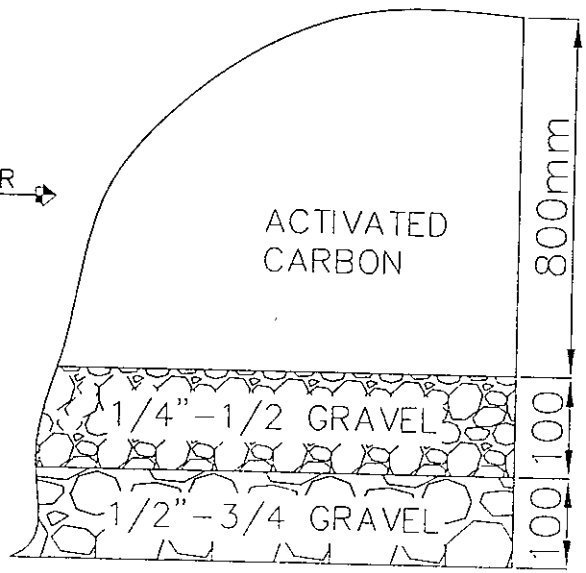
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-06
Date	23-09-2015	Rev	0

A	TECHNICAL DETAILS		DETAILS
1	Make		Invenir
2	Filter dimensions (Diameter)	mm	800 mm
3	Height on Straight	mm	1500 mm
4	Capacity	cu.m / hr.	7.5 Cum/hr
5	Thickness of the shell	mm	6 mm
6	Thickness of the Dish	mm	8 mm
7	Thickness of the Bed Plate	mm	10 mm
8	Design Code		IS: 2825-1969
9	M.O.C of Shell and Dish		IS: 2062
10	Inlet / Outlet nozzle size		40 NB
11	Working Pressure	K.SC	3 kg/cm2
12	Test pressure	K.SC	6 kg/cm2
13	Internal Protection		Black Bitumin paint
14	Bolts and Nuts		Cadium Coated
15	Gaskets		Provided
16	**Media details**		
	Gravel / Pebbles		
	1/2" - 3/4" Pebbles & 100 mm Ht.	CFT	2 cft
	1/4" - 1/2" Gravels & 100 mm Ht.	CFT	2 cft
	Actived carbon (1.25 -2.5 mm & 800 mm Ht)	kg	250 Kg
	Iodine No. of Activated Carbon Media		1000
17	**Frontal Piping**		
	Pipe Size		40 NB
	MOC		MS ERW Class - B
	Standards		IS:1239
	Valve Type		Butterfly
	MOC		C.I.
	Sampling cock		Provided
18	Initial charge of media		Provided
NOTE	REFER GA DRAWING ATTACHED		

INVENIR TECH SYSTEMS PVT. LTD. KOL-126



G.A DRAWING OF ACTIVATED CARBON FILTER



DEATIL-A
DIFFERENT LAYER OF GRAVEL

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-07

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOLKATA

AIR BLOWERS

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-07
Date	30-09-2015	Rev	0

A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	02 Nos. (1w+1s)
2	Temperature	°C	40°C
3	Capacity	cu.m/hr	150 Cum/hr
4	Discharge Pressure	kg/sq. cm	0.45 kg/Cm2
5	Delivery Air (Outlet Tempeature)	°C	90°C
B	**BLOWER DESCRIPTION**		
1	Make		Kay International/ Everest/ Usha/ Subhas
2	Model		53 AC/ Equv.
3	Type		Twin Lobe
4	Speed	RPM	1200
5	Motor Power	HP	7.5 HP
6	Discharge Size	mm	65 mm
7	No of Stages		Single
8	Material Of Construction		
	Casing / Cover / SidePlates		C.I.F.G.260,IS:210
	Lobes		C.I.F.G.260, IS:210
	Shaft		EN-09/070M55
	Gears		EN-353/815M17 (HARDENED & GROUND)
	Base Frame		MS Fabricated
9	Safety valve		Spring loaded safety valve
10	V- Belt		Provided
11	Drive arrangement		By V-belt & Pulley
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	5.6 KW / 7.5 HP
2	Speed	rpm	1440
3	Type Of Operation		Continuous
4	Type of Mounting		Foot Mounted
5	Type Of Enclosure		Cast Iron
6	Class Of Insulation		Class F
7	Degree Of Protection		IP 68
8	Make		Kirloskar/ ABB/ Siemens/ CG/ BB

NOTE	**REFER CATALOGUE ATTACHED**

INVENIR TECH SYSTEMS PVT. LTD.

Visit us at: www.kayblowers.com

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22025508
2220 [illegible]
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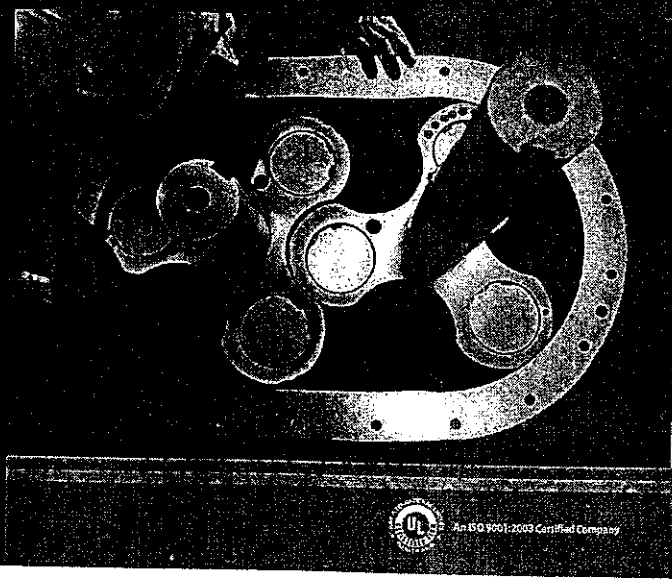
e-mail:
kay [illegible]

Leading the way in manufacturing Roots Blowers since 1966

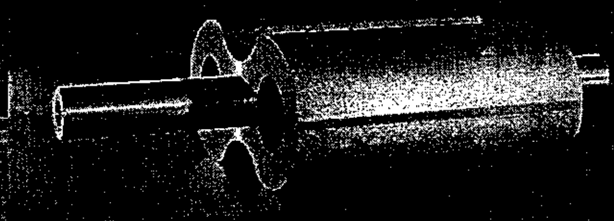
KAY
INTERNATIONAL LTD.



An ISO 9001:2003 Certified Company

The Journey So Far

From a humble beginning in 1966 in a small tin roofed rented workshop to a 20,000 square yard, state-of-the-art plant with over 300 employees, a global clientele of over 150 companies across the world. KAY International at Sonepat, Haryana is at the forefront of manufacturing Twin / Tri Lobe (Roots Blowers) in India. Our competition so far has been to challenge our own set quality standards and consistently break them to set new ones.



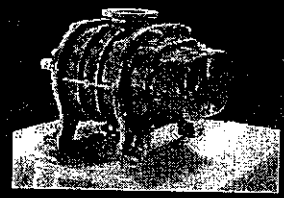
Twin-lobe Blowers

PERFORMANCE DATA

PERFORMANCE CATALOGUE OF TWIN LOBE KE/PRT SERIES

Model	Inlet/ outlet Size (mm)	Speed (RPM)	1000 MMWG M³/HR BHP	2000 MMWG M³/HR BHP	3000 MMWG M³/HR BHP	4000 MMWG M³/HR BHP	5000 MMWG M³/HR BHP	6000 MMWG M³/HR BHP	7000 MMWG M³/HR BHP	8000 MMWG M³/HR BHP	9000 MMWG M³/HR BHP	10000 MMWG M³/HR BHP
36	65	900	109 0.72	88 1.30	73 1.88	60 2.43						
		1200	162 0.97	141 1.74	126 2.52	113 3.28						
		1440	205 1.16	184 2.09	168 3.02	155 3.94						
315	20	1200	37 0.38	31 0.57	26 0.76	22 0.96	19 1.15	16 1.33	13 1.53	10 1.71		
		1440	48 0.47	41 0.69	37 0.92	33 1.15	29 1.37	25 1.60	23 1.87	20 2.05		
42	40	900	63 0.51	51 0.85	41 1.19	33 1.52	27 1.86	20 2.20	14 2.54	9 2.87		
		1200	94 0.69	82 1.14	72 1.59	64 2.04	57 2.49	51 2.93	45 3.38	40 3.83		
		1440	118 0.83	105 1.37	97 1.91	89 2.44	82 2.98	76 3.52	70 4.06	65 4.60		
49	50	900	96 0.67	80 1.16	67 1.65	57 2.14	49 2.63					
		1200	148 0.89	124 1.55	110 2.20	102 2.85	93 3.51					
		1440	179 1.07	160 1.85	148 2.64	138 3.43	129 4.21					
47	65	900	165 1.07	160 1.96	142 2.84	126 3.73						
		1200	266 1.42	242 2.61	223 3.79	208 4.98						
		1440	331 1.71	305 3.13	288 4.55	273 5.98						
53	65	750	124 0.84	105 1.45	93 2.06	81 2.67	71 3.28	62 3.89	54 4.51	45 5.12		
		900	158 1.03	142 1.74	126 2.47	115 3.21	105 3.94	95 4.66	87 5.41	79 6.14	72 6.86	65 7.61
		1200	223 1.34	209 2.32	194 3.30	183 4.28	172 5.29	163 6.22	154 7.21	146 8.19	139 9.17	132 10.15
		1440	279 1.61	261 2.78	247 3.96	236 5.13	225 6.31	216 7.47	208 8.65	200 9.83	192 11.01	185 12.18
53	65	750	166 1.01	145 1.80	129 2.59	116 3.36	103 4.17					
		900	209 1.20	188 2.16	172 3.11	159 4.06	146 5.00					
		1200	324 1.75	303 3.13	287 4.49	274 5.86	262 7.23					
		1440	365 1.95	344 3.46	328 4.98	315 6.49	302 8.01					
9035	65	750	166 1.10	145 1.80	129 2.59	116 3.38	103 4.17	93 4.96	83 5.76			
		900	209 1.20	188 2.16	172 3.11	159 4.06	146 5.00	136 5.95	126 6.91			
		1200	324 1.75	303 3.13	287 4.49	274 5.86	262 7.23	252 8.61	242 10.00			
		1440	365 1.95	344 3.46	328 4.98	315 6.49	302 8.01	292 9.54	282 11.06			
59	80	750	328 1.74	294 3.22	259 4.72	247 6.22						
		900	411 2.07	377 3.87	351 5.67	329 7.47						
		1200	630 2.99	595 5.59	570 8.18	548 10.79						
		1440	707 3.31	673 6.19	647 9.07	625 11.95						
9059	80	750	328 1.74	294 3.22	269 4.72	247 6.22	227 7.74	210 9.24				
		900	411 2.07	377 3.87	351 5.67	329 7.47	310 9.28	292 11.08				
		1200	630 2.99	595 5.59	570 8.18	548 10.79	529 13.41	512 16.01				
		1440	707 3.31	673 6.19	647 9.07	625 11.95	606 14.85	589 17.14				
65	80	750	219 1.33	194 2.35	175 3.37	159 4.39	144 5.41	131 6.43	118 7.45	108 8.46	98 9.50	88 10.52
		1100	350 1.85	325 3.44	308 4.94	289 6.44	275 7.94	262 9.42	250 10.94	235 12.43	229 13.93	219 15.43
		1440	477 2.53	452 4.50	433 6.47	416 8.44	402 10.40	389 12.33	377 14.32	366 16.28	356 18.24	346 20.20
68	80	750	329 1.84	291 3.37	262 4.90	238 6.43	216 7.97					
		1100	525 2.70	487 4.95	457 7.19	434 9.44	412 11.69					
		1440	715 3.54	673 6.48	649 9.42	625 12.36	603 15.30					
87	80	750	438 2.35	389 4.39	349 6.43	317 8.48	288 10.52					
		1100	700 3.44	649 6.94	611 9.44	579 13.43	550 15.43					
		1440	954 4.51	903 8.43	865 12.36	833 16.28	804 20.20					
610	100	750	658 3.37	583 6.43	524 9.50	476 12.56						
		1100	1050 4.49	974 9.44	917 13.93	868 18.43						
		1440	1431 6.47	1355 12.36	1296 18.24	1249 24.12						
615	125											
705	100	960	583 2.92	551 5.21	527 7.71	506 10.11	488 12.51	472 14.91	457 17.31	443 19.71	429 22.11	417 24.51
		1440	913 4.38	881 7.98	857 11.59	836 15.20	816 18.80	802 22.41	786 26.02	772 29.63	759 33.23	746 36.84
		1000	1024 4.87	991 8.88	966 12.89	946 16.90	927 20.91	911 24.92	895 28.93	882 32.95	868 36.96	856 40.97
715	100	960	778 3.72	735 6.93	703 10.14	675 13.35	651 16.56	629 19.77	609 22.98	592 26.19	572 29.40	556 32.60
		1440	1217 5.59	1175 10.40	1143 15.21	1115 20.03	1091 24.84	1065 29.65	1048 34.47	1030 39.28	1012 44.10	996 48.91
		1600	1364 6.21	1317 11.56	1288 16.90	1261 22.25	1237 27.60	1215 32.95	1195 38.30	1176 43.65	1158 49.00	1141 54.35
710	100	720	721 3.33	677 6.57	637 9.80	603 13.04	572 16.27					
		1000	1017 4.71	965 8.89	924 13.07	889 17.25	858 21.43					
		1440	1521 6.79	1459 12.61	1427 18.42	1393 24.84	1363 30.66					
715	125	750	950 4.47	850 8.54	827 12.62	783 16.69	743 20.76					
		1000	1322 5.96	1253 11.39	1200 16.81	1155 22.25	1115 27.68					
		1440	1977 8.59	1908 16.41	1855 24.23	1810 32.05	1770 39.86					
712	125	750	1243 5.73	1152 11.06	1083 16.39	1025 21.72						
		1000	1730 7.64	1649 14.75	1571 21.86	1513 28.98						
		1440	2588 11.01	2497 21.24	2428 31.48	2370 41.71						
816	200/ 250	960	1105 5.66	1036 10.29	983 14.93	938 19.56	899 24.20	864 28.83	831 33.47	800 38.10	772 42.74	745 47.37
		1440	1740 10.41	1671 17.36	1618 24.32	1574 31.27	1534 38.27	1499 45.18	1466 52.06	1436 59.08	1407 65.95	1380 72.89
		1600	1953 12.47	1884 20.19	1831 27.92	1786 35.65	1747 43.37	1711 51.10	1679 58.83	1646 66.55	1620 74.28	1593 82.01
812	125	960	1487 7.26	1394 13.50	1323 19.74	1263 25.98	1210 32.22	1162 38.46	1119 44.70	1078 50.94	1039 57.18	1003 63.42
		1440	2343 12.81	2250 23.10	2178 31.54	2119 40.10	2065 50.26	2018 59.62	1974 68.98	1933 78.42	1894 87.70	1858 97.07
		1600	2628 15.14	2535 25.54	2464 35.95	2404 46.35	2352 56.75	2304 67.15	2260 77.55	2219 87.95	2180 98.35	2144 108.75
816	200/ 250	960	1987 9.36	1893 17.70	1768 26.04	1668 34.37	1637 42.71	1553 51.05	1495 59.38	1440 67.73		
		1440	3130 15.95	3036 28.48	2911 40.98	2831 53.49	2760 66.00	2696 78.50	2637 91.01	2583 103.53		
		1600	3512 18.64	3388 32.54	3293 46.44	3213 60.33	3142 74.23	3078 88.13	3020 102.03	2965 115.93		
912	250/ 300	1105	3028 13.33	2930 25.95	2854 39.39	2791 51.30	2735 63.20	2685 75.10	2638 87.01			
		1260	3485 15.25	3383 29.67	3312 44.92	3249 58.50	3193 72.07	3143 85.64	3096 99.22			
		1428	3958 17.15	3868 33.37	3785 50.62	3721 65.92	3666 81.22	3615 96.51	3569 111.81			
1016	250/ 300	1575	4416 19.06	4318 37.08	4243 55.05	4180 73.02	4124 89.99	4074 106.95	4027 123.92			
		960	2385 12.47	2255 22.22	2174 31.97	2097 41.71	2029 51.46	1967 61.21	1911 70.96	1858 80.70	1809 90.45	1762 100.20
		1440	3721 23.84	3602 28.45	3510 53.07	3433 67.70	3365 82.32	3303 96.94	3246 111.64	3194 126.12	3144 140.80	3098 155.42
		1700	4690 35.04	4521 53.05	4429 71.03	4357 88.90	4284 106.97	4223 124.94	4167 142.91	4114 160.88	4064 178.86	4017 196.83
1012	200	960	3352 16.36	3215 29.59	3110 43.02	3022 56.45	2944 69.89	2873 83.32	2808 96.75	2748 110.18	2691 123.62	2637 137.05
		1440	5194 29.35	5057 49.30	4952 69.65	4863 89.80	4785 109.95	4715 130.10	4648 150.25	4589 170.35	4532 190.54	4478 210.69
		1770	6461 41.85	6324 66.64	6218 91.41	6139 116.17	6052 140.94	5981 165.71	5916 190.47	5856 215.24	5799 240.00	5746 264.77
1016	250/ 300	960	3812 18.00	3656 33.27	3537 48.51	3436 63.82	3347 79.10	3267 94.37	3193 109.65	3125 124.92		
		1440	5906 32.12	5750 55.03	5631 77.91	5530 100.85	5441 123.77	5361 146.68	5287 169.59	5218 192.50		
		1770	7347 45.27	7191 73.44	7072 101.60	6971 129.76	6882 157.93	6802 186.09	6728 214.25	6659 242.42		
1020	300	960	6097 27.15	5848 51.58	5657 76.01	5495 100.44	5353 124.86					
		1440	9496 45.85	9196 82.49	9006 119.13	8844 155.77	8702 192.41					
		1770	11749 62.15	11500 107.19	11309 152.23	11148 197.27	11006 242.31					
1030	400/ 350	960	4747 24.80	4589 43.58	4452 62.36	4344 81.14	4249 99.92	4163 118.70	4084 137.49	4010 156.27	3941 175.05	3876 193.83
		1270	6410 38.50	6264 67.65	6115 88.49	6008 111.34	5911 134.19	5828 157.03	5747 179.88	5674 202.73	5604 225.57	5539 248.42
		1460	7430 49.77	7253 78.33	7135 106.89	7027 135.46	6932 164.02	6845 192.59	6767 221.15	6693 249.71	6624 278.28	6559 306.84
1216	350/ 300	960	7509 35.32	7291 64.62	7124 93.92	6984 123.22	6859 152.52	6747 181.83	6644 211.13			
		1270	10104 52.72	9687 91.48	9720 130.25	9579 169.01	9455 207.77	9343 246.54	9239 285.30			
		1460	11695 65.77	11477 110.33	11310 154.89	11169 199.46	11045 244.02	10932 288.58	10829 333.14			
1225	350/ 300	960	9002 41.14	8741 76.27	8541 111.39	8372 146.52	8223 181.65					
		1270	12113 60.42	11852 106.89	11652 153.36	11483 199.83	11334 246.30					
		1460	14019 74.63	13758 128.05	13558 181.47	13389 234.89	13240 288.31					
1230	350/ 400											

Our Product Line

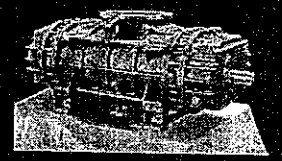


TWIN LOBE BLOWERS

Twin Lobe Rotary Blowers are available in low RPM high pressure and high RPM low pressure variants. They perform superbly in single as well as double stage. Also available in air-cooled and water-cooled variants.

Capacity: max 55,000m³ / hr+ pressure 1kg

Models available:
- KE Series
- PRT Series
- 2KHC Series
- HMLK Indiana

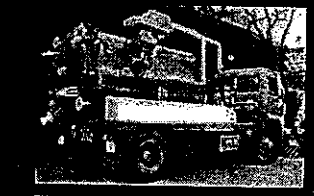


TRI LOBE BLOWERS

The Tri-Lobe Blower, with rotor tips disposed at 120° on each rotor, causes the rotor set to be much more resistant to angular deflection along its length. Five bearing technology makes the blower more robust and sturdy. Also available in air-cooled and water-cooled variants.

Capacity: max 18,000m³ / hr+ pressure 1kg

Models available:
- K3H Series
- K3HN Series



TRUCK MOUNTED BLOWERS

The unique DRY-HIGH VACUUM PUMP (Positive Displacement Type) is capable of attaining 28" Hg vacuum and eliminates the need for water or oil sealing. The 3HVP Series pumps do not require Heat Exchanges and are suitable for inlet temperatures without use of Pre coolers.

Models available:
- 3HVP Series

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF FILTER PRESS	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 11 OF 11	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

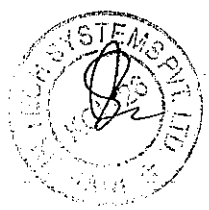
SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-08

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

FILTER PRESS			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-08
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	System Components		Filter Press with plates & frame
2	Application		For formation of sludge cake
4	Quantity		01 No.
5	Type of Filter Press		Plate and Frame type with hand hydraulic
6	Make		Orient/ Sachin Industries Ltd.
7	Plate Thickness		40+/-2 mm
8	Dimension of each Plate		300 x 300 mm
9	No. of Chambers		10 +2 Nos.
10	Operating Pressure		4.0 kg/sqcm
11	Cake Handling Capacity		10 kg/batch
12	Moisture content in cake		70-80%
13	Cake Thickness		20 mm +/- 2 mm
14	Closing Device		Manual type
15	Filter Media		Butterfly type filter cloth
16	Plates drainage surface		Polypropylene-Piped
17	Material of construction		
	Frame		C.I
	Plates		P.P. Recess Filter Plate
NOTE	**REFER INVENIR PRODUCT CATALOGUE ATTACHED**		



PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-09

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

MBBR MEDIA			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-09
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity of MBBR Tank	Nos.	2 Nos.
2	Fluid		Waste Water
3	Temperature	°C	Ambient
B	**AERATION TANK**		
1	Type of Tank		Rectangular
2	Material of Construction		R.C.C.
3	Phase-I Tank Volume		17.5 Cum
4	Phase-II Tank Volume		17.5 Cum
C	**MBBR MEDIA**		
	Media	Qty	9 Cum
	Structure		Cylindrical with external fins
	Make		Invenir
	MOC		Virgin PP UV Stabilized
	Surface Area Considered	m2 / m3	400 m2 / m3
	Colour		Black
	Specific weight (kg/sqm) surface area		0.37
	Specific gravity	gms/cc	0.90 - 0.95 gms/cc
	Max. continuous operating temperature	°C	80 °C
	Voidage		>98%
	Density	gm/cc	0.93
NOTE	**REFER OUR PRODUCT CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD.

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF FILTER PRESS FEED PUMP	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 13 OF 13	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

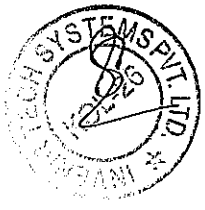
EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-10

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**



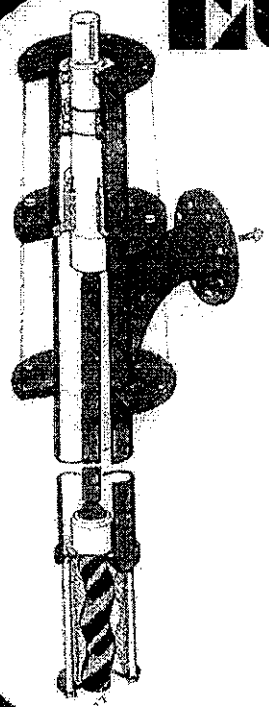
FILTER PRESS FEED PUMP			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-10
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	2 Nos. (1 working + 1 Stand by)
2	Application		To transfer sludge with water from Sludge holding tank to Filter press
3	Fluid		Sludge with water
4	Temperature	°C	ambient
5	Specific Gravity	grams/cc	1.2
6	pH		6.0 - 8.0
7	Solids Size	mm	5 mm
8	Capacity	Cu.m / hr	2 Cum/hr
9	Suction pressure		Flooded
10	Total Head Offered	m	45 Mtrs
B	**PUMP DESCRIPTION**		
1	Make		UT
2	Type		Rotary Screw Pump
3	Speed	rpm	(350-460) RPM
4	Suction x Discharge	mm x mm	25 mm x 20 mm
5	Seal Type		Gland Packing
6	Model		EH 164
7	Make		UT
8	Material Of Construction of		
	Casing / Cover		CI
	Rotar		SS410 HCP.
	Shaft		SS410 HCP.
	Stator		Nitrile Black
	Gland Packing		Graphite Asbestos Packing
C	**DRIVE SPECIFICATION**		
1	Rating	Kw / HP	1.2 kw / 1.5 HP
2	Speed	rpm	1440
3	Type of operation		Continuous
4	Motor Casing		CI
5	Make		Kirloskar/ ABB/ Siemens/ CG/ BB
NOTE	**REFER CATALOGUE ATTACHED**		

UT PUMPS & SYSTEMS PVT. LTD.

PUMPS

EU

Vertical Pump



Eccentric Helical Rotor Pump

Applications

Paste, Paint, Grease, Adhesives, Thick Paste, Malt Extract, Latex, Viscous Oil, Clear & Corrosive Liquid, Agriculture & Drinking Water, Oily Sludge etc.

