TECHNICAL SPECIFICATIONS FOR TUBEWELL

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1.0 TECHNICAL SPECIFICATION FOR CONSTRUCTION OFBOREWELL.

GENERAL:

The purpose of constructing the tube-well is to obtain optimum quantityof ground water of good potable quality for drinking purposes. The deeper tube-well will go to a approx. depth up to 300 mts.from ground level. In this case the first 170 mts.approximately will have M.S. ERW housing pipes of200mm. dia. The minimumthickness of housing pipe will be minimum 5.82mm. From 170 mts.onwards below ground level, therewill be 200mm. dia. casing pipe having a minimum thicknessof5.82mm. pipes as per IS 3589/1981 and Johnson filtration make 200mm. dia. heavy duty strainer pipes for deep tube-well to beused.The quantity of this housingand casing pipe will vary according to the requirement at the site but the tube-well is not expected to 300 mts.below ground level. In the case of deep bores about 120 M^3/hror discharge is accepted with a draw downof 10mts.

I. Definition:

In thiscontract a tube-well willmean:

(a) Satisfactory completion of bore hole drilling the maximum prescribed depth in all sorts of soil, kankar, boulder or soft or hard rock. The stated depths are approximate and the contractor may have to go higher or lower depth as decided by Employeras per condition of starter generally available in the locality. The contractorhas to arrange for electro logging and cost has to be given in prices scheduleseparately.

(b) The installation of casing and housing pipes, complete with strainer or slotted pipes including bail plug, reducer, clamp top half coupling and well cap. The housing pipes casing pipes, Johnson strainer pipes, housing pipe clamp wooden slippers well cap, half coupling and cone of bail plug will have to be supplied by the contractor. 50 mm width x 4 mm thick M.S. strip for welding between two housing pipes andchaplashould alsosupplied.

(c) Placing of a gravel packing of minimum 13 brass quantity around casing, housing and strainer pipes as per design. All gravelas per specifications of required quality of(and)quantity will be. supplied bycontractor.

(d) Strata wise development of gravel packed tube-well with adequate capacityofaircompressor.

(e) The development of gravel packed tube-well with submersible pump with the object of obtaining a minimum yield of 100M^3/hrat 140 mt.head of125/85 H.P. sub-pump till water become potable and nearly sand free.

(f) Measuring eccentricity andsounding.

Drillingprocedure:

(a) The contractor will employ the hydraulic direct rotary (i.e. by direct rotary drilling rigs fitted with a heavy duty reciprocating mud pump)

(b) All water bearing strata decided by the engineer in-charge shall be tapped.

(c) The contractor shall have to drill first a pilot bore of 9" diameter but not more than 12" diameter after completion of which the contractor shall have to inform engineer in charge for electro logging. Contractor willhave to arrange for electro logging of each bore. Without electro logging of bore rimming work should notbe started in anycase.

(d) After pipe & strainer lowering in the bore hole and before gravel packing, minimum 12 hours back washing is required to keep proper mud density.

(e) After gravel packing work, minimum 24 hours back washing is required with clean water, putting washing line at thebottom.

(f) The contractor shall have to use fresh quality of Bantonite sothat the mud salinity should be less than 230 PPM.

(g) Bore hole shall be drilled freely in plumb &vertical.

3. Material to be supplied by thecontractor

All housing pipes, casing pipes and strainer pipes shall be supplied by the contractor. The contractor shall be responsible for all the losses or damage for anyreason.

4. BoreHole

(a) Minimum dia. of 450 mm. from ground level to a depthof 3 mtsbelow the bottom end of housing pipe should be drilled for which payment will be given. On completion of 450 mm. dia. running size of rimmerbit shouldbe checked in and measured by engineer in-charge after removing from bore hole.

(b) Minimum dia. of 350mm- from 3 mts.below reducer to 3 mtsBelow the bottom end of the casing pipes should be drilled (for which payment will be given) on completion of 350 mm. dia. running site of rimmer bit should be checked in presence of engineer in-charge.

5 (a) Pipes, Strainers & Materials: The contractor hasto arrange to supply 200 mm. dia. M.S. ERW new pipes confirming to IS 3589/1981 and 1SI mark and minimum wall thickness of 5.82mm with square edge finish with suitable chapla welded. **The acceptance make of the pipes are Jindal/Ajanta/S uryaRoshni/Lloyd, Welspunand Asian as per IS.** The contractorhas to provide materials test certificates from the respective manufacturer. The individual length of the pipes should not be less than 5 mt(5 mt<pipe length < 7 mt)

(b) 200mm dia MS ERW black casing pipes: The contractor has to arrange to supply 200 mm. dia. M.S. ERW new pipes confirming to IS 3589/1981 and 1SI mark and minimum wall thickness of 5.82mm with square edge finish with suitable chaplawelded. **The acceptance make of the pipes are Jindal/Ajanta/S uryaRoshni/Lloyd, Welspun and Asian as per IS.** The contractorhas to provide materials test certificates from the respective manufacturer. The individuallength of the pipes should not be less than 5 mt(5 mt< pipe length < 7 mt)

(c) 200 mm. dia**Johnson make** strainer pipes :Johnson filtration make new strainer pipes to be manufactured from LOG materials. Diameter ofscreen pipes to be 200 mm. and should be suitable tensile strength &collapsible strength should be more than 28 metric tonnesand 30 kg/cm^2 respectively for which certificate should be attached. The openingsof screen required are 1.50 mm. and 2mm. according to the strata available atthe site, the screen should be used. The contractorshould give rates for the both sizes of the screen.