Industries

Agriculture, Beverages, Breweries, Chemical industry, Color & varnish factories, Cosmetic industry, Filter technique, Fish processing plant, Medicinal & mud baths, Oil mills & starch factories, Paper & cellulose industry, Petrochemical industry, Pharmaceutical industry, Refineries, Sewage & clarification techniques, Soap & fats industry, Sugar refineries, Water treatment

Basic Design, Principle of Operation

UTPSL Eccentric Helical Rotor Pumps are Self Priming, Rotary, Valve less Positive Displacement pumps having two pumping element, Rubber Stator and Metallic Rotor. Stator is having helical profile with pitch double to Rotor pitch resulting in cavities, which carry the liquid vertically Mounted. EU pumps are specifically designed for emptying barrels, containers or wells having low or highly viscous media with or without solid or fibrous components. The Drive unit is directly mounted on the pump body and the whole unit can be suspended and lowered in the container or well. Running at low speed, pumps have vibration free operation. In the Cross-section, stator and rotor contact each other at two points which, viewed axially, are lines of contact or "sealing".
When the rotors turns, this geometry resolves into tandem chamber which are self-contained as also when pumps are stationary.

Because of Elastomer Stator, EU pumps are not suitable for dry running.

Materials of Construction

Pumps are manufactured in different materials of construction depending on the liquid to be handled. All parts in contact with liquid are selected to ensure compatibility.
Wetted casings are available in stainless steel, and carbon steel. Rotors are available in stainless steel, carbon steel hard chrome plated or nitrided steel. Stators are available in all types of elastomer material. Option of using sealing material, as gland packing material or mechanical seal is available.
UTPSL pumps are having two special design Cardon joints completly sealed against liquid.

Special Features / Advantages

Small Initial Starting Torque, Higher Mechanical Efficiency, Capability to handle large proportions of solids, Less radial thrust, Low rubbing velocity, Less wear, Lower axial thrust, Smaller unbalance, Quieter operation, Mounted directly over the well or container.

UT TECH SYSTEMS PVT. LTD. KOLKATA

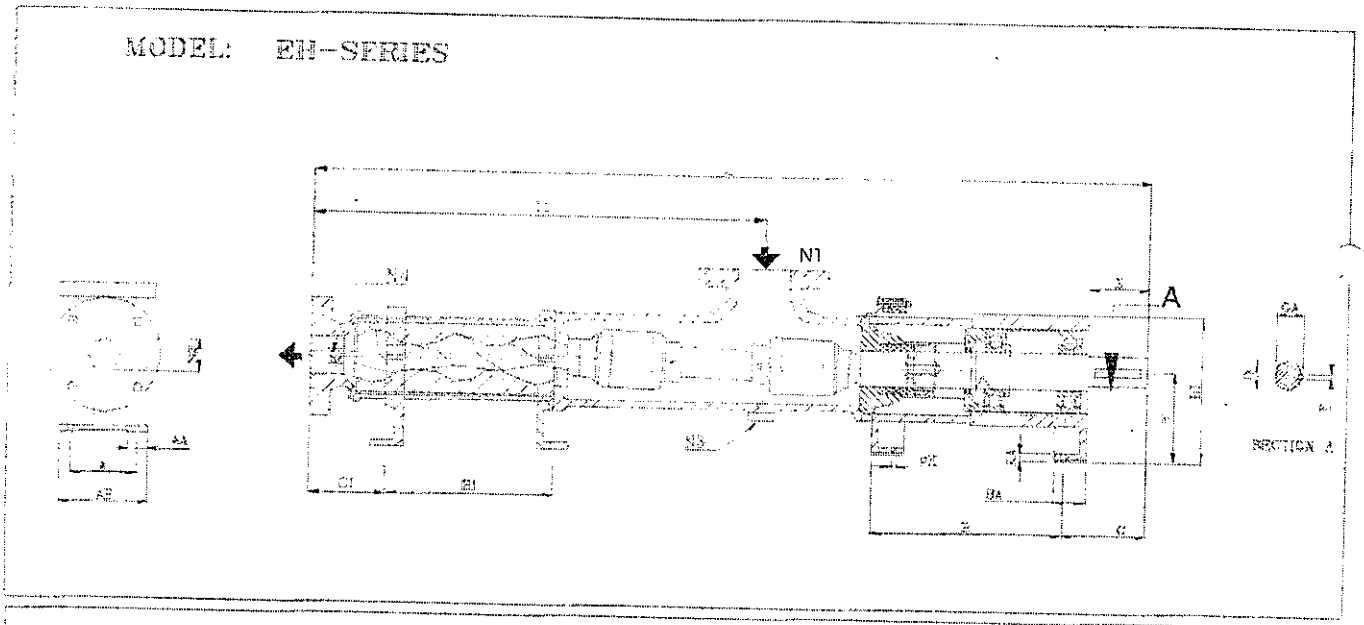
Performance

Eccentric Helical Rotor Pumps of type EH are available in different size and stages depending upon the requirement of pressure.

Type	MAX. Pressure	MAX. FLOW (m³/hr)									
		164	236	375	600	1024	1500	1900	2650	4500	6300
EH	6	4.2	9	13.8	24.1	27	61.7	90	103.5	192	276.1
E2H	12	2.1	4.5	6.8	11.8	13.7	28.5	42.4	62.2	91	141
E4H	24	0.9	1.7	3.2	5.5	7.4	10.1	15	32.8		

The Capacity Corresponds to Max Speed

Dimensional Diagram



Dimensions in mm

Size	L	L1	H	H1	B	C	A	AB	BA	AA	K	B1	C1	KA	Shaft End D	Shaft End E	Shaft End GA	Shaft End F	Flange Ends N1	Flange Ends N2	Flange Ends N3 NPT	Flange Ends N4 NPT	Weight Kg
EH164 / E2H 164 / E4H 164	732	461	80	164	125	63	56	80	32	25	9	-	-	8	16	40	18	5	1"	¾"	3/8"	½"	14
EH236 / E2H 236 / E4H 236	920	575	90	180	155	78	70	95	40	25	11.5	-	80	10	25	50	27.9	8	2"	1 ½"	½"	¼"	24
Eh375 / E2H 375 / E4H 375	1148	768	90	208	155	78	70	95	40	25	11.5	-	90	10	25	50	27.9	8	2 ½"	2"	½"	½"	35
EH600 / E2H 600 / E4H 600	1252	867	90	208	155	78	70	95	40	25	11.5	-	110	10 12	25	50	27.9	8	3"	2 ½"	½"	½"	45
EH1024 / E2H 1024 / E4H 1024	1311 1574	926 1030	90 112	208 280	155 230	78 116	70 95	95 140	40 45	25 40	11.5 14	- -	110 110	10 12	25 40	50 80	27.9 43.1	8 12	3"	2 ½"	½"	½"	53 74
EH1500 / E2H 1500 / E4H 1500	1855	1315	112	265	230	116	95	140	45	40	14	-	135	12	40	80	43.1	12	5"	4"	½"	½"	105
EH1900 / E2H 1900 / E4H 1900	2193	1535	140	300	280	155	130	165	55	35	18	1015	135	16	50	110	53.5	14	5"	4"	½"	½"	168
EH 2650 / E2H 2650 / E4H 2650	2335 2716	1647 1908	140 180	320 380	280 330	155 175	130 150	165 200	55 70	35 50	18 18	1055 1000	115 195	16 18	50 60	110 120	53.5 64.2	14 18	6" 8"	5" 6"	¾" ¾"	½" ½"	244 369
EH 4500 / E2H 4500	2876	2068	180	380	330	175	150	200	70	50	18	1170	185	18	60	120	64.2	18	8"	6"	¾"	½"	448
EH 6300 / E2H 6300	3344	2341	250	500	400	258	240	300	100	70	22	1350	185	22	80	170	85	22	8"	8"	¾"	½"	716

For Further Details, Please Contact

UT PUMPS & SYSTEMS PVT. LTD.

WORKS : 14/7, Mathura Road, Faridabad-121 003, Haryana . Ph : 0129-5045831/2274861/2258586/3099731. FAX: 0129-2258584 / 2275877. E-Mail: utpsl@eth.net. **MARKETING & REGIONAL OFFICES, HEAD QUARTER/NORTH ZONE:** 14/7, Mathura Road, Faridabad 121003, Haryana. Ph: 0129-5045831/2274861/2258586/3099731, Fax:0129-2258584/2275877. E-mail:utpsl@eth.net, sales@utpsl.in, website : www.utpsl.in/ www.utpumps.com, **WEST** : 602 (B-Wing, Hermes Atrium), Plot No. 57, Sector-11, CBD Belapur, Navi Mumbai - 400 614, Maharashtra, Ph. : 022-30992488/27580242, FAX : 022-27580240, E-mail : westzone@utpsl.in. **SOUTH** : No.1, 3RD Floor, Aisa Towers, No. 186 & 187, Poonamalle High Road, Kilpauk, Chennai-600 010. Ph. : 044 30924212/26401850, FAX : 044-26401850, E-mail : southzone@utpsl.in. **EAST** : BC/71, Near Tank No. 3, Sector-1, Salt Lake City, Kolkata-700 064, Ph. : 033-39583700/23377408, FAX : 033-28360512, E-mail : eastzone@utpsl.in.

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF DIFFUSER	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 14 OF 14	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-11

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD.

DIFFUSER			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-11
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Location		Equalization tank, FAB-1, FAB-2 and Sludge holding tank
2	Type		Non Clog type Coarse Bubble
3	Shape		Disc type
4	Pore Size	mm	4 mm
5	No. of Pore	Qty	10
6	Operating Tempeature of Membrane	°C	40 °C
7	Tolerance Temperature	°C	+30 °C
8	Quantity	nos.	86*
9	Size		Dia - 80 mm
10	MOC of Membrane		EPDM
11	MOC of Diffuser base		PP
12	Air Distribution	m3/ hr	3-6 m3/ hr
13	Oxygen Transfer effeciency		3% per meter submergence
14	Max. Allowable pressure	Kg / Sqcm	0.7 Kg / Sqcm
15	End Connection		3/4 "
	*Detail Quantity of diffuser	FAB-I	18 nos. (3 Rows x 6 per row)
		FAB-II	18 nos. (3 Rows x 6 per row)
		EQT	36 nos. (6 Rows x 6 Columns)
		Sludge holding tank	14 nos. (2 Rows x 7 Columns)
NOTE	REFER OUR PRODUCT CATALOGUE ATTACHED		

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF TUBE SETTLER		INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026		
Document No.: SP-STP-130KLD-004		Project No. : C3825	Page – 15 OF 15	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

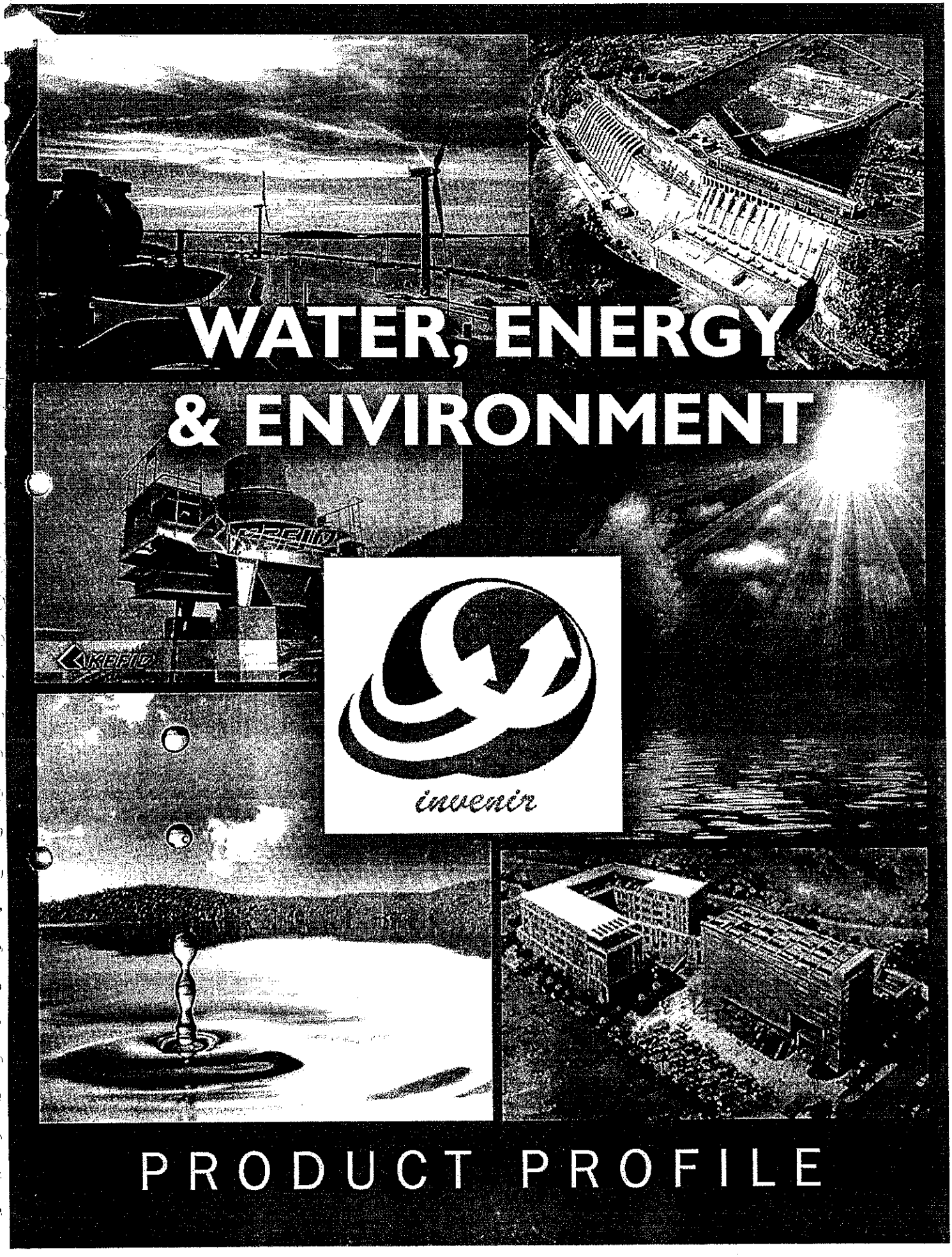
SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-12

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

TUBE SETTLER			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-12
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	1 No.
2	Fluid		Water with sludge
3	Temperature	°C	Ambient
B	**SETTLINT TANK DETAILS**		
1	Type of Tank		Square
2	Material of Construction		R.C.C.
4	Tank size / Volume		9 cum
C	**TUBE SETTLER DETAILS**		
	Tube Settler Media	Qty	2.5 Cum
	Plan settling area of media - 60° Slope		12.0 m^2 / m^3
	Fitting arrangement		Tongue & groove
	Make		Scogen
	Shape		Hexagonal chevron
	MOC of media		PVC
	Cross-section area	Sqm	75 mm X 60 mm
	Hydraulic Radius	Cm	1.5 cm
	Thickness	mm	1.1 mm (± 0.1mm)
	Max. Continuous operating temperature	°C	55°C
	Colour		Black
	Straight Heights	mm	750 mm
	Weight	Kg / m^3	75 Kg / m^3 (approx)
NOTE	**REFER OUR PRODUCT CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD.



WATER, ENERGY & ENVIRONMENT

invenir

PRODUCT PROFILE

About "Invenir"

"Invenir Tech Systems" is a new Indian environmental engineering company focusing on designing and turnkey project execution in water and waste water treatment and energy related projects for industries, institutions & municipalities. The company also has a strong product line up to meet the market requirement on WATER, ENERGY & ENVIRONMENTAL respect.

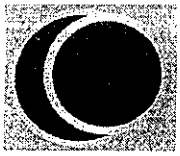
The company has qualified and highly experienced Engineers & Scientists successfully executed more than 600 projects on WATER, WASTEWATER, BOILER & ENVIRONMENT in India & abroad. Although water is perhaps the resource most under pressure globally, the increasing energy saving and environmental concern has loomed us to form an integrated approach towards energy saving & environment management aspects. Therefore, we have combined our experience and approach towards gamut of energy & environment solution. We offer a complete portfolio of advanced environmental solutions and services on rain water harvesting to total recycling of spanning water, heat recovery and treatment of gaseous effluents, solid & hazardous waste Incineration and renewable energy, for infrastructure, industrial, municipal and household applications.

We offer complete environmental solution under one roof.

"Invenir" Products

- **Fine Bubble Disc Diffusers**
- **Coarse Bubble Diffusers**
- **Filter Press**
- **Tube Pack Media**
- **Bio Pack Media**
- **SAFF Media**
- **Membrane Systems - MF,NF,UF,RO**
- **Turbine / Vacuum Blower**
- **Twin Lobe Blower**
- **Mechanical Aerator**
- **DAF Unit**
- **MFS Unit**
- **Packaged Drinking Water Plant**
- **Waste Incinerator**
- **Economiser**

FINE BUBBLE: DISC DIFFUSERS



Standard 9" Disc - SFD270
Design Flow: 1.5-3.0 SCFM (2.5-5.0 Nm³/hr)
Flow Range: 0-7 SCFM (0-12 Nm³/hr)
Slit Quantity: 6,900

Standard 12" Disc - SFD350
Design Flow: 2.5-5.0 SCFM (4.2-8.3 Nm³/hr)
Flow Range: 0-12 SCFM (0-20 Nm³/hr)
Slit Quantity: 10,555

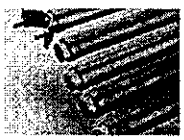
INVENIR presents disc diffusers with compression molded membranes. Standard materials are EPDM, SILICON & VITON. Compression molding ensures a diffuser with even specific gravity and uniform tear resistance. The tear resistance of a compression molded part is multidirectional, which is typically not found in injection molded unidirectional parts.

Our experience ensure emulsifying fats cannot leech plasticizer and cause shrinkage and increase hardness, nor are our membranes at risk of flexure failure

INVENIR offers a variety of ultra fine bubble/high efficiency products including flat panel shaped diffusers and modified versions of our standard disc and tube products with low surface tension membranes, small slits, operating at low flux rates and high diffuser densities.

Standard oxygen transfer efficiencies of up to 3.3%/ft (11%/m) are achievable under extreme circumstances, however a more typical and practical value is 2.3 to 2.5%/ft (7.5 to 8.0%/m). When high SOTE's are combined with low headloss, it is possible to achieve SAE, wire-to-water of in excess of 8 lb/HP-hr (5 kgO2/kWh).

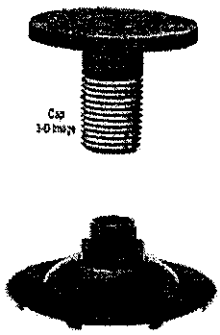
FINE BUBBLE: TUBULER DIFFUSERS



Our tubes are designed for maximum strength at minimum positive buoyancy. The OD 90mm diameter X 1 m is favored by the industry due to their large size and high air capacity compared to disc diffusers. They require fewer header pipes, less support stands and less installation time than disc diffusers. The tube membranes are manufactured with compression molding which supports higher flow rates, better tear resistance and lower pressure drops. Perforations are available on 1 mm or 2 mm slit lengths and both saddles and nipples are designed to mount British or Metric dimension pipes.

TYPE - SFT 610, SFT 100, SFT 1000
MATERIAL - EPDM / Silicon / Viton / PTFE Layered EPDM

INVENIR TECH SYSTEMS PVT. LTD.



Coarse Bubble Diffusers

The company manufactures and supplies various types of Coarse Bubble Diffusers which are designed to provide an even distribution of finely divided air bubbles with freedom from common clogging problems. New, one piece plastic diffuser base and neoprene disc assures trouble free operation without corrosion problems.

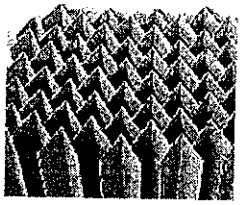
Technical Specifications

Material	Body : ABS Membrane : EPDM
Aeration Capacity	7 – 10 m³/hr.
Oxygen Transfer (%)	10%-20%
Diameter	80 mm
Connection	1" BSP, Male

Material	Body : ABS Membrane : EPDM
Aeration Capacity	8 – 12 m³/hr.
Oxygen Transfer (%)	10%-20%
Diameter	150 mm
Connection	1" BSP, Male

INVENIR makes available filter press which is widely used in water purification plants and sewage treatment plants. It designs and produces Filter Presses with years of dependable service. Filters are sturdily built, with a rugged carbon steel stand coated in durable epoxy paint.

MODEL	PP-FP17	PP-FP18
PLATE SIZE DETAILS (In mm) & no. of plate	300 X 300, (10+2)	450 x 450, (17+2)
MOC OF PLATE	PP	PP
CAKE HOLDING CAPACITY	25 Ltrs	25 Ltrs
FILTERATION AREA	1.75 M2	7.1 M2
TIGHTENING MACHENISM	Manual	Manual
MAX. TEST PRESSURE	4.0	5.0
REQUIRED FLOOR AREA (in Mts.)	1.5 x 0.7	2.2 x 0.8
BARE WIEGHT IN KG	220	450



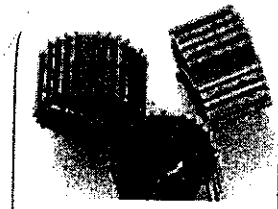
Tube Pack Media

INVENIR TUBE deck is a PVC tube settler which offers enhanced capacity for settling suspended solids in a fractional area. TUBE deck provides the most economical way of improving clarifier performance in a variety of municipal, industrial and wastewater applications. It can be installed within settling tanks, both existing and new. TUBE deck increases the capacity of a clarifier, improves the resultant effluent and increases the stability of the process in the events of surges of other process upsets.

TUBE Deck increases the effective area of a basin (by 5.5 m2/m2 for a 500mm deep module) and decreases the effective particle settling distance drastically and are also used for effective settling in portable and industrial water treatment plants. Can be used for the clarification of raw river water in water treatment plants, from coal mines, mineral processing industries, and clarifies water waste\ from wet scrubbers.

MODEL		PP-TSM-70
MEDIA TYPE		HEX.CHERVRON
CRESS SECTION OF MEDIA	mm x mm	75 X 60
ANGLE OF INCLINATION	degree	60
SP. SETTING AREA	m2/m3	12
SETTLING VELOCITY	m/s	0.50
STRAIGHT HEIGHT OF MEDIA	mm	750
ANGLE CORRECTION	m	0.43
HOPPER SLOPE	degree	50
TOTAL NO. OF HOPPERS	nos.	4
HOPPER DEPTH	m	1.66
TOTAL VOLUME OFT TUBE PAC MEDIA	m3	55.0

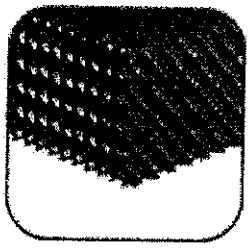
INVENIR TECH SYSTEMS PVT. LTD.



Bio Pac Media

INVENIR supplies Bio Pac Media for biological treatment systems for industrial and wastewater treatment facilities around the country.

MODEL	PP 22
LENGTH (MM)	22
DIAMETER (MM)	22
SHAPE (MM)	CYLINDRICAL
TYPE	SEMI CLOG
PROTECTED SURFACE AREA (M2)	400
TOTAL SURFACE ARE (M2)	530
PSA TSA RATIO (%)	75
VOID RATION (V/V)	90
SPECIFIC WEIGHT (KG/M2 SURFACE AREA	0.37
DENSITY (GMCC)	0.93
NO. OF PIECES PER UNIT (NOS./M3)	78,000
MEDIA FILL RATE RANGE % FILL OF V	25-55



SAFF Media

INVENIR offers complete range of SAFF Media Which is specifically designed for biological fixed film systems. Cross flow media provides a cost-effective method for reduction of organics (roughing and polishing), nitrification, and anaerobic treatment of municipal and industrial wastewaters.

Applications:
SAFF MEDIA has numerous applications in wastewater treatment. The shape of the media hasa significant influence on application and must be considered along specific surface area and void ratio. Applications are as follows:
- Upgrading existing rock trickling filters.
- BOD Reduction in Trickling Filters
- Complete Secondary Treatment.
- Trickling Filters/Solids Contact (TF/SC)
- Roughing of pre-treatment.
- Nitrification.
- Denitrification.
- Odour Scrubbing.
- Anaerobic Treatment
- SAFF or submerged aerobic fixed film reactors.

Turbine Blowers/ Vacuum Blower – Data Summary

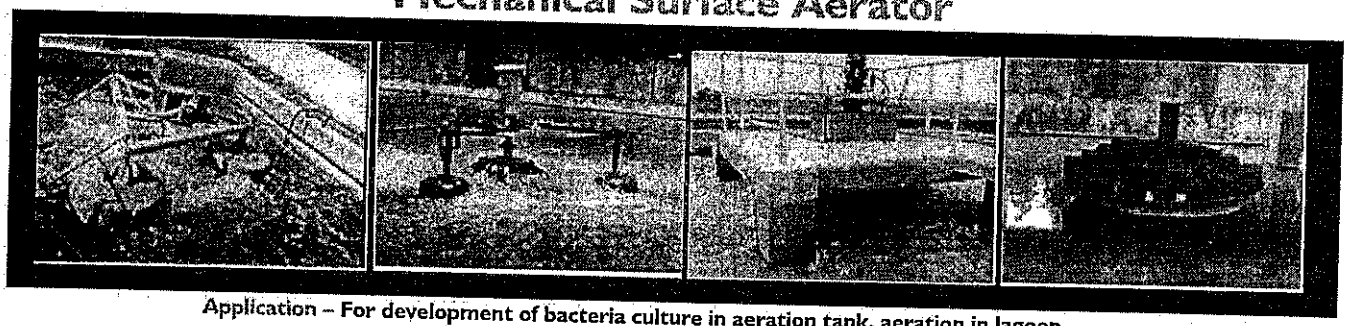
INVENIR deals lateral side channel Blower and regenerative Blower, both for Pressure and Vacuum application.

MODEL NO.	POWER (KW)	MAX FLOW (M^3 / Hr)	MAX PRESSURE (mbar)	MAX VACUUM (mbar)
10	0.20	40	70	60
11	0.25	55	80	80
21	0.25	80	110	100
21	0.40	80	130	120
23	0.25	105	80	80
23	0.40	105	130	120
31	0.7	150	130	120
31	0.55	100	120	110
33	0.75	100	150	150
33	0.55	140	60	60
41	0.75	140	100	100
41	0.7	145	120	120
41	0.85	145	160	160
43	1.3	145	200	170
43	0.7	180	70	70
43	0.85	180	120	120
49	0.7	180	70	70
51	0.6	140	120	120
51	0.85	210	100	110
51	1.3	210	170	170
51	1.6	210	190	200
53	2.2	210	270	220
53	0.85	270	40	40
53	1.3	270	100	100
53	1.6	270	150	150
59	2.2	270	230	220
61	1.1	210	150	130
61	1.6	265	180	160
61	2.2	265	220	200
63	3.0	265	280	280
63	1.6	345	125	130
63	2.2	345	195	200
63	3.0	345	220	240

INVENIR TECH SYSTEMS PVT. LTD. TDK-26

MODEL NO.	POWER (KW)	MAX FLOW (M^3 / Hr)	MAX PRESSURE (mbar)	MAX VACUUM (mbar)
71	1.6	318	150	160
71	2.2	318	200	110
71	3.0	318	290	270
71	4.0	318	330	290
73	1.6	420	100	100
73	2.2	420	170	170
73	3.0	420	220	220
73	4.0	420	310	260
74	4.0	500	140	150
74	5.5	500	260	240
74	7.5	500	320	240
79	2.2	320	200	160
81	4.0	530	200	200
81	5.5	530	300	300
81	7.5	530	430	320
83	4.0	700	140	150
83	5.5	700	180	200
83	7.5	700	260	270
84	7.5	900	180	200
84	11.0	900	370	280
91	8.50	1050	210	210
91	12.50	1050	270	280
91	18.50	1050	460	340
93	8.50	1370	110	120
93	12.50	1370	190	210
93	18.50	1370	320	310
94	15.00	1940	100	130
94	20.00	1940	200	220
94	25.00	1940	270	310
94.3	15.00	2050	170	160
94.3	20.00	2050	23	0250
94.3	25.00	2050	270	310

Mechanical Surface Aerator



Application – For development of bacteria culture in aeration tank, aeration in lagoon

Type - Slow Speed Floating / Fixed Surface

Power - 2 HP / 3 HP / 5 HP / 7.5 HP / 10 HP /12.5 HP / 15 HP / 20 HP / 25 HP

Speed - (45-90) RPM

Drive Arrangement via Flanged Mounted, Vertically Downward, Planetary Geared Motor

M.O.C - Mild Steel Epoxy Painted – Impeller (Optional – FRP Lined) & FRP - Float

Dissolved Air Floatation (DAF) Unit

Application - To remove emulsified oil & grease Suspended solid / colour

Type - Skid Mounted Packaged Unit

Capacity m3/Hr- 2.5 / 5.0 / 7.5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50

No Compressor (Air Suction by Ejector)

Accessories consist of the followings:

a) Screw Type Recycle Pump

b) Automatic Oil Skimmer for removal of oil

c) Tube Pack Media for TSS settlement

d) Automatic Pressure Control valve

e) Saturation Tank

M.O.C - Mild Steel Epoxy Painted

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

Mixing, Flocculation & Settling (MFS) Unit

Application - To remove Suspended solid / colour / heavy metals / etc.
Type - Skid Mounted Packaged Unit
Capacity m3/Hr- From 2.5 Up to 100 in a single unit
Accessories consist of the followings:

a) Flash Mixing Tank with High Speed SS Agitator
b) Flocculation Tank with slow speed MS-FRP Lined Flocculator
c) Tube Settler with Tube Pack Media
d) Automatic Sludge Drain Valve (optional Sludge Discharge Pump)

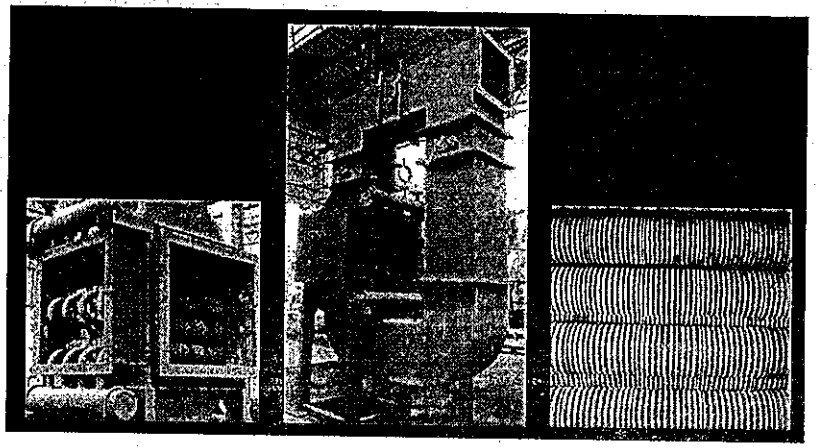
M.O.C - Mild Steel Epoxy Painted

Package RO Plant (From 500 LPH to 10,000 LPH)

Application - To remove Dissolved solid (TDS)
Type - Skid Mounted Packaged Unit
Capacity m3/Hr- From 0.5 Up to 10 as a packaged unit
Accessories consist of the followings:

a) Dual Media Filter (optional chlorination)
b) SMBS, Antiscalant & pH Dosing System
c) Micron Cartridge Filter with High Pressure Pump
d) RO Module with membrane
e) Control panel
f) All Instrumentation including flowmeter, TDS meter, pH meter etc.

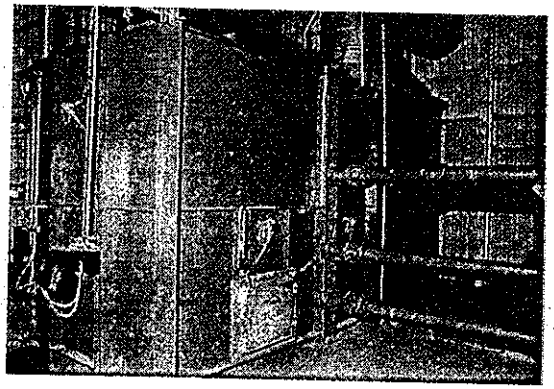
Economiser



INVENIR also manufacture C.I. Gilled Economiser used as IBR or non IBR Economiser/ Feed water heaters to recover heat and improve the efficiency of the boiler. These are installed at various places in India. These Products can pay for themselves in 12/16 months time. This can be used in any other brand boilers, existing or new. Our application engineers can study the existing installations and suggest solutions.

INVENIR TECH SYSTEMS PVT. LTD.

Incinerator



The two stage combustion Incinerators are used for various chemical / industrial wastes and hospital applications. These incinerators are based on the temperature controlled combustion system wherein it completely burns waste and convert it into CO_2 and other harmless gases before letting it into the chimney. Exhaust heat can be recovered, if the quantity is large. The Licensor has successfully installed an incinerator at Hyundai car project for waste paints and waste oil incineration.

OTHER TAILORMADE ITEMS INCLUDES:

- **Primary & Secondary Clarifier Mechanism**
- **Clariflocculator and HRSCC Mechanism**
- **CPI / TPI for free floating oil & grease reduction**
- **All Types of filters including IRF, PSF, ACF, DMF in FRP as well as in MS construction**
- **Ion Exchanger**
- **Energy Efficient Back Pressure Steam Turbine.**
- **Oil, Gas, Oil cum Gas Burners.**
- **Gas Booster.**

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF DOSING PUMP	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 16 OF 16	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-13

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD.

DOSING PUMP			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-13
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	System Components		Dosing Pump
2	Application		For dosing of chemicals (Hypo & Poly)
4	Quantity		02 Nos.
5	Type of Pump		Electronic Solenoid Type
6	Make		Etatron
7	Max. Flowrate		(0-4)
8	Max. Pressure		5 bar
9	Power Supply		AC, 1 phase, 220V, 50 Hz
10	Power Consumption		32 Watt
11	M.O.C of Pump Head		PP
12	M.O.C of Diaphragm		PTFE
13	M.O.C of Nipples		PP
14	M.O.C of Sealings/ O-Ring		FPM
15	M.O.C of Injection Valve		PP
NOTE	**REFER CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD.

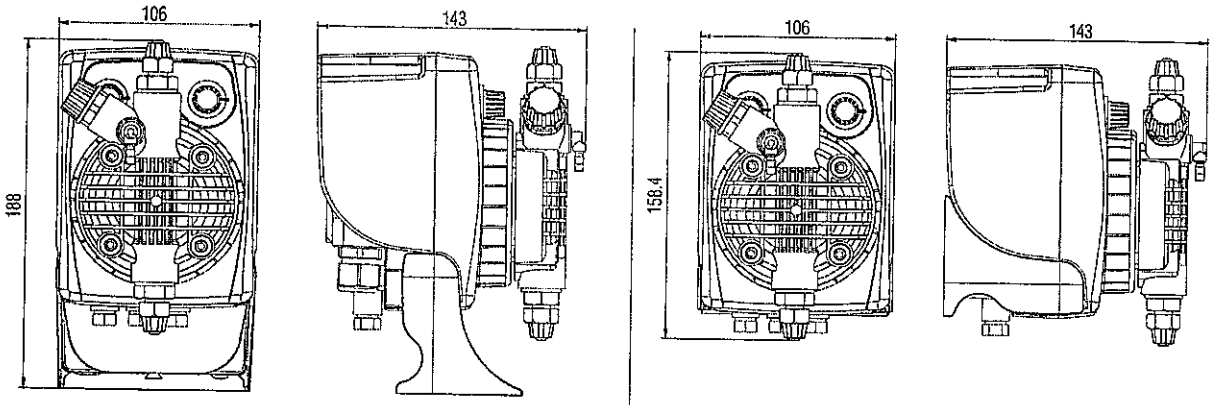
ETATRON D.S.

PKX: THE GENUINE COMPACT DOSING

PKX series

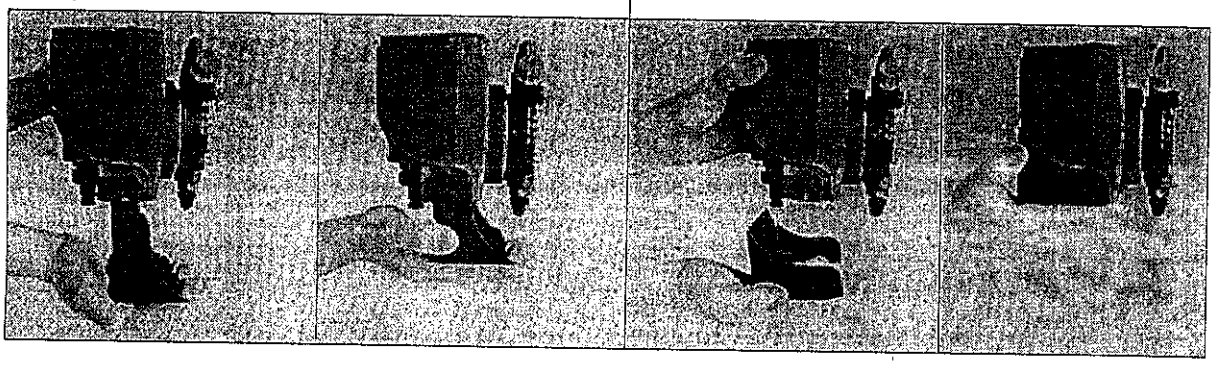
- Solenoid driven dosing pump
- Pompa dosatrice elettromagnetica
- Pompe doseuse électromagnétique
- Elektromagnetische Dosierpumpe
- Bomba dosadora electromagnética
- Bomba dosificadora electromagnetica
- Соленоидный дозирующий насос

● Overal dimensions ● Dimensioni di ingombro ● Dimensions ● Dimensionen ● Dimensiones ● Dimensões ● Размеры

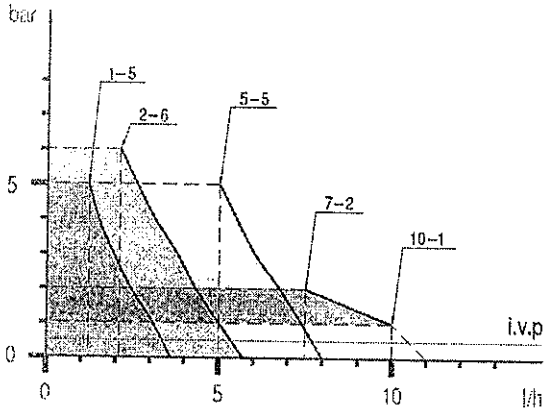


- Foot mounting
- Montaggio a basamento
- Montage sur pied
- Bodenmontage
- Instalación a pared
- Montagem em base
- Горизонтальное крепление

- Wall mounting
- Montaggio a parete
- Montage mural
- Wandmontage
- Instalación a pié
- Montagem em parede
- Настенное крепление



- Curves flow rate vs. pressure
- Curve caratteristiche portata-pressione
- Courbes debit - pression
- Förderleistung abhängig vom Druck
- Curvas caudal-presión
- Curvas de vazão x pressão
- Кривая зависимости от противодавления



TECHNICAL CHARACTERISTICS/CARATTERISTICHE TECNICHE										
Type Tipo	**Max flow** Portata max	**Max press** Pressione max	**Max imp./min.** Max imp./min.	**Output per stroke** Dosaggio per imp.	**Stroke** Corsa	**Suction height** Altez. aspiraz	**Standard power supply** Aliment. elettr. standard	**Power comp.** Potenza ass.	**Current comp.** Corrente ass.	**Net weight** Peso netto
	l/h	bar		ml	mm	m	Volts - Hz	Watts	Ampere	kg
1-5	1	5	120	0.14	0.80	2.0	220/240 V 50-60 Hz	32	0.14	1.9
2-6	2	6	120	0.28	0.80	2.0	220/240 V 50-60 Hz	32	0.14	1.9
5-5	5	5	120	0.69	1.10	2.0	220/240 V 50-60 Hz	32	0.14	1.9
7-2	7	2	120	0.97	1.30	2.0	220/240 V 50-60 Hz	32	0.14	1.9
10-1	10	1	120	1.39	1.30	2.0	220/240 V 50-60 Hz	32	0.14	1.9

HYDRAULIC PARTS/CONFIGURAZIONE IDRAULICA		
WETTED PARTS/PARTI A CONTATTO CON IL LIQUIDO	**STANDARD MATERIALS**/VERSIONE STANDARD	**UPON REQUEST**/ A RICHIESTA
Pump head/ Corpo pompa	PP	PVC; AISI 316; PVDF ; PTFE
Diaphragm/ Diaframma	PTFE	PTFE; PVDF
Nipples/ Raccordi	PP	AISI 316; PVDF
LIP valves/ Valvola a labbro	FPM (Viton®)	EPDM (Dutral®); Silicone ; NBR
Sealings/O-rings/ Guarnizioni/O-ring	FPM (Viton®)	EPDM (Dutral®); Silicone ; NBR
Injection valve/ Corpo valvola iniezione	PP	AISI 316; PTFE
Foot filter / Filtro di fondo	PP	AISI 316; PTFE
Suction/Bleeding tubings/ Tubi aspirazione/spurgo	PVC	PTFE; PVDF
Delivery tubing/ Tubo mandata	PE	PTFE; PVDF
Injection valve sleeve/ Tenute Valvola iniezione/non ritorno	FPM (Viton®)	EPDM (Dutral®)
A RICHIESTA/ **UPON REQUEST:**		
Pump head with gravity ball/ Corpo pompa con valvole a sfera gravità	Glass Pyrex/ Vetro Pyrex	AISI 316; Ceramic/Ceramica
Pump head with hastelloy spring loaded ball valve/ Corpo pompa con valvole a sfera e molla in Hastelloy	Glass Pyrex/ Vetro Pyrex	AISI 316; Ceramic/Ceramica
Viton®: FPM / Dutral®, Dupont trademarks/ Viton®: FPM / Dutral®, sono marchi registrati della Dupont Elastomeri		

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code DCY00024MLt-A (07-2006)

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	DATASHEET OF DOSING TANK	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 17 OF 17	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

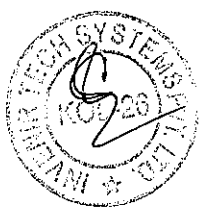
EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-14

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**



DOSING TANK			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-14
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	System Components		Dosing Tank
2	Application		For storage of chemicals (Hypo & Poly)
4	Quantity		02 Nos.
5	Type of Tank		Circular
6	Make		Pattom
7	Capacity		100 Lit
8	Model		HHT-100
9	Diameter		19 inch (480 mm)
10	Height		28 inch (715 mm)
12	Tank Manhole Dia		10.5 inch (265 mm)
13	M.O.C of Tank		LDPE
14	Outlet Drain Valve		25 NB
NOTE	**REFER CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD. KOCHI

Inlet and outlet ports are located on flat surfaces which eliminate possibilities of leakages.

PATTON water storage tanks are made of 100% food grade plastic that conforms the USFDA standards which helps the water to retain its original characteristic over the period of time.

Hi-tech technology is used to prepare the tanks in one piece so that there are no joints. This prevents leakages & longevity of the product.

Centre manhole opening provided to facilitate easy accessibility inside the tank during inspection and cleaning.

Patton tanks manufactured to general and customized requirements, address a storage capacity range from 200 liters to 10,000 liters.

These tanks are available in various colours and are odor free.

It is easily transferable, fungus free and available at a cheap rate.

Specifications of Loft, Household & Double Layered Tanks

Code	Capacity In Ltrs.	Dimension Length	Breadth	Height (Inch)
PLT / 125	125	24.00	15.00	15.00
PLT / 200	200	28.00	28.00	16.00
PLT / 265	265	38.00	28.00	17.00
PLT / 300	300	39.00	27.00	20.00
PLT / 375	375	43.00	32.00	21.00
PLT / 475	475	48.00	40.00	16.00

Capacity	Tank Height Inch	Tank Height mm	Tank O.D Inch	Tank O.D mm	Tank Man Hole Dia Inch
HHT - 100	28.00	715.00	19.00	485.00	10.50

Capacity	Tank Height Inch	Tank Height mm	Tank O.D Inch	Tank O.D mm	Tank Man Hole Dia Inch
CVT - 200	24.00	598.00	28.00	711.00	11.00
CVT - 300	31.00	788.00	30.00	762.00	11.00
CVT - 400	33.00	839.00	34.00	864.00	11.00
CVT - 500	38.00	966.00	35.00	889.00	16.00
CVT - 750	44.00	1118.00	38.00	966.00	16.00
CVT - 1000	51.00	1296.00	42.00	1067.00	16.00
CVT - 1500	52.00	1321.00	51.00	1296.00	16.00
CVT - 2000	65.00	1651.00	53.00	1347.00	18.00
CVT - 2500	70.00	1778.00	58.00	1475.00	18.00
CVT - 3000	69.00	1753.00	62.00	1575.00	18.00
CVT - 4000	76.00	1931.00	70.00	1778.00	18.00
CVT - 5000	78.00	1982.00	77.00	1965.00	18.00
CVT - 6000	106.00	2693.00	70.00	1778.00	18.00
CVT - 10000	94.00	2338.00	97.00	2464.00	18.00

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-15

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOLKATA

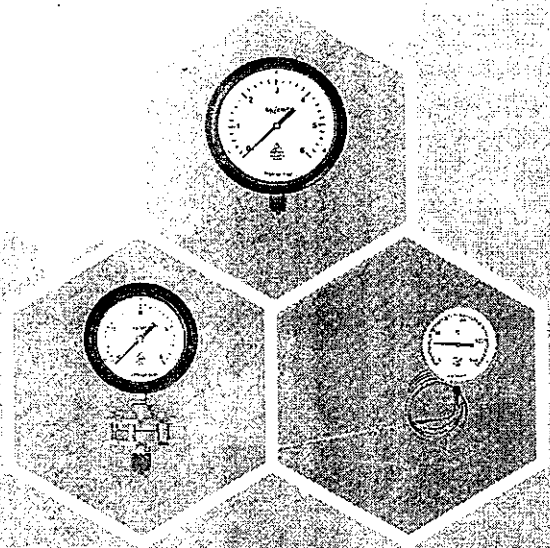
PRESSURE GAUGES			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-15
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	Service Description		Waste water / Clear water
2	Location		Delivery Line of Pump / Before Filter / Blower
4	Qty		12 (Twelve)
5	Type		Bourdon
6	Mounting		Direct
7	Dial Size		100 mm
8	Dial Colour		Black & Red On White Dial
9	Range (Kg/sq.cm)		(0-6) for Pump/Filter; (0-2) for Blower
10	Process Connection		1/2" NPT (M)
12	Case/Head Cover Material		Cast Aluminium
13	Bourdon/Element		SS-316
14	Calibration		Full Scale
	Wetted Parts material		SS-316
	Overrange Protection		130% of scale value
	Operating Temeprature, deg C		Ambient
	Callibration Range, kg/sq.cm (g)		±1% of F.S
	Accessories		SS 3 way gauge cock
	Make		H.Guru/ KI
NOTE	**REFER CATALOGUE ATTACHED**		

INVENIR TECH SYSTEMS

H.GURU
NORTH

H . GURU INSTRUMENTS (N.I) PVT.LTD

An ISO:9001 Company



"Concept to creation through Design & Development with Quality and Innovation"

H.GURU
NORTH

H . GURU INSTRUMENTS (N.I) PVT.LTD

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About H. Guru North

H. GURU INSTRUMENTS (N.I.) PVT. LTD. a distinguished name driven by 'concept to creation through design & development with quality and innovation'. The pioneer in the field of instrumentation H Guru Instruments Pvt. Ltd. was established in 1983 with insatiable passion for new inventions to support its clients. Backed by a team of experienced and qualified electronics & mechanical engineers, we soon grew into prominence winning the trust of our prominent clients with unmatched quality products like Pressure Checking & temperature measuring instruments. Our work force engages in intense research to strive to offer innovative solutions for trouble free-pressure checking & temperature measuring experience.

We are committed to provide our valued clients the products and services which cater to their exact requirements and exceed their expectation levels. We emphasize upon adhering to the highest standard of quality in all areas of our operation, striving to win complete customer satisfaction. Our products provide our clients a total value for money and designed with perfection. With our commitment in Pressure & temperature measuring instruments & dedicated service, we have etched a special place in the market scenarios.

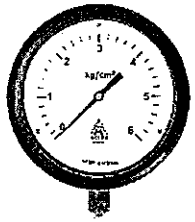
Our in house std. room features calibration & testing capacity of high accuracy pressure instruments with ranges from:-

400mmwc to 700 kg/cm2

-38dg c to 650dg c in Thermometer

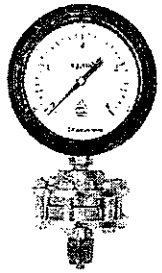
Our customers have been very supportive in terms of maintaining good & a healthy relationship. And we continue to endeavor to serve our customers better than the best. Hence, our engineering expertise, coupled with our commitment to excellence, has enabled us to satisfy the highly challenging global markets.

Pressure, Vacuum & Compound Gauge



Dial Size	-	100, 150 & 250 Mm
Accuracy	-	+/- 0.5%, 1% Fsd. As Per Is 3624
Sensing Element	-	Boudon Tube
Sensing Element Material	-	Aisi - 316
Movement	-	Aisi - 304, Brass
Block	-	Extruded Brass/ Aisi - Ss 316
Case	-	Cast Aluminum 304 Weather Proof As Per Ip 65
Connection Size	-	3/8" Bsp, ½" Bsp, ½" Npt, M 20 X 1.5
Dial	-	Aluminum White Finish With Black Lettering
Pointer	-	Aluminum Black Finished With Micro Adjustable
Window	-	Glass, Shutter Proof Glass, Toughened Glass, Acrylic Glass
Mounting	-	Direct/ Projection With Bottom Entry & Flush Panel With Back Entry
Range	-	0-1, 1.6, 2, 2.5, 4, 6, 7, 10, 14, 16, 21, 25, 40, 60, 100, 160, 250, 400, 600 Kg/cm2 - 760 Mmhg And Compound Ranges
Accessories	-	Single & Double Electric Contact, Syphon, Gaugecock, Snubbers Niddle Valve, Liquid Filling Etc.

Sealed Diaphragm Pressure Gauge



Dial Size	-	100 & 150 Mm
Accuracy	-	+/- 1% Fsd. As Per Is 3624
Case & Bezel	-	Die Cast Aluminum / ss 304 Weather Proof As Per Ip 65
Bourdon	-	Ss - 316
Movement	-	Aisi - 304
Block	-	Aisi - Ss 304
Connection Size	-	½" Bsp & ½" Npt (m) Optional - Flange As Per Bs, Asa & Din Standard
Dial	-	Aluminum White Finish With Black Lettering
Pointer	-	Aluminum Black Finished With Micro Adjustable
Window	-	Glass, Shatter Proof Glass, Toughened Glass, Acrylic Glass
Mounting	-	Projection With Bottom Entry, Direct With Bottom Entry & Flush Panel With Back Entry
Range	-	0-1, 1.6, 2, 2.5, 4, 6, 7, 10, 14, 16, 21, 25, 40, 60, 100, 160, 250 Kg/cm2 Vacuum & Compound Ranges
Temperature	-	Upto 150°c With Silicon Oil (max)
Diaphragm Material	-	Aisi 316
Diaphragm Protection	-	Teflon Coating, Teflon Lining Silver Foil (optional)
Top Chamber	-	Aisi 304
Bottom Chamber	-	Aisi 316
Accessories	-	Flanges, Liquid Filling, Gauge Cock & Snubbers.

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

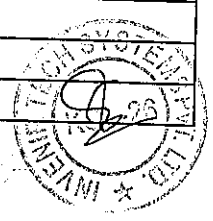
SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-16

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

LEVEL CONTROLLER

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-16
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	Service Description		Waste water / Clear water
2	Location		In EQT & in Filter Feed Tank
4	Qty		02 (Two)
5	Type		Capacitance
6	Make		Levcon
	FEATURES		
7	MOUNTING		FIELD (SUITABLE FOR 2" PIPE MOUNTING)
8	EXTERNAL ZERO & SPAN ADJUSTMENT		PROVIDED
9	PROCESS TEMERATURE LIMIT		(-) 40 TO 125 DEG C
10	ACCURACY		0.075% OF CALIBRATED SPAN
12	CALIBRATED RANGE		. 0 - 3000 MM WC/ 0-2500 MM WC
13	DIGITAL OUTPUT		PC INETRFACE
14	ALARM INDICATION		HIGH / LOW
15	TIME DELAY		0-10 SEC
16	PROTOCOL		HART
17	OUTPUT		(4-20) mA Output WITH MAX. LOAD OF 600 OHM
18	ALARM SET POINTS		4 NOS.
19	TEMPEARTURE EFFECT		MAXIMUM SHIFT OF O/P IS AT 44 Hz HORIZONTAL VIBRATION
20	VIBRATION EFFECT		MAXIMUM SHIFT OF O/P IS AT 44 Hz HORIZONTAL VIBRATION
21	VIBRATION EFFECT		0.1% OF CAL. SPAN (COMBINED ZERO & SPAN PER 28 DEG C)
22	TEMPERATURE EFFECT		0.01% PER YEAR (+/- 0.05% FOR FIVE YEARS)
23	STABILITY		200 TO 500 MILI SEC
24	ENCLOSURE		NEMA 4X & NEMA 7
25	CASE COLOR		GREY
26	PAINT MATERIAL		EPOXY POLYSTER HYBRID PAINT
27	PROTECTION CLASS		NEMA 4X
	SUPPLY / SIGNAL		
28	POWER SUPPLY		230 V AC
29	OUTPUT SIGNAL		(4-20) mA DC (LINEAR)
	MATERIAL		
30	ELEMENT		SS 316 L
31	FILLING FLUID		SILICONE OIL (DC 200)
32	PROCESS FLANGES & ADAPTORS		SS 316
33	DRAIN / VENT VALVES		SS 316
	CONNECTIONS		
34	PROCESS CONNECTION		1/4" NPT (F)
35	ELECTRICAL CONNECTION		1/2" NPT
36	CONNECTION LOCATION		SIDE
NOTE	**REFER CATALOGUE ATTACHED**		



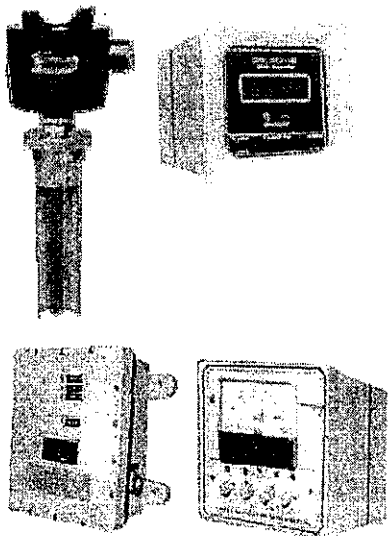
LEVCON CONTROLS PRIVATE LIMITED

CAPACITANCE TYPE LEVEL INDICATOR/SWITCH/TRANSMITTER

Capacitance type Level Indicators/Switches/Transmitters are suitably used for monitoring and controlling of liquid levels in tanks or vessels. No moving parts ensure any wear and tear. These level indicators/Switches are suitable for a wide variety of applications with fixed di-electric constant.

Feature:

- Power Supply healthy indication
- Digital/Analogue indication of liquid level in mm, ft., meters, % etc
- LED indication/ Relay outputs for 2 (max) different levels for level indicator model
- LED indication/ Relay outputs for 4 (max) different levels for level switch model
- Relay output-2 SPDT per set point (max) for single set point integral model
- Set points adjustable throughout the range
- Selectable high/low level alarm
- Time Delay to tackle turbulence
- Continuous 4-20 mA DC open collector non-isolated o/p
- Wide range of Probe design to suit a wide variety of applications
- Integral and Non Integral models



Applications:

- Water
- Acids
- Alkalis
- Oils
- Chemicals

Principle of Operation :

As media rises and falls in the vessel, the amount of capacitance developed between the sensing probe and the ground (vessel wall or reference probe in case of non-metallic vessels) also rises and falls. This change of capacitance is converted into a current signal by the pre- amplifier. The pre-amplifier output is connected to the Control Unit. The amplifier, in the control Unit converts the pre amplifier signal into a proportional voltage, which is amplified to drive the indication circuit LED, relay circuit and the transmitter circuit.

Specifications :

Materials of Construction: : Active Probe : SS304/ SS316 – with Teflon /PVC / PP Insulation.
Reference Probe : SS304/ SS316/Hastelloy 'C'/ 'B'
Flanges : CS/ SS304/ SS316-ECTFE coated/ PVC
Adapters, Connectors : CS/ SS304/ SS316/PVC/PP/MSRL
Probe Head Enclosure : Cast Aluminum
Control Unit Enclosure : Cast Aluminum(MS/SS Fabricated for Indicator types only)

Protection of Enclosure : Weatherproof to IP66

Mounting : Vertical

Measuring Range : 10M (max), for flexible wire rope as Active Probe. 2M(max) for Rigid Rod as Active Probe. For higher range factory to be contacted.

Process Connection	: Flanged to 2 ½ " ANSI # 150 RF, other types on request screwed to ½ " NPT (M), other types on request.
Temperature Rating	: 200 ° C (max), please contact us for higher temperatures.
Pressure Rating	: 20 Kg/ cm2 (max), please contact us for higher pressures.
Power Supply	: 230V AC/ 110V AC, ± 10%, 50 Hz/24V DC
Output Relays	: SPDT (1NO + 1NC)/ DPDT (2NO + 2NC)
Relay Contact Rating	: 5A at 230V AC
Time Delay	: 0-10 seconds as standard
Accuracy/ Repeatability	: ± 1% / ± 0.5% of full scale
Power Consumption	: 14V A (max) for 4 Set Point Level Switch/Level Indicator
Cable Entry	: ½ " NPT (F) as standard

MODEL NUMBER DECODING SYSTEM

Probe Unit

LCP/LCPI						S
	Type of Enclosure	**Type of Design**	**Process Connection**	**Probe Type**	**Output**	**Special Features**
	1. Standard 3. Weather - proof 5. WP + Flp (IIA , IIB)	1. Non-Integral 3. Integral	1. Screwed 2. Flanged	1. Flexible Wire rope 4. Rigid Rod	1. Dedicated Current Output 2. 4-20 mA non-Isolated output 3. Single set point type (1/2 SPDT or 1 DPDT) 5. Two Set Point type (1 SPDT or 1 DPDT for each) 6. 4-20 mA non-isolated output (loop powered)	(Cooling fins etc.)

Control Unit

LC							S
	Type of Enclosure	**Type of Mounting**	**Type of Indication**	**Type of Output**	**No. of Switches**	**Type of Switches**	**Special Features**
	1. Standard 3. Weather - proof 5. Universal	1. Panel 2. Wall	1. Digital 2. Analogue 3. No Indication	1. No output 3. 4 – 20 mA 5. 0 – 5 DC	1. No set-point 3. One set-point 5. Two set-points 7. Three set-points 9. Four set-points	0. Not app -licable 1. SPDT 3. DPDT 5. 2 SPDT per set-point 7. 2 DPDT per set-point	(Intrinsically Safe Circuit)

Head Office Address : "RajKamal" Bldg, 6th Floor, 13, Camac Street, Kolkata – 700017, Tel : (033)2283-2766, (033)3022-5767, (0) 98318 26885 Fax : (033)2283-2719 E-mail : levconh@vsnl.net, info@levcongroup.com, levconw@vsnl.net. Website : www.levcongroup.com
Mumbai Branch Address : 301, Protprima Chambers, 1 Suren Road,Andheri East, Mumbai-400093, Tel :(022)2683 2127/ 2683-3015, Fax : (022)2683-3015 . levconm@vsnl.net,
NOTE : All combinations are not possible
Since improvements are made from time to time, the specifications are liable to change without notice.
Tech Pub : LC/CP/001. Dt. 01/10/2005

INVENIR TECH SYSTEMS PVT. LTD.

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

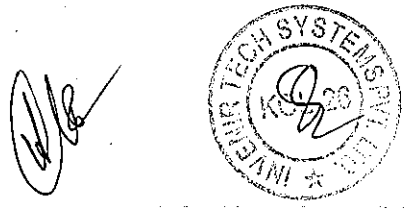
SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-17

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. 26

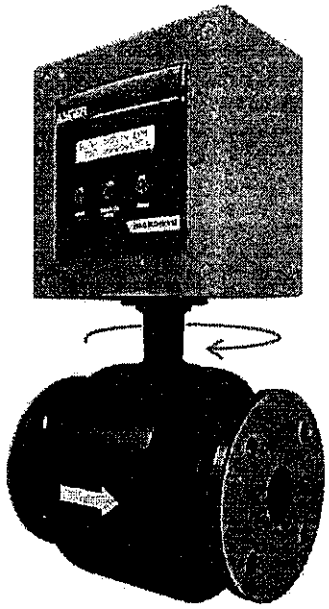
MAGNETIC FLOWMETER			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-17
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	Service Description		Clear water
2	Location		At outlet to Activated Carbon Filter
4	Qty		01 (One)
5	Type		Magnetic
6	Make		Aster Technologies
	FEATURES		
7	Line Size		40 NB
8	Flow Range		(01-20) Cum/hr
	INDICATOR		
9	Enclosure		Cast Aluminium, Weather Proof IP 65
10	Mounting		Field (Direct on Sensor)
11	Input Power Supply		AC. 1 Phase, 220V, 50 Hz
12	Accuracy		±0.5% FSD
13	Display		16 x 2 Alphanumeric LCD
14	Output		RS 485/4-20 mA Current
	SENSOR		
15	Type		Full Bore
16	M.O.C		Flange - MS, Electrode - SS316
17	Operating Pressure		10 Kg/sq.cm (max.)
18	Process Temperature		85 deg C (max.)
19	Lining		Rubber
20	Conductivity		> 5 micro-siemens/sec
21	Process Connection		BS Table-10D Flange
24	Calibration Set Point		Using front panel keyboard
25	Terminals		Mains - 3 core mains chord through gland
26	Relay Output		3 core 1 m through gland
NOTE	**REFER CATALOGUE ATTACHED**		



MAG- FLOW 650

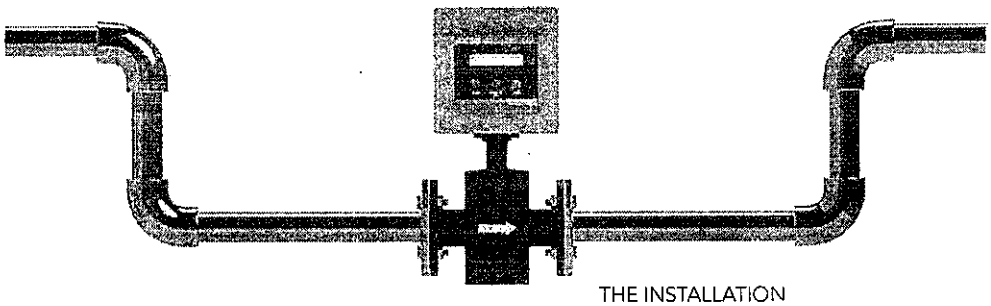
ASTER TECHNOLOGIES

The instrument works on Faraday's law of electromagnetic induction. The magnetic field is generated around the measuring tube by the instrument. The fluid passing through the measuring tube generates a voltage. This voltage is directly proportional to the velocity of the flow. Thus the flow is measured and displayed on the indicator. Mag-Flow 650 provides worry free flow measurement, which measures the flow of any conductive liquid flowing through it. It uses non-intrusive measurement element hence, debris/solids will not interfere with the measurement. Its rugged rubber lining provides outstanding electrical insulating properties. Mag-flow 650 is well designed for industrial waste water and water industry.



KEY ATTRIBUTES

- **UNIQUE DESIGN ALLOWS INDICATOR DISPLAY ROTATION UPTO 270°**
- **SUITABLE FOR ANY TYPE OF CONDUCTIVE FLUID**
- **NEGLIGIBLE PRESSURE DROP**
- **UNAFFECTED BY DENSITY OR VISCOSITY**
- **HIGH TURN-DOWN RATIO**
- **IDEAL FOR OUTDOOR INSTALLATION**
- **COMMUNICATION READY** for monitoring/data logging
- **HIGH ACCURACY**
- **REVERSE FLOW WARNING**
- **NO MOVING PARTS TO WEAR AND BREAK**
- **ALL METERS INDIVIDUALLY CALIBRATED**



THE INSTALLATION

APPLICATIONS

Raw Water

Beverage Industry

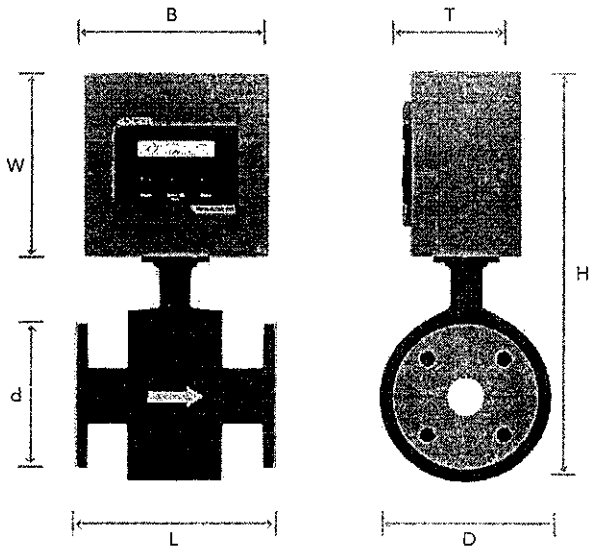
Pharma & Chemical

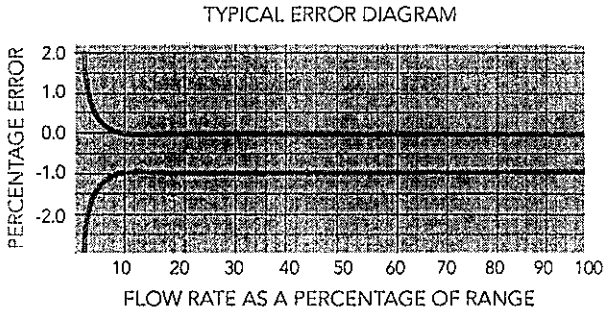
Industrial Waste Water

Sewage Treatment

Mining/ Minerals processing

INVENTIR TECH SYSTEMS PVT. LTD. KOL-26





INDICATOR

Physical dimensions	160 x 160 x 90mm
Enclosure	Cast Aluminum, Weather proof IP 65
Mounting	Field(Direct on Sensor)
Input supply	230 V A.C.± 15%
Display Range	0-999999.9 m³ / 0-9999999 liters
Flow rate sampling	2 Second
Accuracy	± 0.5 % FSD
Display	16 x 2 Alphanumeric LCD
Calibration/set point	Using front panel keypad
Linearity	± 0.5 %
Output	RS 485/4-20 mA current (optional)

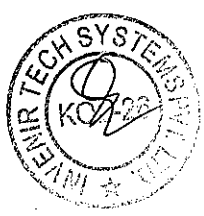
SENSOR

Type	Full Bore
MOC	Flange - Mild Steel Electrode SS316 Coil Housing - Mild Steel
Maximum Operating Pressure	10 Kg/cm²
Process Temperatures	85° C Max
Lining	Rubber
Conductivity	>5 µs/cm²
Process Connection	BS10 Table D Flanged

AVAILABLE RANGES

LINE SIZE		FLOW RANGE	L	D	B	W	T	H	d
25 NB	1"	0.2-10 m³/hr	165	144	160	160	90	324	140
40 NB	1.5"	01-20 m³/hr	175	133	160	160	90	343	175
50 NB	2"	02-35 m³/hr	175	152	160	160	90	362	175
65 NB	2.5"	04-60 m³/hr	185	184	160	160	90	390	180
80 NB	3"	06-90 m³/hr	185	216	160	160	90	390	180

• All dimensions are in mm.



PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

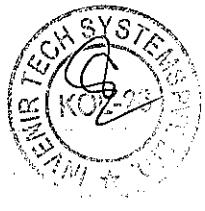
EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-18

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**



VALVES

Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
roject	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-18
Date	30-09-2015	Rev	0
A	**TECHNICAL DETAILS**		**DETAILS**
1	Service Description		Waste water / Sludge / Air / Clear water
2	Transfer Pump Line		Delivery - 50 NB CI Flanged Type NRV - 02 Nos.
	--do--		Delivery - 80 NB CI Flanged Type Butterfly - 01 No.
3	Air Blower Line		Delivery - 65 NB CI Flap Type NRV - 02 Nos.
	--do--		Delivery - 80 NB CI Flanged Type Butterfly - 01 No. for EQT
	--do--		Delivery - 65 NB CI Flanged Type Butterfly - 01 No. for SHT
	--do--		Delivery - 65 NB CI Flanged Type Butterfly - 02 Nos. for FAB-I & -II
4	Sludge Recirculation Pump Line		Suction - 40 NB CI Flanged Type Gate Valve - 02 Nos.
	--do--		Delivery - 40 NB CI Flanged Type Butterfly - 02 Nos.
5	Filter Feed Pump Line		Suction - 65 NB CI Flanged Type Gate Valve - 02 Nos.
	--do--		Delivery - 50 NB PVC Flanged Type Ball - 02 Nos.
	--do--		Delivery - 50 NB PVC Flanged NRV - 01 No.
6	Pressure Sand Filter		Frontal - 40 NB PVC Multiport Valve
7	Activated Carbon Filter		Frontal - 40 NB PVC Multiport Valve
8	Irrigation Water Pump Line		Suction - 50 NB CI Flanged Type Gate Valve - 02 Nos.
	--do--		Delivery - 40 NB CI Flanged Type Butterfly - 02 Nos.
	--do--		Delivery - 40 NB CI Flanged NRV - 01 No.
9	Filter Fress Feed Pump		Suction - 25 NB CI Screwed Type Gate Valve - 02 Nos.
	--do--		Delivery - 20 NB CI Screwed Type Ball Valve - 02 Nos.
	--do--		Delivery - 20 NB CI Screwed NRV - 01 No.
10	Make of Valves		Butterfly - Kitz/ Audco/ Leader/ Intervalve/ Equv.
	--do--		NRV - Kitz/ Audco/ Leader/ Sigma/ Intervalve/ Equv.
	--do--		Gate / Ball - Kitz/ Audco/ Leader/ Sigma/ Intervalve/ Equv.
	--do--		PVC Ball - Supreme/ Equv.

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

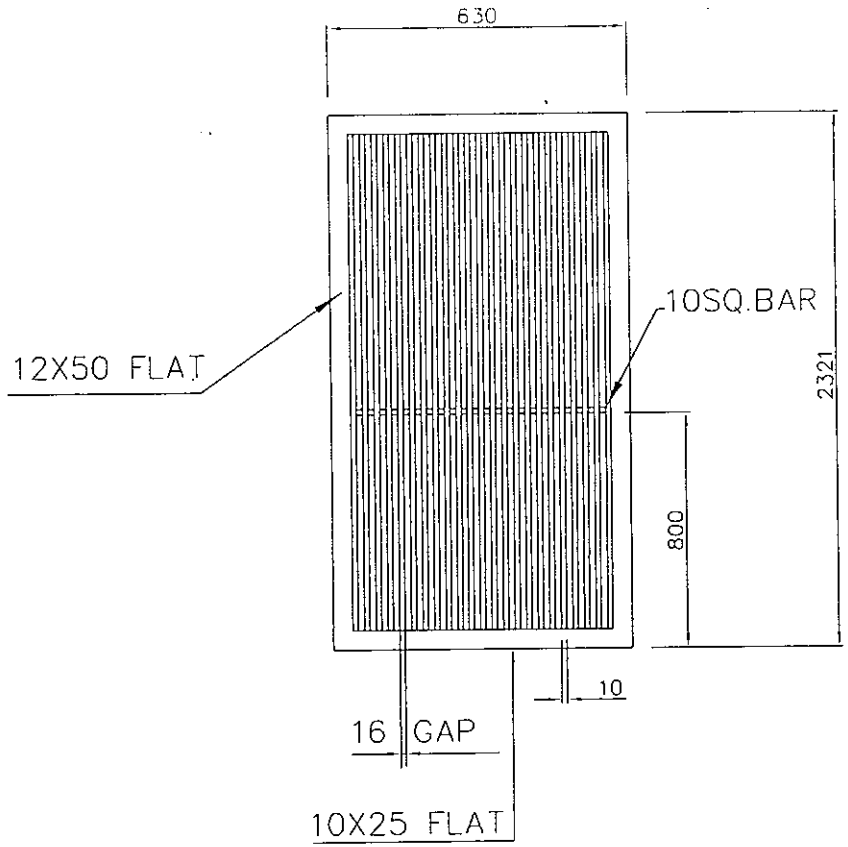
SUPPLIER DOCUMENT NO. : SHP-130KLD-STP-19

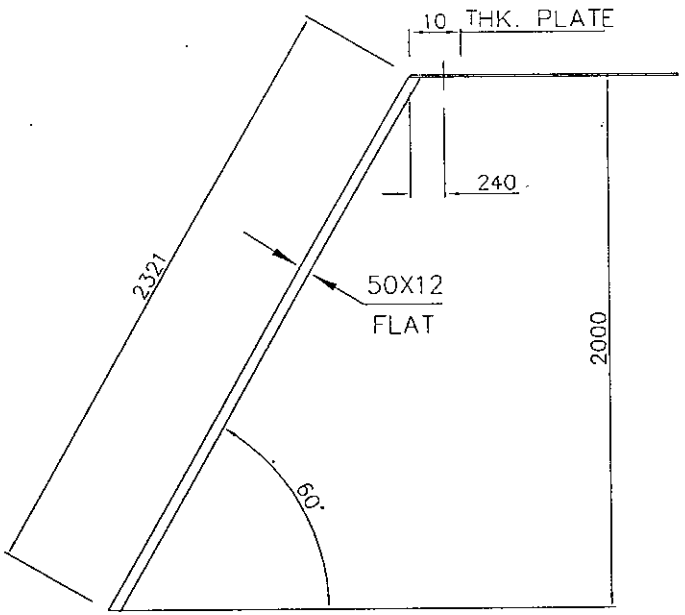
0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

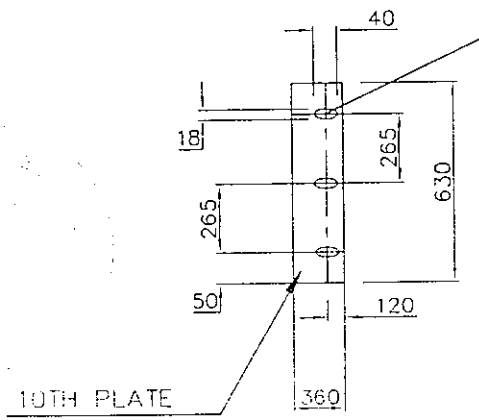
INVENIR TECH SYSTEMS PVT. LTD. KOLKATA

BAR SCREEN			
Client	Shapoorji Pallonji & Co. Ltd.	Consultant	CES
Project	Sewage Treatment Plant	Capacity	130 KLD
Vendor	Invenir Tech Systems Pvt. Ltd.	Doc. No.	SHP-130KLD-STP-19
Date	30-09-2015	Rev	0
A	**PROCESS REQUIREMENT**		**DETAILS**
1	Quantity	nos.	01 No.
2	Type		Manually operated
3	Size of bar screen		2321 mm X 630 mm
4	Space inbetween the bars	mm	16 mm
5	No of bars	nos.	21 Nos.
6	Bar Thickness	mm	10 mm
7	Bar Width	mm	10 mm
B	**MATERIAL OF CONSTRUCTION**		
1	Bars		MS Black Bitumin Paint
NOTE	**GA DRAWING ATTACHED**		

INVENIR TECH SYSTEMS PVT. LTD.







3-OBLONG HOLE 18X40

SUPPLY 3NOS FOUNDATION BOLT
M-16X150LONG (FULL THREADED)
WITH NUTS & WASHERS FOR FIXING

NOTE:
1:REMOVE BARS
2:PAINTS WITH BLACK BITUMEN

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

G.A DRAWING OF BARSCREN

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	GA DRAWING OF MCC PANEL	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 23 OF 23	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

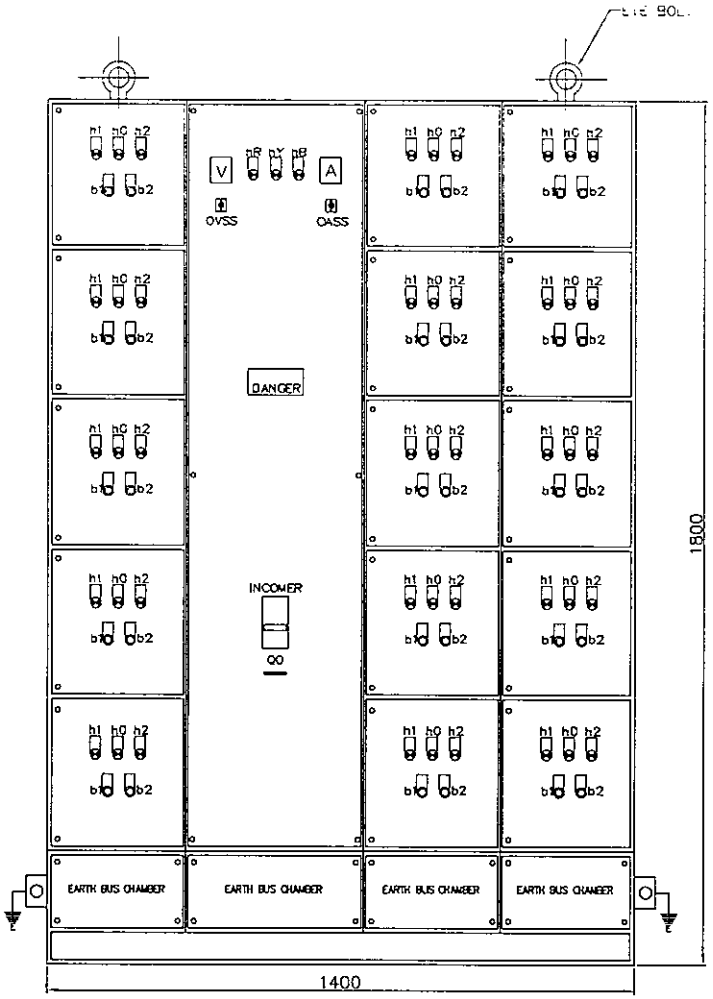
SUPPLIER DOCUMENT NO. : 005

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

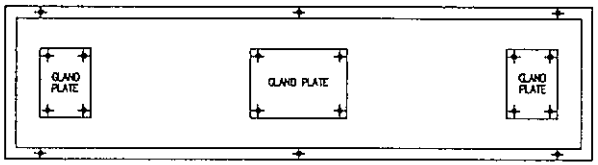
Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

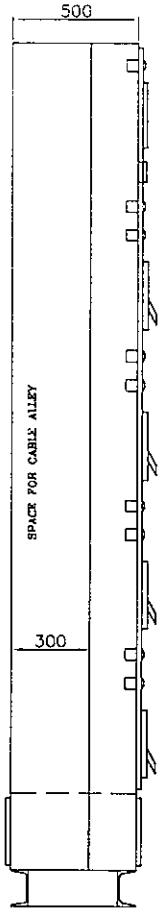
INVENIR TECH SYSTEMS PVT. LTD. KOL 026



FRONT VIEW



PLAN



LEGENDS–

R,Y,B – PH. IND. LAMP.
V – VOLTMETER
VSS – VOLTMETER SEL. SW.
A – AMMETER
ASS – AMMETER SEL. SW.
EM – ENERGEE METER
1h1–16h1 – ON IND. LAMP.
1h0–16h0 – OFF IND. LAMP.
1h2–16h2 – TRIP IND. LAMP.
1b0–16b0 – STOP PB.
1b1–16b1 – START PB.
1L1,5L1 – LOW LEVEL OFF IND. LAMP.
A/M – AUTO MANUAL SEL. SW.
W/S – WORKING STAND BY SEL. SW.

NAME PLATE DETAILS–

Q0 – INCOMER
1 – TRANSFER PUMP–1 (1HP)–(1W)
2 – TRANSFER PUMP–2 (1HP)–(1S)
3 – SLUDGE RECIRCULATION PUMP–1 (1HP)–(1W)
4 – SLUDGE RECIRCULATION PUMP–2 (1HP)–(1S)
5 – FILTER FEED PUMP–1 (3HP)–(1W)
6 – FILTER FEED PUMP–2 (3HP)–(1S)
7 – AIR BLOWER–1 (7.5HP)–(1W)
8 – AIR BLOWER–2 (7.5HP)–(1S)
9 – FILTER PRESS FEED PUMP–1 (1.5HP)–(1W)
10 – FILTER PRESS FEED PUMP–2 (1.5HP)–(1S)
11 – IRRIGATION WATER PUMP–1 (2HP)–(1W)
12 – IRRIGATION WATER PUMP–2 (2HP)–(1S)
13 – LIGHTING (240 WATTS)
14 – DOSING PUMP (240 WATTS)
15 – SPARE FEEDER (7.5HP)

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
PA No.- 13[illegible]

NOTE–

1. ALL DIMENSIONS ARE IN mm.
2. PANEL SHALL BE MADE OF 2mm. THICK SHEET STEEL SIEMENS GREY & POWDER COATING.
3. DETACHABLE GLAND PLATE AT BOTTOM
4. COLOUR OF THE PANEL–
5. PROTECTION : IP 54
6. DOOR WILL BE PROVIDED WITH RUBBER GASKET ALL AROUND FOR DUST & VERMIN PROOF.
7. CABLE ENTRY FROM BOTTOM.
8. LOCATION OF FRONT & INSIDE COMPONENTS ARE TENTATIVE AND CAN BE CHANGD DURING MANUFACTURING.

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

INVENIR TECH SYSTEMS PVT. LTD. 6, PARKSIDE ROAD, KOLKATA - 700 026	CLIENT. SHAPOORJI PALLONJI & CO. LTD.		NAME	DATE	DRG. NO.
	CONSULTANT:– CES	DES.	C.ROY	30.09.15	SJE/INV/SHP/130/15-16/02
	TITLE.– GA FOR 130 KLD STP	DRN.	PRABIR	30.09.15	
		CKD.	C.ROY	30.09.15	SHEET 1 OF 1

REV. 1

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	SINGLE LINE DIAGRAM OF MCC PANEL	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 24 OF 24	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

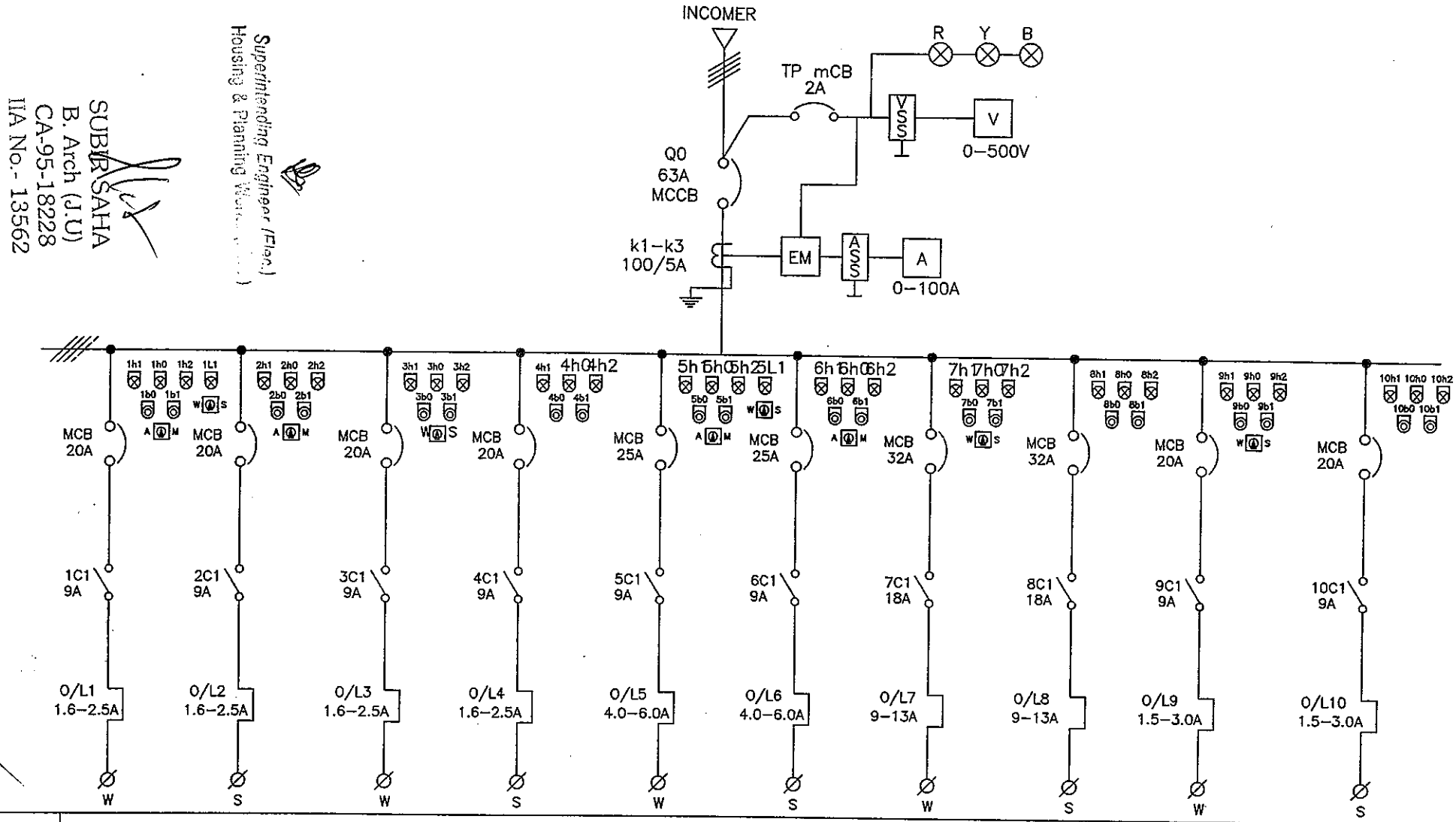
SUPPLIER DOCUMENT NO. : 006

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 1[illegible]

INVENIR TECH SYSTEMS PVT. LTD. KOL-26



RATING	1HP	1HP	1HP	1HP	3HP	3HP	7.5HP	7.5HP	1.5HP	1.5HP
FED. NAME	TRANSFER PUMP–1	TRANSFER PUMP–2	SLUDGE PUMP PUMP–1	SLUDGE PUMP PUMP–2	FILTER FEED PUMP–1	FILTER FEED PUMP–2	AIR BLOWER–1	AIR BLOWER–2	FILTER PRESS FEED PUMP–1	FILTER PRESS FEED PUMP–2
FED. NO.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

Superintending Engineer (Elec.)
Housing & Planning

INVENIR TECH SYSTEMS PVT. LTD.
6, PARKSIDE ROAD, KOLKATA – 700 026

CLIENT. SHAPOORJI PALLONJI & CO. LTD.
CONSULTANT:– CES
TITLE. SLD FOR 130 KLD STP

	NAME	DATE
DES.	C.ROY	30.09.15
DRN.	PRABIR	30.09.15
CKD.	C.ROY	30.09.15

DRG.NO. SJE/INV/SHP/130/15–16/01
SHEET 1 OF 2
REV. 0

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	SCHEMATIC FLOW DIAGRAM OF S.T.P	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 25 OF 25	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : 007

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

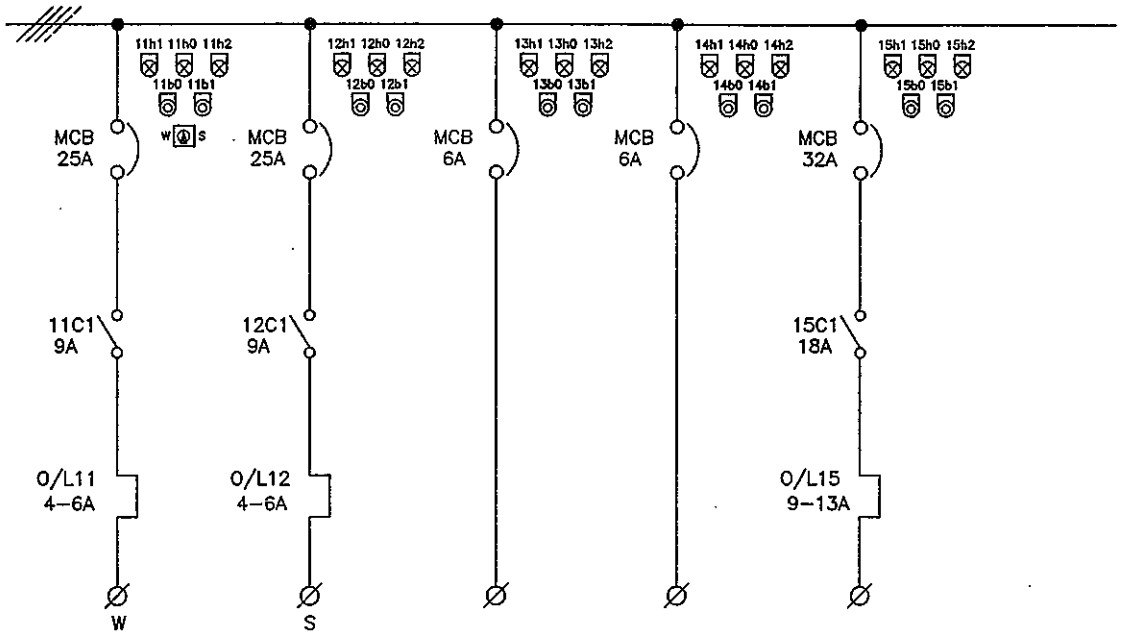
Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13569

INVENIR TECH SYSTEMS PVT. LTD.

Superintending Engineer (Elec.)
Housing & Planning Works (E...)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562



RATING	2HP	2HP	240 WATTS	240 WATTS	7.5HP
FED. NAME	IRRIGATION WATER PUMP-1	IRRIGATION WATER PUMP-2	LIGHTING	DOSING PUMP	SPARE FEEDER
FED. NO.	11.	12.	13.	14.	15.

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

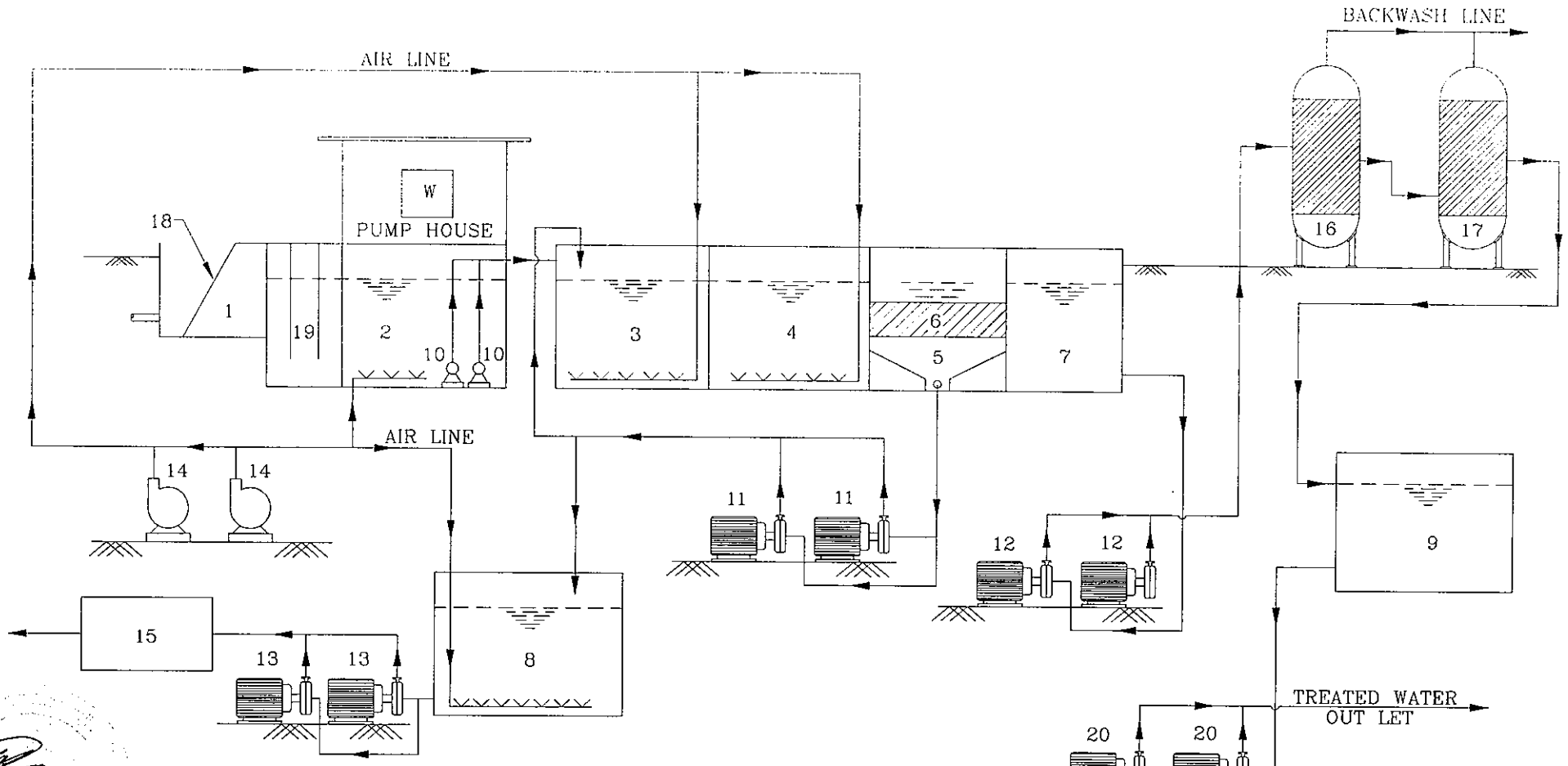
INVENIR TECH SYSTEMS PVT. LTD.
6, PARKSIDE ROAD, KOLKATA – 700 026

CLIENT. SHAPOORJI PALLONJI & CO. LTD.
CONSULTANT:- CES
TITLE. SLD FOR 130 KLD STP

	NAME	DATE
DES.	C.ROY	30.09.15
DRN.	PRABIR	30.09.15
CKD.	C.ROY	30.09.15

DRG.NO. SJE/INV/SHP/130/15-1601
SHEET 2 OF 2

REV. 0



LEGENDA

1. BAR SREEN CHAMBER
2. EQULIZATION TANK
3. FAB–1
4. FAB–2
5. TUBE SETTLER
6. TUBE PACK MEDIA
7. FILTER FEED TANK
8. SLUDGE HOLDING TANK
9. TRAETED WATER TANK
10. TRANSFER PUMP
11. SLUDGE RECIRCULATION PUMP
12. FILTER FEED PUMP
13. FILTER PRESS FEED PUMP
14. AIR BLOWER
15. FILTER PRESS
16. PRESSURE SAND FILTER
17. ACTIVATED CARBON FILTER
18. BAR SCREEN
19. OIL & GREASE TRAP
20. IRRIGATION WATER PUMP

Superintending Engineer (Elec.)
Housing & Planning Works (PWD)

SUBIR SAHA
B. Arch (J.U)
CA-95-18228
IIA No.- 13562

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

INVENIR TECH SYSTEMS PVT. LTD. 6, PARKSIDE ROAD, KOLKATA - 700 026	CLIENT. SHAPOORJI PALLONJI & CO. LTD.		NAME DATE	DRG. NO. / REV.
	CONSULTANT:– CES	DES.	C.ROY 30.09.15	SP–STP–130KLD–007
	TITLE.– SCHEMATIC FLOW DIAGRAM OF STP	DRN.	PRABIR 30.09.15	
		CKD.	C.ROY 30.09.15	SHEET 1 OF 1 / 0

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	LAYOUT DIAGRAM OF S.T.P	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026

Document No.:	SP-STP-130KLD-004	Project No. : C3825	Page – 26 OF 26	Rev.:	0

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

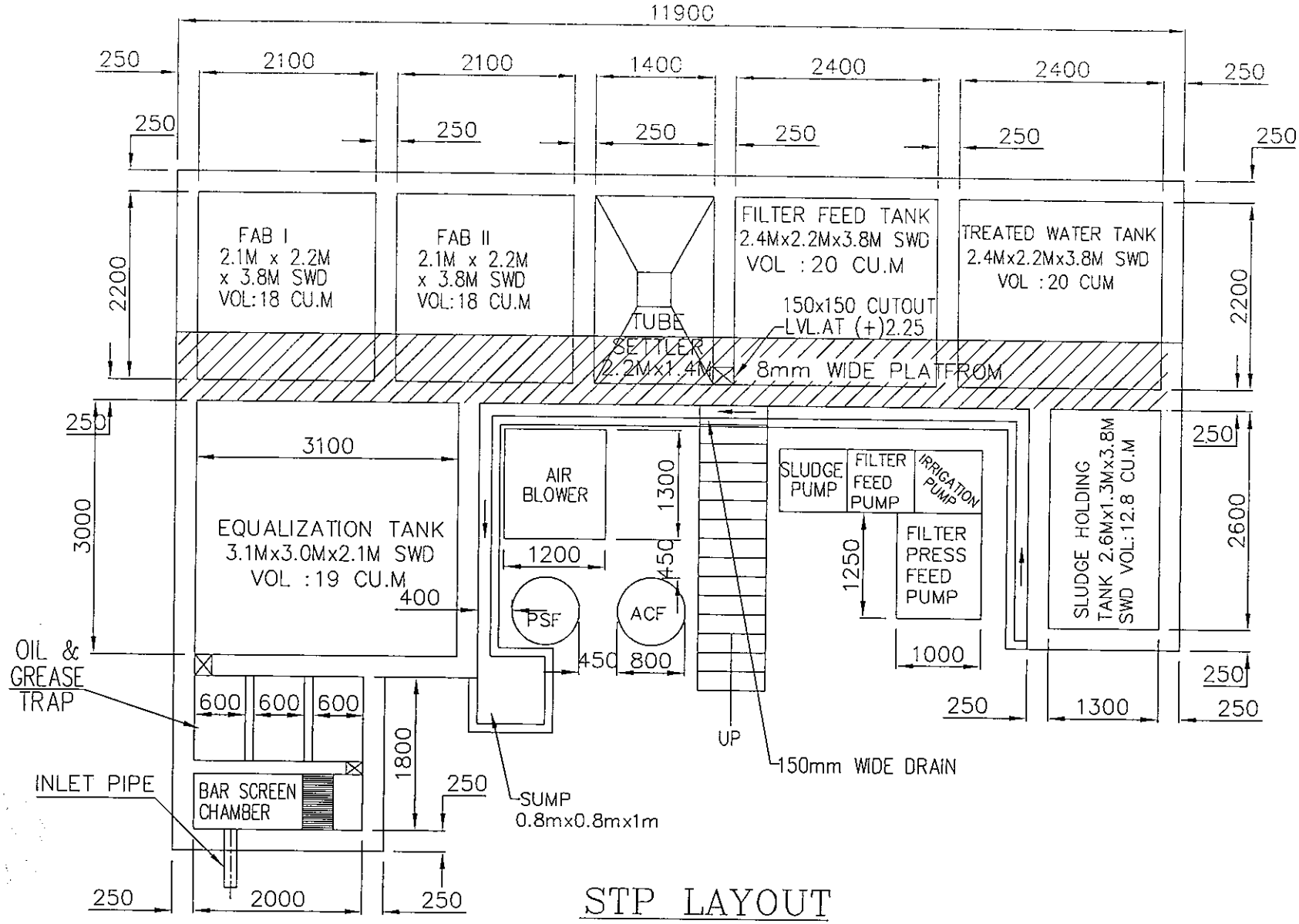
SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : 008

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOLKATA



STP LAYOUT

INVENIR TECH SYSTEMS PVT. LTD. ★ KOL-26

INVENIR TECH SYSTEMS PVT. LTD. 6, PARKSIDE ROAD, KOLKATA - 700 026	CLIENT. SHAPOORJI PALLONJI & CO. LTD.		NAME	DATE	DRG. NO. / REV.
	CONSULTANT:- CES	DES.	C.ROY	30.09.15	SP-STP-130KLD-008
	TITLE.- LAYOUT DRAWING OF STP	DRN.	PRABIR	30.09.15	
		CKD.	C.ROY	30.09.15	SHEET 1 OF 1 / 1

SHAPOORJI PALLONJI & CO. PVT. LTD. DESIGN & BUILD DIVISION CONTRACTOR BUILDING, IST FLOOR, RAMJIBHAI KAMANI MARG, BALLARD ESTATE MUMBAI – 400 038	GA & CROSS-SECTIONAL DRAWING OF S.T.P	INVENIR TECH SYSTEMS PV T. LTD. 6, PARKSIDE ROAD, DESAPRIYA PARK KOLKATA – 700 026			
Document No.:	**SP-STP-130KLD-004**	**Project No. : C3825**	**Page – 27 OF 27**	**Rev.:**	**0**

PROJECT NAME : PROPOSED 9 STORIED TERTIARY HEALTHCARE HOSPITAL AT MALBAZAR, WEST BENGAL

PRINCIPAL CONSULTANT : CONSULTING ENGINEER SERVICES (INDIA) PVT. LTD., KOLKATA

EPCC CONTRACTOR : SHAPOORJI PALLONJI & CO. PVT. LTD.

SUPPLIER : INVENIR TECH SYSTEMS PVT. LTD.

SUPPLIER PROJECT NO. : C3825

SUPPLIER DOCUMENT NO. : 009

0	09.10.15	ISSUED FOR APPROVAL	DB		
Rev. No.	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

INVENIR TECH SYSTEMS PVT. LTD. KOL-26

SECTION–IV
FORM-2911

Issued to (Bidder): ……
Postal Address with Contact No. & e-mail ……..

Price – Free of Cost

West Bengal Form No. 2911
Applicable For Works of value up to Rs 25 (Twenty Five) Crore

Tender No.- WBMSCL/NIQ-55/2022 Date- 17/02/2022

TENDER AND CONTRACT FOR WORKS
GENERAL RULES AND DIRECTIONS FOR GUIDANCE OF BIDDERS/CONTRACTORS

(A) Applicable for off-line tenders up to Tender Value of Rs. 5.0lakh

1. All work proposed for execution by contract will be notified in the form of invitation to tender posted in concerned departmental website, e-procurement portal of the Government of West Bengal (https://wbtenders.gov.in) and to be published in local news paper for wide circulation also in the notice boards at public places signed by the Tender Inviting Authority.

This form will state the work to be carried out, the date for submitting and opening of tenders as well as the time allowed for carrying out the work; also the amount of earnest money to be deposited with the tender, the amount of security deposit to be deposited by the successful bidder and the percentage, if any, to be deducted from bills. Copies of the specification, design & drawings and other documents required in connection with the work, signed for the purpose of identification by the Authority inviting Tender shall also be open for inspection by the contractor at the office of the Tender Inviting Authority during Office hours.

2. In the event of the tender being submitted by a firm, it must be signed separately by each member thereof, or, in the event of absence of any of the partners, it must be signed on his/her behalf by a person holding a Power-of-Attorney authorizing him/her to do so. Such power-of-attorney is to be produced with the tender, and in the case of a firm carried on by one member of a joint family; it must disclose that the firm is duly registered under the Indian Partnership Act.

3. Acceptance of measurements entered and bills raised on account of a work, when executed by a firm, must also be signed by the several partners, except where the contractors are described in their tender as a firm in which case the receipts must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipt for the firm.

4. Any person who submits a tender shall fill up the usual printed form, stating at what rate he or she is willing to undertake the work. Tenders which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each. Tenders shall have the name and number of the work to which they refer, written outside the sealed envelopes.

5. The Tender Inviting Authority or his/her duly authorized representative will open tenders in presence of intending contractors/bidders who may be present at the time, and

will enter the bid amounts as percentage rates above or below or at par of the tender BOQ of several tenders in a comparative statement in a suitable form. In the event of a tender being accepted, a receipt shall thereupon be given to the contractor/bidder who shall thereupon for the purpose of identification, sign copies of specifications and other documents mentioned in the Rules. In the event of a tender being rejected, the earnest money with such unaccepted tender shall be refunded within 10 days from the date on which the tender is decided, provided the contractor(s) present himself/herself before the Tender Inviting Authority to take the earnest money refund.

6. The accepting authority reserves the right to reject any or all of the tenders without assigning any reasons to the participating bidders and he/she will not be bound to accept either the lowest tenderor any of the other tenders.

7. Receipt of an accountant or clerk for any money paid by the contractor/bidder will not be considered as an acknowledgement of payment to the Tender Inviting Authority and the contractor shall be responsible for ensuring that he/she procures a receipt signed by the Tender Inviting Authority, or a duly authorized representative.

8. The Memorandum of work tendered for, and the schedule of materials to be supplied by the executing Department at their supply/issue rates, shall be filled in and completed in the office of the Tender Inviting Authority before the tender form is issued. If a form is issued to an intending bidder/contractor without having been so filled in and completed, he/she shall request the office to have this done before he/she completes and delivers his/her tender.

(B) Applicable for <u>e-tenders</u> of value above Rs. 5.0Lakh

1. All works of tender value above Rs. 5.00 lakh proposed for execution through this contract document are to be notified and published in the form of notice inviting e-tender (e-NIT) in the designated official tender website of Government of West Bengal having URL https://wbtenders.gov.in, and uploaded simultaneously in the URL of concerned Department inviting Tenders. Thus the tender may be seen and downloaded by logging into the "e-procurement" link provided therein, digitally signed by the concerned Tender Inviting Authority and its corresponding abridged notice also published on the same date in the print media.

2. This e-Notice Inviting Tender (e-NIT) will state the work to be carried out, the date for encrypting (submitting) and decrypting (opening) of e-tenders, the time allowed for carrying out the work; amount of earnest money to be deposited with the e-tender; procedure for submission of EMD, amount of security to be furnished by the successful bidder/contractor, security/ performance security to be deducted from running account bills, copies of specifications, Bill of Quantities, design and drawings and any other document required in connection with the work, digitally signed for the purpose of identification by the Tender Inviting Authority.

3. Intending contractors/bidders are required to download the e-tender documents directly from the website stated above. Tender is required to be submitted online by the intending bidders by authorized e-Tokens provided as DSC. This is the only mode of e-submission of tender and document(s). All information posted in the website consisting of e-NIT, WB Form No. 2911, Tender Bill of Quantities (BOQ), corrigenda notices and drawings etc., if any, shall form part of the Contract. Details of procedure of submission have been explained under "General Terms & Conditions" and Annexure attached with the notice of e-tender (e-NIT).

4. All the documents uploaded by the Tender Inviting Authority forms an integral part of the tender contract/agreement. Contractors/bidders are required to upload the entire set of tender documents along with other related documents as asked for in the e-tender through the above website(s) within the stipulated date and time as given in the e-NIT. Tenders are to be submitted in two folders at a time for each work, one being the 'Technical Bid' and the other 'Financial Bid'. The contractor/ bidder shall carefully go through all the documents and prepare to upload the scanned documents in Portable Document Format (PDF) in the designated link in the web portal as their Technical Bid. He/she needs to fill up the rates of items/percentage in the BOQ downloaded for the work in the designated cell and upload the same again in the designated link in the portal as their Financial Bid. Documents uploaded are virus scanned and digitally signed using the Digital Signature Certificate (DSC). Contractors/bidders should especially take note of all

the addenda and corrigenda related to the e-tender and upload all of these documents also as apart of their tender document.

5. Documents uploaded by the contractors/bidders with all information & rates comprising Technical and Financial bids cannot be changed after last/end date for submission of thee-tender.

6. Deed of Consortium/Partnership Firm, and documents of their registration in the form of certified copy of 'Form No. VIII,' issued under the Indian Partnership Act, 1932 (Act-IX of 1932), GST, & PAN (Permanent Account Number) as per RBI guidelines/above Rs. 50,000/- may be compulsorily furnished for all contracts and all other statutory clearances defined in thee-NIT.

7. The tender evaluation and accepting authorities reserve the right to reject any or all of the tenders without assigning any reasons and he/she will not be bound to accept either the lowest tender or any of the tenders.

8. Withdrawal of e-Tender once the bid has been submitted online and after passing of end date for submission which has been accepted for further processing is not allowed. EMD will be forfeited by the Government and the bidder/contractor penalized in terms of provisions in the notice of the tender.

9. Generally Bids will be valid for 120 days from the date of opening of the financial proposal. However, extension of bid validity may be suitably considered by the Tender Inviting Authority, if required, subject to obtaining a written confirmation of the contractor/bidder(s) to that effect.

TENDER FOR WORKS

I/We on behalf of the Governor hereby tender for the execution of the work specified in the underwritten "Memorandum" within the time specified in such " Memorandum" at the rates specified therein, and in accordance, in all respects within the Rules contained in clauses hereinafter, in all of the annexed General Conditions of Contract (GCC), Special Conditions of Contract (SCC) and with such other materials as are provided for, by and in all other respects in accordance and with such conditions so far as applicable.

MEMORANDUM

(a) General description of work.....

(a) If several sub-works are included, they should be detailed in a separatelist

(b) Estimated cost put to Tender ... Rs

(c) Earnest Money Deposit ... Rs.

(d) Security Deposit (including earnest money) .....Rs

(e) Percentage, if any, to be deducted from bill..... Rs .....
(Rupees.....
Percentage.....)

(f) Time allowed for the work from date of written order to Commence .....calendar months.

For offline tender during submission of bid and during execution of Agreement for online tender

Name of Work Tendered	Amount Put to Tender	Rate Quoted by the Bidder (% above or less or at par)	Tendered Amount (Contract Price both in words & figures)

Should this Tender be accepted, I/we hereby agree to abide by and fulfill all of the terms and provisions of the said conditions of contract annexed hereto so far as applicable, or in default thereof to forfeit and pay to the Governor or his/ her successions in office, the sums of money mentioned in the said conditions.

**Give particulars and numbers*

Strikeout (a) or (b) as applicable.

A sum of Rs ..... * has been furnished through online net banking/RTGS/NEFT transfer as earnest money deposit [(a) the full value of which is to be absolutely forfeited to the Governor or his/her successors in office, without prejudice to any other rights or remedies of the said Governor or his successors in office. Should I/we not deposit the full amount of security specified in the above 'Memorandum' in accordance with clause I(A) of the said conditions of contract, the said sum of Rs ..... shall be retained by the Government as on account of such security as aforesaid:(b) the full value of which shall be retained by Government on account of the security deposit specified in clause I (B) of the said conditions of contract].

T Signature of Contractor before submission of tender

X Signature of Witness to Contractor's signature

Dated the Day of 20

X T

(Witness)
Address
Occupation

XX Signature of the Executive Engineer/AE on behalf of the Department.

The above tender is here by accepted by me for and on behalf of the Governor of the State of West Bengal

XX

Dated the_____Day of_____(Month)_____(Year)

GENERAL CONDITIONS OF CONTRACT

Clause 1 1.1 Earnest Money - The person/persons who intend to participate in the Tender for an Estimated Amount up to Rs. 25 (Twenty Five) Crore shall have to deposit Earnest Money @ 2% (Two percent) of the Estimated Amount put to Tender or Rs 10 Lakh, whichever is lower.

In case of offline tender earnest money is to be submitted in the form of Bank Draft or Bankers Cheque.

In case of Online Tender (e-Tender) earnest money is to be deposited through e-tender portal (https://wbtenders.gov.in**)** by selecting from either of the following payment modes:

i) Net banking (any of the banks listed in the ICICI Bank Payment gateway) in case of payment through ICICI Bank Payment Gateway.
ii) RTGS/NEFT in case of offline payment through bank account in any Bank with his/her tender/quotation as per Memorandum No. 3975-F(Y) dated: - 28.07.2016 of Secretary to the Government of West Bengal, Finance Department. The L1 bidder shall make the Formal Agreement after getting the Letter of Acceptance (LOA) issued by the Tender Accepting Authority. Failure to make the Formal Agreement within the time period as prescribed in the Letter of Acceptance (LOA) for the purpose, may be construed as an attempt to disturb the tendering process and will be dealt with accordingly in a legal manner as deemed fit including black listing the bidder.

1.2 Security Deposit - While making any payment to the person(s) whose tender has been accepted (hereinafter shall be called the contractor) for work done under the contract, the authority making payment shall deduct such sum which together with the Earnest Money already deposited and converted into security deposit, shall amount to 10% of the value of works executed at the material point of time and paid during the progressive running accounts bills, so that total deduction together with

Earnest Money constitute 10% of the tendered value of work actually done.

In case of excess/and supplementary work over the tendered amount, additional security @ of 10% of such additional amount is to be deposited for all such excess/ and supplementary works beyond the tendered amount before payment of final bill.

Compensation of all other sums of money payable by the contractor to the Government under the terms of the contract may be deducted from the security deposit.

However, even though the earnest money deposited exceeds the prescribed percentage, due to reduction of tendered amount due to any reason whatsoever, such additional earnest money shall be deemed to have been converted into security and further deductions from progressive bills shall be made, taking into consideration the enhanced component of earnest money so converted into security.

Security deduction will not normally be required for hiring of inspection vehicles and boats etc., supply of tools & plants, furniture and computer peripherals. Separate agreement may be required in those cases, particularly for consultancy and RFP for EPC, which shall be made in standard formats to be approved by the Government.

After completion of the work, the Contractor may opt for refund of the Security Deposit by replacing equal amount of Bank Guarantee of scheduled Bank valid up to 3 months beyond the defect liability period.

Additional Performance Security @ 10% of the tendered amount in the form of Bank Guarantee from a Scheduled Bank, valid up to the date of completion of work, shall be obtained from the successful bidder, if the accepted bid value is 80% or less than the estimated amount put to tender.

If the bidder fails to submit Additional Performance Security within 7 (seven) working days from the date of LoA or the time period as approved by the Tender inviting Authority, his Earnest Money will be forfeited.

If the bidder fails to complete the works successfully, the Additional Performance Security along with Security Deposit lying with the Government shall be forfeited at any time during the pendency of contract period as per relevant Clauses of the Contract.

Necessary provisions regarding deductions of Security Deposit from the progressive bills of the Contractor as per relevant clauses of the contract will in no way be affected/ altered by this Additional Performance Security.

Compensation for delay

Clause 2. The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date on which the order to commence work is given to the contractor. The work shall throughout the stipulated period of the contract be proceeded with all due diligence. Time being deemed to be the essence of the contract on the part of the contractor, the contractor shall be bound in all cases, to achieve the 'Milestones' as defined under Clause 5 and specified in the NIT into various 'Identifiable and quantifiable construction related stages' pertaining to the work. In the event of the contractor failing to comply with any of the conditions related to achieving the 'Milestones' within the specified time period prescribed for such 'Milestone' plus one month, he/she shall be liable to pay compensation.

If the contractor fails to commence and/or maintain required progress viz. Milestones defined in the Notice Inviting Tender over the total time allotted for its full completion and in terms of clause 5 or fails to complete the work and clear the site on or before the end of contract period or extended date of completion, he/she shall, without prejudice to any other right or remedy available under the law on account of such breach, pay as agreed compensation to the implementing Department.

This will also apply to items or group of items for which a separate period of completion has been specified.

Compensation for delay of work: @ 2% (Two percent) of the tendered value of work arrived for each month of delay to be computed on per day basis subject to the ceiling limit of security deposit already withheld or due to be withheld during imposition of the said clause and minimum payable compensation equivalent to the Earnest Money deposited(EMD).

Provided always, that the total amount of compensation for delay, to be paid under this clause shall not exceed 10% of the tendered value of work or the tendered value of the item or group of items of the work, for which a separate period of completion is originally given.

Action when whole of security deposit is forfeited

The amount of compensation may be adjusted or set-off against any sum payable to the contractor under this contract, if the contractor catches up with the progress of work subsequently, part or full of the desired progress as per the contract in accordance with the decision of the Tender Accepting Authority, under powers delegated by Government to be communicated by the Engineer-in-Charge, the withheld amount shall be released. However, no interest, what so ever, shall be payable on such with held amount.

Force majeure :-If the work(s) be delayed for the following reasons:-
Due to war, internal emergency and other conditions such as abnormally bad weather, flood, cyclone natural calamity or serious loss or damage by fire or civil commotion, the contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his/her best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer- in-charge to proceed with the works.

Contractor remains liable to pay compensation, if action is not taken under Clause3

Clause 3. Subject to other provisions contained in this clause, the Engineer-in-charge with the prior approval of Tender Accepting Authority, may, without prejudice to his/her any other rights, remedy against the Contractor in respect of any delay, inferior workmanship, any claims for damages and/or any other provision of the contract or otherwise, and whether the date of completion has or has not been elapsed, by notice in writing, absolutely determine the contract in any of the following cases:

(i) If the Contractor has been given by the Engineer-in-Charge a notice in writing to rectify, reconstruct or replace any defective work or that work is being performed in an inefficient or otherwise improper or un-workman like manner, shall omit to comply with the requirements of such notice for a period of seven days thereafter;

(ii) If the Contractor has without reasonable cause suspended the progress of work, or has failed to proceed with the work with due diligence so that, in the opinion of the Engineer-in-Charge he/she will be unable to secure completion of the work by the schedule date for completion, and continues to do so after a notice of seven days in writing from the Engineer-in-charge;

(iii) If the Contractor fails to complete the work within the stipulated date or the Milestones/items of work within individual dates of completion, if any, stipulated on or before such date(s) of completion and does not complete them or reach the defined Milestones within the period specified in the notice given in writing to that effect by the Engineer-in-charge;

(iv) If the Contractor persistently neglects to carry out his/her obligations under the contract and/or commits default by not complying with any of the terms & conditions of the contract and does not remedy it, or take effective steps to remedy it, within seven days after a notice in writing is given to him/her to that effect by the Engineer-in-Charge;

(v) If the Contractor being an individual, or a firm, or any partner thereof, shall at any time be adjudged insolvent or have a 'Receiving Order' or Order for administration of his/her Estate made against him/her, or take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force, or make any conveyance or assignment of his/her effects or composition or arrangement for the benefit of his/her creditor or purport to do so, or if any application be made under Insolvency Act for the time being in force for the sequestration of his/her Estate, or if a trust deed is executed by him/her for benefit of his/her creditors;

(vi) If the Contractor being a Company pass a resolution or the court delivers an order of judgement that the Company shall be wound up, or if a receiver or a manager on behalf of a creditor be appointed, or if a circumstance arise which entitle the Court or the creditor to appoint a receiver or a manager or which entitle the court to issue a winding up order;

(vii) If the Contractor shall suffer an execution order being levied on his/her goods and allow sitto be continued for a period of 21 days;

(viii) If the Contractor assigns without prior written approval of the Tender Accepting

Authority, transfers, sublets (engagement of labour on piece work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire work or any portion thereof without prior written approval of the Engineer–in–charge;

(ix) AND THEREFORE, the Contractor has made himself/herself liable for action under any of the cases aforesaid, the Engineer-in-charge on behalf of the Government with the prior approval of Tender Accepting Authority, shall have the powers to adopt any of the following actions, as he/she may deem best suited to the interest of the Government:-

(a) To determine the contract as aforesaid, of which rescission notice in writing and costs to be recovered for works since executed subject to a minimum of the amount of Earnest Money deposited by the Contractor under the hand of Engineer-in-charge, shall be the conclusive evidence. Upon such determination, the Earnest Money Deposit, Security Deposit already recovered for executed works and performance guarantee, if any under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Government.

(b) After giving notice to the Contractor to measure up the work executed and to take such whole or the balance or part thereof, as shall be un-executed out of his/her hands, and to give it to another Contractor to complete the balance work. The Contractor, whose contract is determined or rescinded as above, shall not be allowed to participate in the tendering process for the balance work.

(c) To employ labour paid by the implementing Department, and to supply materials, to carry out the works or any part of the work, debarring the contract or and debiting the cost of labour and price of materials (of the amount of which cost and price determined by certificate of the Engineer-in-Charge shall be final and conclusive against the contractor) and crediting him/her with the value of the work done, in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his/her contract; the certificate of the Executive Engineer as to the value of the work done shall be final and conclusive against the contractor.

Contractors remains liable to pay compensation if action not taken under Clause 3

In the event of above course being adopted by the Engineer-in-charge, the Contractor shall have no claim of compensation for any loss sustained by him/her by reason of his/her having purchased or procured any material or entered into any engagement or made any advances on any account or with a view to execute the work or the performance of the contract. In case, action is taken under any of the provisions aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof actually performed under this contract, unless and until the Engineer-in-charge has certified in writing that the performance of such work and value payable in respect thereof, and he/she shall only been titled to be paid the value so certified.

Clause 3A. In case, the work cannot be started due to reasons not within the control of the Contractor within 1/4th (one fourth) of the stipulated time for completion of the work or 45 days whichever is less, which is accepted as a valid & justified reason by the Tender Accepting Authority, either party viz. Contractor &the Engineer-in-Charge may close the contract with the approval of Tender Accepting Authority. In such an eventuality, the earnest money deposited and the security of the contractor shall be refunded, but no payment on account of interests, loss of profit or damages etc. shall be payable at all.

Clause 3B. In case a continuing work cannot be completed due to reasons beyond the control of the contractor, like Force Majeure enumerated later under Clause 5, the contract may be terminated as stated in clause 3A above by the Engineer-in-Charge with the consent of the contractor and approval of the Tender Accepting Authority.

Clause 4. In cases in which any of the powers conferred upon the Engineer-in- Charge under Clause3 here of shall have become exercisable and the same had not

Power to take possession of or require removal of or sell Contractor's plant

been previously exercised, non-exercising thereof shall not constitute as a waiver of any of the conditions hereto, and such powers shall, notwithstanding be exercisable in the event of any future case of default by the contractor, for which by any clause or clauses hereof, he/she is declared liable to pay compensation amounting to whole of his/her security deposit, and the liability of the contractor for past and future compensation shall remain unaffected. In the event of the Engineer-in-Charge putting in force either of the powers under ix (a) or (c) vested with him/her under the preceding clause, he/she may if he/she so desires, take possession of all or any tools & plant, materials and stores, in or upon the work, or the site thereof, or belonging to the contractor, or procured by him/her and intended to be used for execution of the work, or any part thereof, paying or allowing for the same in account at the contract rates or in case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge whose certificate thereof, shall be final and binding. Otherwise, the Engineer-in-Charge may deliver notice in writing to the contractor or his/her clerk, foreman or other authorized agent, requiring him/her to remove such tools & plant, materials or stores from the premises within a time to be specified in such notice; and in the event of the contractor failing to comply with any such requisition, the Engineer-in- Charge may remove them at the contractor's expense or sale them by p u b l i c auction or private sale on account of the contractor and at his/her risk, in all respects, and the certificate of the Engineer-in-Charge as to the expense of any such removal, and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

Clause 5. The time allowed for execution of a work as specified in the 'Schedule of Work' or in the extended time in accordance with the terms and conditions shall be the essence of the contract. Execution of work shall commence from such time period as mentioned in the said schedule, or from the date of handing over of the site to the contractor whichever is later. If the contractor commits default in commencing execution of the work as aforesaid within thirty days, without justifiable reasons included under Force Majeure or other such reasons beyond the control of the contractor, in which case to be reported within seven days by the contractor, considered valid and cogent by the Engineer-in-Charge, the Engineer-in-Charge shall after passing of thirty days from the date of scheduled commencement of work as per work order, with the prior approval of the Tender Accepting Authority, without prejudice to any other right to remedy available in law, be at liberty to apply clause 2 and subsequently clause 3 of the tender document.

As soon as possible after the contract is executed, signed and agreed, the contractor shall submit a 'Time and Progress Chart' for each broad activity (Milestone) and get it approved by the Engineer-in-Charge. The chart shall be prepared in direct relation to the time slated in the Notice Inviting Tender (NIT) document, for completion of items or group of items of the work. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work. This may be amended, as necessary, by an agreement between the Engineer-in-Charge and the contractor within the limitations of time imposed in the NIT document. Further, to ensure good progress during execution of work, the contractor shall in all cases, in which the time allowed for any work exceeds one month (save and except for special jobs for which a separate programme has been agreed upon) to complete the work as per defined 'Milestones' given in such 'Schedule of Work' defined clearly in the NIT itself into various 'Identifiable and quantifiable construction related stages' related with the type and nature of work, and that the 'total time allowed for completion of work' is to be broken up against achievement of those stages during the construction / progress of work to ensure a periodic monitoring of progress and enable the contractor and the Engineer-in-Charge to take corrective measures from time to time.

If the work(s) be delayed by:

Force majeure, due to war, internal emergency and other conditions such as abnormally bad weather, flood, cyclone natural calamity or serious loss or damage by fire or civil commotion, strike or lockout affecting procurement of construction materials or any of the trades employed in the work, or any other cause which in the absolute discretion of the Engineer-in-Charge is beyond the contractor's control, then upon happening of any such event causing delay, the

contractor shall immediately give notice in writing to the Engineer-in-Charge but shall nevertheless use constantly his/her best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.

Request for rescheduling of 'Milestones' of various activities and extension of time, to be eligible for consideration, shall be made by the contractor in writing within fourteen days of the happening of the event causing delay in the prescribed form. The contractor may also, if practicable, indicate in such a request the period for which extension is desired.

If any such case the Engineer-in-Charge, with the approval of Tender Accepting Authority, may give a fair and reasonable extension of time and reschedule the activity wise 'Milestones' for completion of the work. Such extension shall be communicated to the contractor by the Engineer-in-Charge with the approval of Tender Accepting Authority in writing within maximum 1 (one) month of the date of receipt of such request.

Final Certificate

Clause 6. On completion of work, the contractor shall be furnished with a certificate by the Engineer-in-Charge of such completion, but no such certificate shall be given, nor shall the work be considered to be completed until and unless the contractor shall have removed from the work premises on which the work is executed, all scaffolding, surplus materials and rubbish, and cleaned off the dirt from wood works, doors, windows, floors, or other parts of any building, upon or about which the work is executed, or of which he may have had possession for the purpose of the execution thereof, nor until the work shall have been measured by the Engineer-in-charge whose measurements shall be binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding, surplus materials and rubbish and cleaning off dirt on or before the date fixed for completion of the work, the Engineer-in-charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish, and dispose of the same as he/she thinks fit, and clean off such dirt as aforesaid; and the contractor shall forthwith be bound to pay the amount of all expense so incurred, and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid, except for any sum actually realized by the sale thereof.

Payment on inter- mediate certificates to be regarded asadvances

Clause 7. No running account bill payment shall be normally made for works less than 30 (Thirty) percent of Tendered Value or up to Rs 25.00 lakh, whichever is less, till after the whole of the work shall have been completed and certificate of completion given. For works of tendered value above Rs 25.00 lakh, for running account bill payment, the contractor shall on submitting a bill of at least Rs 25.00 lakh there for, be entitled to receive a payment proportionate to the part thereof, approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor. But all such intermediate payments shall be regarded as payments by way of advance against the final measured bill payment only and not as payments for work actually done and completed, and shall not preclude the bad, unsound, and imperfect or unskillful work which is to be removed and taken away and reconstructed, or re-erected or to be considered as an admission of the due performance of the contract, or any part thereof, in any respect, or the accruing of any claim, nor shall it conclude, determine or affect in any way the powers of the Engineer-in-charge under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on all parties.

Bills to be submitted monthly

Clause 8. W o r k s bill shall be submitted by the contractor each month, after fulfilling above clause, on or before the date fixed by the Engineer-in-charge, for all works executed during the previous month, and the Engineer-in-charge shall take or cause to take the requisite measurement for the purpose of having the same verified, and the claim as far as admissible adjusted, if possible, before the expiry of fourteen days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, the Engineer-in-charge may depute a Junior Engineer to measure up the said

work in presence of the contractor, whose countersignature in the measurement book will be sufficient warrant; and the Engineer-in-charge may prepare a bill from such list which shall be binding on the contract or in all respects.

Within 10 (Ten) days of completion of work, the contractor shall give notice of such completion to the Engineer-in-charge and within 14 (Fourteen) days of receipt of such notice, the Engineer-in-charge shall inspect the work, and if there is no defect in the work, he/she shall furnish to the contractor a final certificate of completion. Otherwise, a provisional certificate of physical completion indicating defects (a) to be rectified by the Contractor and/or (b) for which payment will be made at reduced rates, shall be issued. Such reduced rate is to be imposed with the approval of Superintending Engineer concerned.

Clause 8A. When annual repair and maintenance work is carried out, the splashes and droppings from white washing, colour washing, painting etc., on walls, floors, windows shall be removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done without waiting for the actual completion of all the other items of work in the contract. In case, the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge shall have the right to get this work done at the cost of the contractor either Depart mentally or through any other contractor. Before taking such action, the Engineer-in-Charge shall give ten days notice in writing to the contractor.

Clause 8B. The Contractor shall submit completion Plan/Drawing as required in the 'General Specification' for Civil as well as Electrical Works as applicable within 30 days of completion of the work.

Clause 9. The Contractor shall submit all bills in printed forms, as per format prescribed by Government of West Bengal, in the office of the Engineer- in-Charge, and the charges in the bills shall always be entered at the rates specified in tender or in case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender at rates thereinafter provided for such work.

Payments of contractor's bills to Banks

Clause 9A (1) Payments due to the contractor may, if so desired by him/her be made to his bank through e-Pradan, details of which has to be directly furnished to the Engineer- in-charge.

While the online receipt given by such Banks shall constitute a full and sufficient discharge/acquaintance for the payment, the contractor should wherever possible present his/her bills duly receipted and discharged through his/her Banker/s.

(2) In the case of bills, which the contractor presents for payment direct, and which are not endorsed in favour of the Bank, while efforts will be made to secure payment to the financing Bank, payments made to the contractor should be accepted as full acquaintance so far as the Government is concerned. As a part of the arrangement, the financing Bank should give the Government a letter to this effect.

Note1. The procedure will not affect the usual rights of the Government to deduct from contractor's bill, (whether endorsed in favour of a Bank or not) any sum due to Government of account of penalties, over-payments etc., on this or any other contract with the Governor of the State of West Bengal.

Note2. Nothing contained herein shall operate to create in favour of the Bank any rights, claims or equities vis-à-vis the Governor.

Stores supplied by Government

Clause 10. If the specification or estimate of the work provides for use of any special description of material to be supplied by the Engineer-in-Charge, (such materials & stores and the prices to be charged there for as hereinafter mentioned being so far as practicable for the convenience of the contractor, but not so as in any way to control the meaning or effect of this contract specified in the schedule or 'Memorandum' hereto annexed), the contractor shall be supplied with such materials and stores as is required from time to time to be used by him/her for the purpose of the contract only, and the value of the full quantity of materials and stores so supplied at the rates specified in the said schedule or Memorandum may be set off or deducted from any sums then due, or thereafter to become due to the contractor under the contract, or otherwise or against or from the security deposit, or the proceeds of sale thereof; if the same is held in Government securities, the same or a sufficient portion thereof being in this case sold for

the purpose. All materials supplied to the contractor shall remain the absolute property of Government, and shall not on any account be removed from the site of the work, and shall at all times be open for inspection by the Engineer-in-charge. Any such material unused and in perfectly good condition at the time of the completion or determination of the contract shall be returned to the Engineer-in-charge's store, if by a notice in writing under his/her hand, he/she shall so require; but the contractor shall not be entitled to return any such material unless with such consent, and shall have no claim for compensation on account of any such material so supplied to him/her as aforesaid being un used by him, or for any wastage or damage to any such material.

Work to be executed in accordance with specifications, drawings, orders, etc.

Clause 11. The Contractor shall execute the whole and every part of work in the most substantial and workman like manner, and both, as regards to materials and otherwise, in every respect, in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to the design and drawings, and instructions in writing relating to the work signed by the Engineer-in-Charge and lodged in his/her office, to which the contractor shall be entitled to have access at such office, or on the site of the work for the purpose of inspection during office hours, and the contractor shall, if he/she so require, be entitled at his/her own expense to make or cause to be made copies of the specifications, and of all such design, drawings and instructions as aforesaid.

Alteration in specification and designs do not invalidate contract

Clause 12. The Engineer-in-Charge shall have powers to make any alteration in, omission from, addition to, or substitution for, the original specifications, drawings, designs and instructions, that may appear to him/her to be necessary or recommended by Superintending Engineer or the Chief Engineer during the progress of work, and the contractor shall be at all times be bound to carry out these works, in accordance to any instructions which may be given to him/her in writing, signed by the Engineer-in-charge, and such alterations, omissions, additions or substitutions, shall not invalidate the contract but shall be deemed to have formed a part of the work included in the original tender and any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as a part of the work shall be carried out by the contractor on the same conditions in all respects on which he/she agreed to do the main work, and at the same rates, if any, may be specified in the tender for the main work. Time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work bears to the original work contract, and the certificate of the Engineer-in-charge shall be conclusive as to such proportion. And, if the altered, additional or substituted work includes any class of work, for which no rate is specified in the contract, then such class of work shall be carried out at the rates entered in the schedule of rates of concerned Works Department applicable in the district, which was in force at the time of acceptance of the contract, minus/plus the percentage which the total tendered amount bears to the estimated cost of the entire work put to tender; and if the altered, additional or substituted work is not entered in the said schedule of rates, payment thereof shall be made by the Engineer-in-charge by determining the rates on analysis worked out from (a) the basic rates of materials and labour provided in the aforesaid schedule of rates, or (b) the current market rates of materials and labour when even basic rates for the work are not available in the schedule. In cases when such rates are determined on analysis by the Engineer-in-charge under (a) above, the stipulated percentage above or below schedule of rates as provided in the contract shall also apply, and in case of rates worked out on analysis under (b) above, payment shall be made at the rates so determined without application of the said stipulated percentage. In the event of any dispute regarding rates determined on analysis for any altered, additional or substituted work under this clause, the decision of the Superintending Engineer shall be final and binding.

Rates for works not in tender BOQ/SoR

No compensation for alternation in or restriction of work to be carriedout.

Clause 13. If at any time after the commencement of the work the Governor shall for any reason whatsoever not require the whole thereof as specified in the tender to be carried out, the Engineer-in-charge shall give notice in writing of the fact to the contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from execution of the work in full, but which he/she did not derive in consequence of the full amount of the work not having been carried out; neither shall he/she have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated.

Action and compensation payable in case of bad work

Clause 14. If it shall appear to the Engineer-in-charge or his/her subordinate engineer in-charge of the work, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor, for the execution of the work are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, the contractor shall on demand in writing from the Engineer-in-charge specifying the work, materials or articles complained of notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and re-construct the work so specified in whole or in part, as the case may require, or as the case may be remove the materials or articles so specified and provide other proper and suitable materials or articles at his/her own proper charge and cost; and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his/her demand aforesaid, then the contractor shall be liable to pay compensation at the rate of one percent on the amount of the estimate put to tender / on up to date executed work value for every day not exceeding ten days, while his/ her failure to do so shall continue and in the case of any such failure, the Engineer-in-charge may rectify or remove, and re-execute the work or remove and replace with others, the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor.

Work to be open to inspection

Contractor or his/her responsible agent to be present

Clause 15. All work under or in course of execution or executed in pursuance of the contract shall at all times be open to inspection and supervision of the Engineer-in-Charge and all his/her subordinates and also higher Officers / Authority of the Government and the contractor shall at all times during the normal working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his/her subordinates to visit the work site shall have been given to the contractor, either himself/herself be present to receive orders and instructions, or have a responsible agent duly accredited in writing present for that purpose. Orders given to the contractor's agent shall be considered to have the same force as if it had been given to the contract or himself / herself.

Notice to be given before work is covered up

Clause 16. The Contractor shall give, not less than five days notice in writing to the Engineer-in-charge or his/her subordinate in-charge of the work, before covering up or otherwise placing beyond the reach of measurement any work, in order that the same is so covered up or placed beyond the reach of measurement, and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the Engineer-in-charge or his/her subordinate, in-charge of the work; and if any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the contractor's expense, or, in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Contractor liable for damage done and for imperfections for 180 days after certificate

Clause 17. If the Contractor or his/her workers or authorized representatives shall break, deface, injure or destroy any part of the structure in which they may be working or any building, road, road curbs, fence, canals, water pipes, cables, drains, electric or telephone posts or wires, trees, grass or grassland or cultivated ground contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work from any cause whatever or any imperfections become apparent in it at any time, whether during its execution or within a period of six months after issuance of a certificate of its completion by the Engineer-in-Charge, the contractor shall make the same good at his/her own expense, or in default, the Engineer-in-Charge may cause the same to be made good by other workers, and deduct the expenses (of which the certificate of the Engineer-in-Charge shall be final and binding) from any sums, whether under the contract or otherwise, that may be then, or at any time thereafter become due to the contractor by the Government or from his/her security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof, and if the cost in the opinion of the Engineer-in-Charge whose opinion shall be final and conclusive against the contractor, making such damage or imperfections good shall exceed the amount of such security deposit and/or such sums, it shall be lawful for the Government to recover the excess costs from the contractor in accordance with the procedure prescribed by any law for the time being in force.

Clause 17A. The Contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing, assisting in the joint measurement or examination at any time and from time to time of the work or materials. Failing his/her so doing the same may be

provided by the Engineer-in-Charge at the expense of the Contractor and the expenses may be deducted from any money due to the contractor under the contract or from his/her Security Deposit or the proceeds of sales thereof or of a sufficient portion thereof. The Contractor shall also provide all necessary fencing / barricading / providing caution boards etc. and light required to protect the public from accident, and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damage and costs which may be awarded in such suit, actions or proceedings to any such persons or which may with the consent of the Contractor be paid to compromise any claim by any such persons.

Clause 18A. In every case in which by virtue of the provisions under sub-section (1) of Section 12, of the Workmen's Compensation Act, 1923, the implementing Department is obliged to pay compensation to a workman employed by the contractor, in execution of the works. The implementing Department will recover from the Contractor the amount of compensation so paid; and without prejudice to the rights of the Department under sub-section (2) of section 12, of the said Act, implementing Department shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by implementing Department to the Contractor whether under this contract or otherwise. The implementing Department shall not be bound to contest any claim made against it under sub-section (1) Section 12, of the said Act, except on the written request of the contractor and upon his/her giving to the implementing Department full security for all costs for which the Department might become liable in consequence of contesting such claims.

Clause 18B. In every case in which by virtue of the provisions under 'The Contract Labour (Regulation & Abolition) Act 1970', and its amendments and rules, the implementing Department is obliged to pay amount of wages to a workman employed by the Contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and the rules framed by Government from time to time for the protection of health and sanitary arrangements for workers employed by Contractors, executing Department will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the executing Department under sub- section(2) of Section 20, and sub-section (4) of Section 21, of the Contract Labour (Regulation and Abolition) Act, 1970, executing Department shall be at liberty to recover such amount or any part thereof by deducting it form the security deposit or from any sum due by Executing Department to the Contractor whether under this contract or otherwise and the executing Department shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of section 21, of the said Act, except on the written request of the Contactor and upon his/her giving to the implementing Department full security for all costs for which the Department might become liable in contesting such claim.

Clause 19. The Contractor shall obtain a valid license under the Contract Labour (Regulation and Abolition) Act, 1970, before the commencement of the work, and continue to have valid licenses until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986, Fatal Accident Act,1855, Personal Injuries (Compensation Insurance) Act,1970.

The Contractor shall also comply with the provisions of the 'Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996' and 'The Building and Other Construction Workers Welfare Cess Act, 1996'. Failure to fulfill these requirements shall attract penal provisions of the contract, arising out of the resultant non-implementation of such provisions.

Labour

Clause 19A. No labour/s below the age of eighteen years shall be employed in the work and the contractor shall abide by the provisions of the Child Labour (Prohibition & Regulation) Act, 1986. Employment of female labour/s in works in the neighborhoods of sensitive barracks should be avoided as far as possible.

Payment of minimum Wages to Labour

Clause 19B. The Contractor shall pay to labours employed by him/her either directly or through Sub-Contractors, wages not less than fair wages as defined by the Labour Commissioner of the State Government under 'Minimum Wages Act, 1948', Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and

Abolition) Act, 1970, wherever applicable.

The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him/her.

In respect of all labourers directly or indirectly employed in the works for performance of the Contractor's part of the contract, the contractor shall comply with or cause to be complied with the contractor's Labour Regulations made by the State Government/ Government of India, from time to time in regard to payment of wages, wage period, deductions from wages, recovery of wages not paid and deductions made without authority, maintenance of wage books or wage slips, publication of scale of wage and other terms of employment, inspection and submission of periodical returns and all other matters likewise in nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act,1979, Minimum Wages Act,1948, wherever applicable.

a) The Engineer-in-Charge concerned shall have the right to deduct from the money due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his/her/their wages which are not justified by their terms of the contract or non-observance of the regulations.

b) Under the provision of Weekly Holidays Act, 1986, the contractor is bound to allow to the labours, directly or indirectly employed in the work, one day rest for 6 days of continuous work, and pay wages at the same rate as for duty. In the event of default, the Engineer-in-charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labour and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-charge concerned.

The contractor shall also comply with the provisions of the 'Employees Liability Act, 2008', Workmen's Compensation Act and 'Maternity Benefits Act' or the amendments thereof or any other law relating thereto, and the rules made there under from time to time.

The Contractor shall indemnify and keep indemnified the implementing Department against payments to be made under and for the observance of the laws aforesaid and PW Contractor's Labour Regulations without prejudice to this right to claim indemnity from his/her sub-contractors.

The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.

Whatever is the minimum wage for the time being, or if the wage payable is higher than minimum wage, such wage shall be paid by the contractor to the workers directly without the intervention of any Dafadar, and that Dafadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workers as and by way of commission or otherwise.

The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Dafadar from the wage of workers.

Clause 19C. In respect of all labours directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his/her own expenses, arrange for the safety provisions as framed from time to time by the competent authority, and shall at his/her own expense provide all facilities in connection therewith. In case the contractor fails to make arrangement, and fail to provide necessary facilities as aforesaid, he/she shall be liable to pay a penalty of Rs. 2000/- for each default, and in addition the Engineer-in-Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the costs incurred in their behalf, from the contractor.

Clause 19D. For the works above Rs. 2.0 crore, the Contractor shall submit by the 4th and 19th of every month to the Engineer-in-charge, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively-

The number of labourers employed by him/her on the work, their working hours, and the

wages paid to them;

Accidents that had occurred during the said fortnight showing the circumstances under which it had happened, and the extent of damage and injury caused by them, and the number of female workers who have been allowed maternity benefits according to Clause 19F of the contract and the amount paid to them;

Failing which the contractor shall be liable to pay to the Department, a sum not exceeding Rs. 2000/- for each default or materially incorrect statement. The decision of the Engineer-in-charge shall be final in deducting from any bill due to the contractor; the amount levied as fine and would be binding on the contractor.

Clause 19E. In respect of all labours directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be compiled with all the rules framed by the Government from time to time for the protection of health and sanitary arrangements of workers employed by the contractor.

Clause 19F. In the event of the contractor(s) committing a default or breach of any of the provisions of the Contractor's Labour Regulations and Rules for the protection of health and sanitary arrangement for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above Regulations and Rules which is materially incorrect, he/she shall, without prejudice to any other liability, pay to the Department a sum not exceeding Rs. 2000/- for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractors defaulting continuously in this respect, the penalty may be enhanced to Rs. 200/- per day for each day of default subject to a maximum of five per cent of the tendered value. The decision of the Engineer-in-charge shall be final and binding on the parties.

Should it appear to the Engineer-in-charge that the contractor(s) is/are not properly observing and complying to the provisions of the Contractor's Labour Regulations and Rules, The Minimum Wages Act, 1948 and Contract Labour (Regulation and Abolition) Act 1970, for the protection of health and sanitary arrangements for work-people employed by the contractor(s) (hereinafter referred as 'the said Rules') the Engineer-in-charge shall have the power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people within a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and/or observe the said Rules and to provide the amenities to the work-people as aforesaid, the Engineer-in-charge shall have the power to provide the amenities herein before mentioned at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/her own expense and to approved standards all necessary hutments and sanitary arrangements required for his/her/their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-charge shall have power to give notice in writing to the contractor(s) requiring that the said hutments and sanitary arrangements be remodeled and/or reconstruct such hutments and sanitary arrangements according to approved standards, and if the contractor(s) shall fail to remodel or reconstruct such hutments and sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-charge shall have the power to remodel or reconstruct such hutments and sanitary arrangements according to approved standards at the cost of the contractor(s).

Clause 19G. The contractor shall comply with all the provisions of The Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act, 1970, Employees Liability Act, Industrial Dispute Act and Maternity Benefit Act, 1961, as amended from time to time and rules framed there under and other labour laws affecting contract labour that may be brought into force by the appropriate authority from time to time.

Clause 19H. The Engineer-in-charge may require the contractor to remove from the site of work, any person or persons engaged/assigned or employed by the contractors upon the work who may be determined as insane or incompetent or misconducts himself/herself, and the contractor shall forth with comply with such requirements.

Clause 19I. It shall be the responsibility of the contractor to see that the

building/structure under construction is not occupied by anybody unauthorized during construction, and is handed over to the Engineer-in-charge with vacant possession free from encumbrances in entirety, If such buildings/structures through completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building/structure in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay a levy up to 5% of tendered value of work may be imposed by the Engineer-in-charge whose decision shall be final both with regard to the justification and quantum and shall be binding on the contractor.

However, the Engineer-in-charge, through a notice, may require the contractor to remove the illegal occupations, any time on or before construction and delivery.

Work onSundays

Clause 20. No work shall be done on Sundays without the prior sanction of the Engineer-in-charge.

Work not to be sublet. Contract may be rescinded and security deposit forfeited for subletting, bribing, or if contractor becomesinsolvent

Clause 21. The contract shall not be assigned or sublet without specific orders from Government in respect of a specified sub-contractor. And if the contractor shall assign or sublet his contract, or attempt so to do, or become insolvent or commence any in insolvency proceedings or make any composition with his creditor, or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage, pecuniary or otherwise, shall either directly or indirectly be given, promised, or offered by the contractor, or any of his servants or agents to any public officer or person in the employ of Government in any way relating to his office of employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Divisional Officer may thereupon by notice in writing rescind the contract, and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Government and the same consequences shall ensure as if the contract had been rescinded under the Clause 3 hereof, and in addition the contractor shall not be entitled to recover or be paid for any work there for actually per formed under the contract.

Sum payable as compensation to be considered as reasonable without reference to actual loss

Clause 22. All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

Changes in constitution of firm

Clause 23. Where the contractor is a partnership firm or a consortium, prior approval in writing of the Engineer-in-Charge shall be obtained for any change made in the constitution of the firm/consortium. Where the contractor is an individual or a Hindu Undivided Family (HUF) business concern, such approval as aforesaid shall likewise be obtained, before the contractor enters into any partnership agreement/Memorandum of Articles where under the partnership firm/ consortium would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract is liable to be rescinded.

Works to be under direction of Engineer-in-Charge

Clause 24. All works to be executed under the contract shall be executed under the direction of Engineer-in-Charge. Further instructions/advices, if felt necessary by Superintending Engineer/ Chief Engineer, shall also be binding to be communicated by the Engineer-in-Charge.

Clause 25. Settlement of Disputes and Arbitration:

Settlement of disputes - Dispute Redressal Committee'

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever, in any way arising out of or relating to the contracts, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, or the executions or failure to execute the same, whether arising during the progress of the work, or after the completion or abandonment there of shall be dealt with as mentioned herein after:

If the contractor considers any work demanded of him/her to be outside the requirements of the contract, or disputes any drawings, record or decision given in writing by the Engineer-in-Charge or any matter in connection with or arising out of the contract or carrying out of the work to be unacceptable, he/she shall promptly within 15 days request the Chairman of the Departmental Dispute Redressal Committee, in writing, for

written instruction or decision. Thereupon, the Dispute Redressal Committee shall give its written instruction or decision within a period of three months from the date of receipt of the Contractor's letter.

The Dispute Redressal Committee in each of the Works Departments shall be constituted with the following officials as Members:

1	Secretary / Engineer-in-Chief of the Department concerned	Chairman
2	Joint Secretary / Deputy Secretary / any Officer of equivalent rank of the Department	Member
3	One Designated Chief Engineer / Engineer of the Department to be nominated by the Department concerned.	Member Secretary and Convenor
4	One representative of Finance Department of the Government not below the rank of Joint Secretary or Financial Advisor in case of the Works Department where FA system has been introduced.	Member

This provisions will be applicable irrespective of the value of the works to which the dispute may relate.

Clause 26. The contractor shall fully indemnify and keep indemnified the implementing Department against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under or action brought against implementing Department in respect of any such matter as aforesaid, the contractor shall be immediately notified thereof by the implementing Department and the contractor shall be at liberty, at his/ her own expense, to settle any dispute or to conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the implementing Department if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge this behalf.

Lump sum as in estimates

Clause 27. When the estimate on which the tender is made includes lump sums in respect of parts of the work, the contractor shall be entitled to payment in respect of the items of works involved or the part of the work in question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-charge, capable of measurement, certificate in writing of the Engineer-in-charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of this clause.

Action where nospecification

Clause 28. In the case of any class of work for which there is no such specifications as referred to under Clause 11, such work shall be carried out in accordance with the latest Bureau of Indian Standards (BIS) specifications. In case there are no such specifications in Bureau of Indian Standards, the work shall be carried out as per reputed manufacturer's specifications if accepted by the Engineer-in-Charge. If not available, then as per State Government / Union Government accepted and approved specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in- Charge which is approved by the Tender Accepting Authority.

Definition of works

Clause 29. The expression "works" or "work" where used in these conditions shall, unless there be something either in the subject or context repugnant to such construction, be constructed and taken to mean the works by or by virtue of the contract constructed to be executed, whether temporary or permanent and whether original, altered, substituted or additional.

Clause 30. The Contractor(s) shall at his/their own cost provide his/their labour with hutting on an approved site, and shall make arrangements for conservancy and sanitation in the labour camp to the satisfaction of the local Public Health and Medical Authorities. He/they shall also at his/their own cost make arrangements for the laying

of pipe lines for water supply to his/their labour camp from the existing mains wherever available, and shall pay all fees, charges and expenses in connection with there and incidental thereto.

Clause 31. The contractor(s) shall make his/their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions:-

i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-charge;

ii) The Engineer–in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are, in the opinion of the Engineer-in-Charge, unsatisfactory.

Clause 32. The contractor undertakes to make arrangement for the supervision of the work by the firm supplying the construction materials. The Contractor shall collect the total quantity of materials as per approved programme required for the work as per approved programme, before the work is started and shall hypothecate it to the Engineer- in-Charge. If any material remains unused on completion of the work on account of lesser use of materials in actual execution for reasons other than authorized changes of specifications and abandonment of portion of work, a corresponding deduction equivalent to the cost of unused materials as determined by the Engineer-in-Charge shall be made and the material returned to the contractor. Although the materials are hypothecated to Institute, the contractor undertakes the responsibility for their proper watch, safe custody and protection against all risks. The materials shall not be removed from site of work without the consent of the Engineer-in-Charge in writing.

The contractor shall be responsible for rectifying defects noticed within Defect Liability Period from the date of completion of the work and the portion of the security deposit relating to work shall be refunded after the expiry of Defect Liability Period.

Contractors Superintendence, Supervision, Technical Staff & Employees

Clause 33. The contractor shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(es) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his/her approval or otherwise of such representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative shall be appointed by the contractor soon after receipt of the approval from the Engineer-in-Charge and shall be available at site before start of work.

If the contractor (or any partner in case of firm/company) himself/herself has such qualifications, it will not be necessary for the said contractor to appoint such a principal technical representative but the contractor shall designate and appoint a responsible agent to represent him and to be present at the work whenever the contractor is not in a position to be so present. All the provisions applicable to the principal technical representative under the clause will also be applicable in such a case to the contractor or his responsible agent. The principal technical representative and/or the contractor shall on receiving reasonable notice from the Engineer-in-Charge or his designated representative(s) in charge of the work in writing or in person or otherwise, present himself/herself to the Engineer-in-Charge and/or at the site of work, as required, to take instructions. Instructions given to the principal technical representative or the responsible agent shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and/or the contractor or his/her responsible authorized agent shall be actually available at site especially during important stages of execution of work, during recording of measurement of works and whenever so required by the Engineer-in-Charge by a notice as aforesaid and shall also note down instructions conveyed by the Engineer-in-Charge or his/her designated representative in the site order

book and shall affix his signature in token of noting down the instructions and in token of acceptance of measurements.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule and the decision of the Engineer-in-Charge as recorded in the site order book and measurement recorded checked / test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint a suitable technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) along with every running account bill / final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.

The contractor shall provide and employ skilled, semi-skilled and unskilled labour as is necessary for proper and timely execution of the work.

The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who, in his opinion, misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer-in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.

Clause 34. "Levy / Taxes Payable by Contractor"

(i) GST, Building and other Construction Workers' Welfare Cess or any other tax or Cess in respect of this contract shall be payable by the Contractor and Engineer-in-Charges hall not entertain any claim whatsoever in this respect.

(ii) The contractor shall deposit Government Royalty and obtain necessary permit for supply of the sand, stone chips, red bajri, sand stone, river bed materials etc. from local authorities, if those are directly procured from quarry sites.

In case materials are procured from secondary sources, certificates of quarry owners to the effect of payment of royalties and Cess would have to be furnished. In absence of such certificates towards payment of Royalties and Cess such components shall be deducted from the contractor's bills at prescribed rates and deposited through 'GRIPS' portal or otherwise, in the designated Government Treasuries/PAO.

If pursuant to or under any law, notification or order, any Royalty, Cess or the like becomes payable by the implementing Department and does not at any time become payable by the contractor to the State Government/Local appropriate authorities in respect of any material used by the contractor in the works then in such a case, it shall be lawful to the Department and it will have the right and be entitled to recover the amount paid in the circumstances as afore said from dues of the contractor.

Clause 35.

(i) All tendered rates shall be inclusive of statutory taxes and levies payable under respective statutes. However, if any further tax or cess is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the contractor thereupon necessarily and properly pays such taxes/levies/cess, the contractor shall be reimbursed the amount so paid. Provided such payments, if any, is not, in the opinion of the Engineer-in-charge (whose decision shall be final and binding on the contractor) attributable to delay in execution of work within the control of the contractor.

(ii) The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Department and/or the Engineer-in-Charge

and further shall furnish such other information/document as the Engineer-in-Charge may require from time to time.

(iii) The contractor shall, within a period of 30 days of the imposition of any such further tax or levy or cess, give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition, together with all necessary information relating thereto.

Clause 36. Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the Engineer-in-charge shall have the option of terminating the contract without compensation to the contractor, but would be liable to clear full dues and claims on work done to his/her legal successor/s.

Clause 37. The contractor shall not be permitted to tender for works in which his near relative is posted as in any capacity between the grades of the Executive Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him/her in any capacity or are subsequently employed by him/her and who are near relatives to any Official in the Institute. Any breach of this condition by the contractor would render him/her liable to be removed from the approved list of contractors of the Department. If however the contractor is registered in any other Department, he/she shall be debarred from tendering in the Department for any breach of this condition.

NOTE: By the term "near relatives" is meant wife, husband, own parents and grandparents, own children and grandchildren, own brothers and sisters, own uncles, aunts and first cousins and their corresponding in-laws.

Clause 38. No engineer of Gazetted Rank or other Gazetted Officer employed in engineering or administrative duties in the Government shall work as a contractor or employee of a contractor for a period of one year after his/her retirement from Government service without the previous permission of Government in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

Clause 39. The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him/her to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation up to the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Engineer-in-Charge concerned. The contractor shall be paid for the damages/destruction suffered and for the restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the Air Force Officers or the Engineer-in-Charge (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not intended for the work.

In the event of the contractor having to carry out reconstruction as aforesaid, he/she shall be allowed such extension of time for its completion as is considered reasonable by the Engineer-in-charge.

Clause 40. The contractor shall comply with the provisions of the Apprentices Act, 1961 and the Apprenticeship Rules, 1992 and orders issued there under from time to time. If

he/she fails to do so, his/her failure will be a breach of the contract and the Engineer-in-Charge may, in his/her discretion, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him/her of the provisions of the said Act.

Clause 41. Procedure For Suspension and Debarment of Supplier, Contractors and Consultants

The procedure as laid down below shall govern the suspension/debarment of Suppliers/Contractors/Consultants (Contractors for brevity) involved in Government procurement for offences or violations committed during competitive bidding and contract implementation, for the works under different Departments of Government of West Bengal.

Grounds for Suspension and Debarment:-

(1) Submission of eligibility requirements containing false information or falsified documents.

(2) Submission of Bids that contain false information or falsified documents, or the concealment of such information in the Bids in order to influence the outcome of eligibility screening or any other stage of the bidding process.

(3) Unauthorized use of one's name/digital signature certificate for the purpose of bidding process.

(4) Any documented unsolicited attempt by a bidder (**A Person/Contractor/Agency /Joint Venture/Consortium/Corporation participating in the procurement process and/or a person / Contractor / Agency / Joint Venture / Consortium / Corporation having an agreement/contract for any procurement with the department shall be referred as Bidder**) unduly influencing the outcome of the bidding in his favour.

(5) Refusal or failure to post a self–declaration to the effect of any previous debarment imposed by any other department of State Government and/or Central Government.

(6) All other acts that tend to defeat the purpose of the competitive bidding such as lodging false complain about any Bidder, lodging false complain about any Officer duly authorized by the Department, restraining any interested bidder to participate in the bidding process, etc.

(7) Assignment and subcontracting of the contract or any part thereof without prior written approval of the procuring entity.

(8) Whenever adverse reports related to adverse performance, misbehaviour, direct or indirect involvement in threatening, making false complaints etc. damaging the reputation of the department or any other type complaint considered fit by the competent authority of the department, are received from more than one Officer or on more than one occasion from individual Officer.

(9) Refusal or failure to post the required performance security / earnest money within the prescribed time without justifiable cause.

(10) Failure in deployment of Technical Personnel, Engineers and/or Work Supervisor having requisite license / supervisor certificate of competency as specified in the contract.

(11) Refusal to accept an award after issuance of "Letter of Acceptance" or enter into contract with the Government without justifiable cause.

(12) Failure of the Contractor, due solely to his fault or negligence, to mobilize and start work or performance within the specified period as mentioned in the "Letter of Acceptance", "Letter of Acceptance cum Work Order", "Work Order", "Notice to Proceed", "Award of Contract", etc.

(13) Failure by the Contractor to fully and faithfully comply with its contractual obligations without valid cause, or failure by the Contractor to comply with any written lawful instruction of the Procuring Entity/Authority (the Officer authorized by the Administrative Department, Government of West Bengal for procurement) or its representative(s) pursuant to the implementation of the Contract.

(14) For the procurement of Consultancy Service/Contracts, poor performance by the Consultant of his services arising from his fault or negligence. Any of the following acts by the Consultant shall be construed as poor performance.

(i) Non deployment of competent technical personnel, competent Engineers and/or work supervisors;

(ii) Non-deployment of committed equipment, facilities, support staff and manpower;

(iii) Defective design resulting in substantial corrective works in design and/or construction;

(iv) Failuretodelivercriticaloutputsduetoconsultant'sfaultornegligence;
(v) Specifying materials which are inappropriate and substandard or way above acceptable standards leading to high procurement cost;
(vi) Allowing defective workmanship or works by the Contractor being supervised by the Consultant.

(15) For the procurement of goods, unsatisfactory progress in the delivery of the goods by the manufacturer, supplier, or distributor arising from his fault or negligence and/or unsatisfactoryorinferiorqualityofgoods,vis-à-visaslaiddowninthecontract.

(16) Willful or deliberate abandonment or non-performance of the project or Contract by the Contractor resulting in substantial breach thereof without lawful and/or just cause.

CATEGORY OF OFFENCE :-

(A) First degree of offence: 1 to 16 of the above Clause-41 to be considered as First degree of offence.

(B) Second degree of offence: Any one of the offences as mentioned under 'A' above, committed by a particular Bidder/Contractor/Supplier on more than one occasion, be considered as Second degree of offence.

In addition to the penalty of suspension/debarment, the bid security / earnest money posted by the concerned Bidder or prospective Bidder shall also be forfeited.

PENALTY FOR OFFENCE :-

(I) For committing First degree of offence: Disqualifying a Bidder from participating in any procurement process under the Administrative Department of Government of West Bengal up to 2 (two) years.

(II) For committing Second degree of offence: Disqualifying a Bidder from participating in any procurement process under the Administrative Department of Government of West Bengal up to 3 (three)years.

PROCEDURE OF SUSPENSION AND DEBARMENT DURING THE PROCUREMENT PROCESS

(1) Initiation of Action, Notification and Hearings:
Any Bidder or procurement authority on his own or based on any other information made available to him may invite the process of suspension/debarment proceedings by filing a written application with the **Bid Evaluation Committee** and such filing of written application has to be done within forty eight hours from the date and time of publication of the result of technical evaluation of any bid.

(a) Upon verification of the existence of grounds for suspension/debarment, the Chairperson of **Bid Evaluation Committee** shall immediately notify the bidder concerned either electronically through his registered e-mail or in writing to his postal address, advising him that:
i) A complaint has been filed against him and prima facie material has been found, which may lead to suspension/debarment.
ii) He has been recommended to be placed under suspension/debarment by the suspension committee (as constituted by the respective Administrative Department) stating the ground for such.
iii) The said bidder, within three days from the date of issue of such notification by the Bid Evaluation Committee, may approach the Chairperson of Suspension Committee by submitting all required documents in his favour for hearing. Any application made thereafter would not be entertained.
Such notice should contain the e-mail id and the postal address of the Chairperson of the Suspension Committee.

(b) After receiving the recommendation for suspension from Bid Evaluation Committee, Suspension Committee shall issue a notice to the alleged bidder electronically through his registered e-mail id, to submit all relevant documents in support of his defense within three working days after issuance of the notice of the Suspension Committee. The Suspension Committee will conduct the hearing within seven working days from the date of receipt of the documents from the alleged bidder. If no appeal has been received from the alleged bidder or if after hearing sufficient ground for suspension is found, the Suspension Committee, will suspend the alleged bidder from participating in the procurement process under the Administrative Department for a period of six months from the date of issuance of suspension order. The Chairpers on of the

Suspension Committee shall issue the suspension order within seven days from the last date of hearing and shall notify the bidder concerned either electronically through his registered e-mail id or in writing to his postal address. The Chairperson of Suspension Committee shall also inform the decision to all concerned.

If sufficient reason for suspension is not found, the Suspension Committee would reject there commendation of Bid Evaluation Committee and would allow the bidder to take part in the tendering process.

If the bidder is suspended, the Suspension Committee would recommend debarment of the bidder and forward the case with all documents to the Debarment Committee for further action.

(c) The Debarment Committee upon receipt of the recommendation of the Suspension Committee shall scrutinize the documents. The Debarment Committee will hold a hearing of the alleged bidder and issue necessary order within ten working days from the last date of hearing. The Debarment Committee, if satisfied after hearing, shall forward the case to the Department for orders of Debarment. The Department in due course will issue Debarment Order disqualifying/prohibiting the erring bidder from participating in the bidding/procurement of all projects under the Administrative Department for a specified period. The alleged bidder shall be intimated accordingly either electronically through his registered e-mail id or in writing to his postal address. Otherwise the Debarment Committee may reject the recommendation of the Suspension Committee. The Chairperson of Debarment Committee shall also inform the decision to all concerned.

PROCEDURE FOR DEBARMENT DURING THE CONTRACT IMPLEMENTATION STAGE:-

(A) Upon termination of contract due to default of the Bidder, the Engineer-in-Charge shall recommend for debarment to the Bid Evaluation Committee. The Bid Evaluation Committee shall submit his recommendation of debarment of the alleged Bidder along with a detailed report stating clearly the reasons for debarment to the Debarment Committee within 30 (thirty) days from the date of termination of contract. The alleged Bidder shall be intimated accordingly either electronically to his registered e-mail id or in writing to his postal address. The Chairperson of Bid Evaluation Committee shall also inform the decision to all concerned.

(B) The Debarment Committee upon receipt of the recommendation of Bid Evaluation Committee shall scrutinize the documents. The Debarment Committee will hold a hearing about the matter from the Bidder and issue necessary order within 10 (ten) working days from the last date of hearing. The Debarment Committee, if satisfied after hearing, shall forward the case to the Department for the order of debarment. The Department in due course will issue debarment order disqualifying/prohibiting the erring Bidder from participating in the bidding/procurement of all projects under the Administrative Department, Government of West Bengal for a specified period. The alleged Bidder shall be intimated accordingly either electronically to his registered e-mail id or in writing to his postal address. Otherwise the Debarment Committee may reject the recommendation of the Bid Evaluation Committee. The Chairperson of Debarment Committee shall also inform the decision to all concerned.

STATUS OF SUSPENDED / DEBARRED BIDDER :-

(a) Bidder placed under Suspension/Debarment by the competent authority will not be allowed to participate in any procurement process under the Administrative Department within the period of suspension/debarment. The earnest money of the suspended Bidder shall stand forfeited to the Government.

(b) If the Suspension/Debarment Order is issued prior to the date of issue of “Letter of Acceptance”, “Letter of Acceptance cum Work Order”, “Work Order”, “Notice to Proceed”, “Award of Contract” etc. for any Bid, the Suspended/Debarred Bidder shall not be qualified for Award for the said Bid and such Procurement Process will be dealt with as per existing norms by simply excluding the erring Bidder.

(c) If the Suspension/Debarment Order is issued after award of a Government Project/Contract to the Debarred Bidder, the awarded Project/Contract shall not be prejudiced by the said Order provided that the said offence(s) committed by the Debarred Bidder is not connected with the awarded project/contract.

Clause 42. Executive Engineer of the concerned Division will be the Engineer-in-Charge in respect of the Tender contract and all correspondences concern ingrates, claims, change

in specifications and/or design and similar important matters will be valid only if accepted/recommended by the Engineer-in-Charge. If any correspondence of above tender is made with Officers other than the Engineer-in-charge for speedy execution of works, the same will not be valid unless copies are sent to the Engineer-in-Charge and also approved by him. Instructions given by the Assistant Engineer and the Junior Engineer on behalf of the Engineer-in-Charge (who have been authorized to carry out the work on behalf of the Engineer-in-Charge) regarding specification, supervision, approval of materials and workmanship shall also be valid. In case of dispute relating to specification and work, the decision of Engineer-in-Charge shall be final and binding. The Engineer-in-Charge will however invariably take decisions relating to tender contract or as mentioned in the relevant rules and clauses of the contract document with the approval of the Tender Accepting Authority.

Clause43. Acceptance of the Tender will rest with the Tender Accepting Authority without assigning reason thereof to the bidder. The accepting authority reserves the right to reject any or all of the tenders without as signing any reason thereof to the bidder / contractor.

Clause 44. In the event of acceptance of Lowest Rate, no multiple Lowest Rates will be considered for acceptance by the Department. In such cases, the Tender will be cancelled.

Clause 45. In the event of conflicting different clauses, the clauses in the e-NIT will prevail.

Clause 46. Engineer-in-Charge shall not entertain any claim whatsoever from the Contractor for payment of compensation on account of idle labour on such grounds including non-possession of encumbrance free land.

Clause 47. Engineer-in-Charge shall not be held liable for any compensation due to machines becoming idle or any circumstances including untimely rains, other natural calamities, like strikes etc.

Clause 48. Imposition of any Duty / Tax / Octroi / Royalty etc. whatsoever of its nature (after work order / commencement and before final completion of the work) is to be borne by the contractor / bidder. Original challan of those materials, which are procured by the bidder, may be asked to be submitted for verification.

Clause 49. Cess @ 1% or as amended time to time of the cost of construction works shall be deducted from the Gross value of all Works Bill in terms of Finance Department order. Also it is instructed to register his/her establishment under the Act, with the competent registering Authority, i.e. Assistant Labour Commissioner / Deputy Labour Commissioner of the region.

Clause 50. No Mobilization/Secured Advance will be allowed unless specified otherwise in the contract.

Clause 51. Valid PAN issued by the Income Tax Department, Government of India, valid 15 digit Goods and Services Tax Payer Identification Number (GSTIN) under GST Act 2017, Cess, Royalty of Sand, Stone Chips, Stone Metal Gravel, Boulders, Forest product etc., Toll Tax, Income Tax, Ferry Charges and other Local Taxes, if any, are to be paid by the Contractor/Bidder. No extra payment will be made as a reimbursement or as compensation for these. The rates of supply and finished work items are inclusive of these taxes and charges.

Clause 52. All working Tools & Plants, Scaffolding, Construction of Vats & Platforms and arrangement of Labour Camps will have to be arranged by the Contractor at his/her own cost.

Clause 53. The Contractor shall supply Mazdoors, Bamboos, Ropes, Pegs, Flags etc. for laying out the work and for taking and checking measurements for which no extra payment will be made.

Clause 54. The Contractor/Bidder should see the site of works and Tender Documents, Drawings etc. before submitting e-Tender and satisfy himself/herself regarding the condition and nature of works and ascertain difficulties that might be encountered in executing the work, carrying materials to the site of work, availability of drinking water and

other human requirements & security etc. Work on river banks may be interrupted due to a number of unforeseen reasons e.g. sudden rises in water levels, inundation during flood, inaccessibility of working site for carriage of materials. Engineer-in Charge may order the contractor to suspend work that may be subjected to damage by climate conditions. No claim will be entertained on this account. There may be variation in alignment, height of embankment or depth of cutting, location of revetment, structures etc. due to change of topography, river condition and local requirements etc. between the preparation and execution of the scheme for which the tendered rate and contract will not stand invalid. The Contractor will not be entitled to any claim or extra rate on any of these accounts.

Clause 55. A machine page numbered Site Order Book (with triplicate copy) will have to be maintained at site by the Contractor and the same has got to be issued from the Engineer-in-Charge before commencement of work. Instructions given by inspecting officers not below the rank of Assistant Engineer will be recorded in this book and the contractor must note down the action to be taken by him in this connection as quickly as possible.

Clause 56. The work will have to be completed within the time mentioned in the e-NIT. A suitable Work Programme based on time allowed for completion of work as per e-NIT is to be submitted by the contractor within 7 (seven) days from the date of receipt of work order which should satisfy the time limit of completion. The contractor should inform in writing, within 7 (seven) days from the date of receipt of work order, the names of his authorized representatives who are to remain present at site daily during work execution who will receive instructions of the work, sign measurement book, bills and other Government papers etc.

Clause 57. No compensation for idle labour, establishment charge or on other reasons such as variation of price indices etc. will be entertained.

Clause 58. All possible precautions should be taken for the safety of the people and work force deployed at worksite as per safety rule in force. Contractor will remain responsible for his labour in respect of his liabilities under the Workmen's Compensation Act etc. He must deal with such cases as promptly as possible. Proper road signs as per PWD practice or any other sign board for safety purpose as per requirement by the concerned Administrative Department will have to be erected by the Contractor at his own cost while operating in public thorough fares.

Clause 59. The Contractor will have to maintain qualified technical employees and/or Apprentices at site as per prevailing Apprentice Act or as stipulated in the contract.

Clause 60. The Contractor will have to accept the Work Programme as per modifications and priority of work fixed by the Engineer-in-Charge so that most vulnerable reach and/or vulnerable items are completed before impending monsoon or rise in river flood water level or for other suitable reasons.

Clause 61. Quantities of different items of work mentioned in the tender schedule or in work order are only tentative. In actual work, these may vary considerably. Payment will be made on the basis of works actually done in different items and no claim will be entertained for reduction of quantities in some items or for omission of some items. For execution of quantitative excess in any item or supplementary new items of work as decided by the Department, approval of the Superintending Engineer / Chief Engineer / Government would be required, depending on whosoever be the Tender Accepting Authority, before making such payment.

Clause 62. In order to cope up with the present system of e-billing, supply of departmental materials is generally not allowed. However, if in special circumstances, Departmental materials may be issued to the Contractor/Bidder to the extent of requirements as assessed; those may be recovered from the Running Account Bill and/or Final Bill, as applicable.

Clause 63. Any material brought to site by the contractor is subject to approval of the Engineer-in-Charge. The rejected materials must be removed by the contractor from the site at his own cost within 24 hours of issue of the order to that effect. The rates in the schedule are inclusive of cost and carriage of all materials to worksite. The materials will have to be supplied in phase with due intimation to the Assistant Engineer concerned in

conformity with the progress of the work. For special type of materials, i.e. Geo Synthetic Bags, HDPE Bags, Geo Textile Filter, Geo Jute Filter etc., if any, relevant Data Sheet containing the name of the Manufacturers, Test Report etc. will also be submitted on each occasion. Engineer-in-Charge may conduct independent test on the samples drawn randomly before according approval for using the materials at site. In this regard decision of Engineer-in-Charge shall be final and binding.

Clause 64. For all items of contract jobs requiring skilled labour, the contractor shall have to employ 70% (Seventy Percent) of skilled labour locally. In case the Contractor fails to recruit skilled local labour, the Contractor shall employ skilled labour locally secured by Government in the manner indicated above. For bridge works, highly technical works of labour, the contractor may, with the prior permission in writing of the Engineer-in-charge to whom full facts must be placed for such permission, import and employ skilled labour up to 30% (Thirty Percent) of the total requirement. In this case the expression "Imported labour" shall mean "labour imported primarily from other States and secondarily, from the distant districts of the State of West Bengal." In case where the contactor fails to secure unskilled local labour or to engage imported labour, the contractor shall employ labour locally recruited by Government or labour imported by Government at the rate to be decided by the Superintending Engineer of the works concerned, whose decision as to the circumstances in which employment of such labour is of mutual advantage to Government and the contractor, will be final and binding on the parties.

Clause 65. All queries and disputes arising out of the works tender contract is to be brought to the notice of the Chairman of the 'Department Dispute Redressal Committee' in writing for decision within 15 days.

Clause 66. The contractor shall have to make his own arrangements for water, both for the work and use by his workers, etc., for road rollers and for all tools and plant, etc., required on the work.

Clause 67. Contractor will be responsible for the payments of all water charges payable to the Corporation Municipality / Panchayat or any other water works authority including a Government Department concerned.

Clause 68. If the contractors shall desire an extension of the time for completion of the work under clause 5 of the contract, no application for such extension will be entertained if it is not received in sufficient time to allow the Executive Engineer to consider it and the Contractor will be responsible for the consequences arising out of his negligence in this respect.

Clause 69. The Contractor will have to leave ducts in walls and floors to run conduit or cables, where necessary, and he will not be entitled to any extra payment on this account.

Clause 70. Contractors in the course of their work should understand that all materials obtained in the work of Dismantling, Excavation, etc., will be considered Government property and will be disposed of to the best advantage of Government.

Clause 71. In case of very special case of circumstances, if any Departmental materials are issued, there may be delay in obtaining the materials by the Department and the Contractor is, therefore, required to keep himself/herself in touch with the day to day position regarding the supply of materials from the Engineer-in-charge and to so adjust the progress of the work that his labour may not remain idle nor may there be any other claim due to or arising from delay in obtaining the materials. It should be clearly understood that no claim whatsoever shall be entertained by the Department on account of delay in supplying materials.

Clause 72. No compensation for any damage done by rain or traffic during the execution of the work will be made.

Clause 73. Whenever a work is carried out in municipal area, electric lights or electric danger signals whenever available shall be provided by the contractors on the barriers as well as paraffin lights. Facilities for the electric connection will be made by this Department but the Contractor will bear all the expenses.

Clause 74. The Contractor should quote through rate inclusive of cost of materials and carriage to place of working.

Clause 75. The Contractors should give complete specifications showing the method of execution and the quantity and quality of materials they intend to use per hundred square metre area.

Clause 76. In cases where water is used by the Contractor he will be required to deposit in advance with the Executive Engineer the charges for water which are to be calculated in accordance with the schedule of miscellaneous rates in the Canal Act.

Clause 77. It must be clearly understood by the Contractor that no claim on account of enhanced rates on those already accepted, due to fluctuations arising out of any situation will be entertained during the currency of this contract for the work as per schedule attached to the agreement and the additional work, if any, under Clause12 of the contract.

Clause 78. In the event of emergency the Contractor will be required to pay his labour everyday and if this is not done, Government shall make the requisite payments as would have been paid by the contractor and recover the cost from the contractors.

INCONVENIENCE OF THE PUBLIC

Clause 79. The Contractor(s) shall not deposit material on any site which will seriously inconvenience the public. The Engineer-in-charge may require the Contractor(s) to remove any materials, which are considered by him to be a danger or inconvenience to the public or cause them to be removed at the contractor's cost.

Clause 80. The Contractor undertakes to have the site clean, free from rubbish to the satisfaction of the Engineer-in-charge. All surplus materials, rubbish etc. will be removed to the places fixed by the Engineer-in-charge and nothing extra will be paid.

Clause 81. The Contractor shall not allow any rubbish or debris to remain on the premises during or after repairs, but shall remove the same and keep the place neat and tidy during the progress of the work. The Engineer-in-charge may get the site premises cleared of debris etc. And recover the cost from the bill of the contractor, if the latter shows slackness in observing this clause.

Clause-82. Construction materials brought at site shall not be stacked at random. The contractor shall stack all these materials as directed by the Engineer-in-charge.

INTERPRETATION OF CLAUSES

Governor means the Governor of the State of West Bengal and his/her successors.

The Government means Government in the concerned Works Department.

The Department means the Secretary of the concerned Department or his/her authorized representative.

The Divisional Officer means the Executive Engineer of the concerned Works Department for the time being of the Division concerned, also identified as the Engineer-in-Charge.

The Sub-divisional Officer means the Assistant Engineer of the concerned Works Department for the time being of the Sub-division concerned. Junior Engineer equivalent to Section Officer of the Section concerned.

Superintending Engineer in the concerned works Department is the final Authority regarding Schedule of Rates and also the acceptance of Non-scheduled item rates arrived on the basis of market rate analysis for supplementary items, and the authority for approval of Reduced Rates and Part Rates. He is also the Tender Accepting Authority for works of value above Rs. 45.00 lakh and up to Rs. 2.00 crore under existing delegated power.

Chief Engineer in the concerned Works Department is the technical head of the Directorate and is also the Tender Accepting Authority for all works of value above Rs.

2.00 crore. Excess work over individual items comprising the original tender may be exceeded beyond 10% with the approval of concerned tender accepting authority and verified by the Superintending Engineer/ Chief Engineer subject to the total value of work upon completion is within the technically sanctioned cost and that there is no major deviation from original scope of work in the tender. **Any supplementary tender/item/work in connection with the main tender is to be taken up with the approval of the Tender Accepting Authority not below the rank of Executive Engineer**. Such supplementary tenders above 10% of BOQ are to be executed only with the approval of appropriate Government irrespective of the value of tender.

Words importing the singular number only include the plural number and vice versa.

Irrespective of the accepting authority, Divisional officer shall be the authority signing agreement for all tenders of value more than Rs. 3.00 lakh up to any amount on behalf of the State.

Schedule showing (approximately) materials to be supplied by the Engineer-in-Charge under clause 10:

Particulars	Rates at which the materials will be charged to the contractor			Place of delivery
	Unit	**Rs.**	**P.**	

Note 1- The person or firm submitting the tender should see that the rates in the above schedule are filled up by the Engineer-in-charge on the issue of the form prior to the submission of the tender.

(Name in full)
*Signature of Contractor/Agency
with official seal containing
Principal office address

(Name in full)
*Signature of Executive
Engineer/Assistant Engineer
on behalf of the Governor of the
State of West Bengal with official
seal containing designation &address

* To be authenticated on each and every page of the contract document by all parties.