(d) 200x200 mm dia. Concentric steel cast reducer:- The reducershould be steel casted confirming to IS 216/1971 and machined finish as per the instruction of site in charge engineer. it should be fixed or flexible.

(e) Bail plug: - The bail plug should be prepared from 250 bail plug length should be 5 mts.with 55 mm length x 1.5 mm width, 2900 no. slots in 3 mt. Length of bail plug at thebottom.

(f) Eccentricity:-

(1) All drilling &pipe lowering shall be done in plumb and vertical as far as practicable but within the following limits of verticality.

(2) **Maximum allowable deviation should not be more than 3" in every 100 feet. Depth and proportionally up to 400 ft.**

Construction ofTube-well:

After satisfactory drilling and bore holerimming the contractor has to arrange lowering, installing & welding of housing, pipes, casing pipes and strainer pipes including , reducer, bail plug, housing pipe, joint covering strip, coupling, well cap etc. The contractor has to bring all the materials like bore pipes, strainer pipes, well cap, cone, etc. two daysprior to lowering with necessary test certificates for approval of engineering in charge. The contractor has to obtainwritten permission from the engineer in charge only these after he can start lowering of the pipe in presence of EIC. The clamp applied to the housing pipes supporting to the pipe 0.5 mt.below theground level and supported with wooden slippers. Before lowering housing and casing should be paint with black anticorrosive bituminouspaint.

GravelPacking.

After successful completionof pipe lowering gravel packingoperation should be started. The gravelused should be graded hard well rounded particular 4.75 mm. 'to 8.00mm. size. Minimum 13brass gravel should be used in each tube-well the gravel packing operation should be continuously carried out till it is completed. The claypacking should be done from ground level to 300 ft.depth.

Aircompressordevelopment.

The contractor has to arrange 900 CFM Air-compressor with 200 PSI capacity compressor at site for thiswork. He hasto develop each strata of the tube-well with 3" dia. education pipe and 1.5" dia. air line. The end of the education pipe should be kept in the centreof each strata. The Air compressor development work should be carriedoutfor 8 hour from upper strata to lower strata in turn & lastly at the bottom of the tube-well still water coming out from all the strata become send free. Andsecond stageAir compressor development with 2 nos of 900 CFM Air-compressor with 200PSI capacity with Direct 3" dia. Air line of 800ft. depth for 16 hour(8 Hrs x 2 Compressor). During compressor development the water coming out from the tube-well should be used to setting the gravel and clay around the tube-well. The contractorhas to give clear sounding of the tube-well after Air compressor development. **Air compressor developmentshould be runforminimum 16 hours.** It will be the contractor's responsibility tomake arrangement for disposal of mud and water during air compressor development.

Final development of bore withsub-pump.

After compressor development successfully carried out tube-well is to be further develop by submersible pump having discharge capacity approximately 600-500LPMat 70-85mtr. head of 15HP sub-pump with 6" column pipe till discharge water become sand free. The contractor has to arrange generator for this work. It will be the contractor's responsibility to make arrangement for disposal of waterin the drainage during sub- pump development.

The waterTanker

The water tanker for work of drilling and developing for the tube-well will not be provided by clientin any circumstances. The contractor has to arrange for water tankerat itsown.

Acceptancetest

After development of tube-well by submersible pump the contractor has to

givesounding test of tube-well. If the bore is filled the samehas to be removed by air compressor. The contractor has to clean the site and level the site after completion ofwork.

MudDisposal

The tenderer must dispose offmud and cuttingday to day during construction of bore. It should not be staged atsite. It will bethe constructor's responsibility if any accident, police case, death, court case, injury happen due to not properly dispose offmud and cutting from the boresite.

Certificates:

The contractor has to givefollowingcertificates.

(a) Material test certificate and routine test certificate for 350 mm. diaand 250 mmdiaM.S. ERW pipes as per IS 3589/1981.

(b) Material test certificate and routine test certificate for Johnson filtration makeContinuous slotted strainerpipes.

(c) Strata chart drawing with showing all the technical details intriplicate.

(d) Compressor development report withdetails for all the strata intriplicate.

(e) Submersible pump development certificate mentioning nos. of hourspump run, discharge static water level, drawdown, pumping water level.

(f) Verticality test certificate for400 ft. depth of the tube-well at 0 to every 10ft.

(g) Acceptance test certificate forclearsounding of tube-well and site properly leveled and cleaned and cavity around the tube-well duly packed with clay, well cap, bore pipe, clamp, wooden slipper, earthing terminal and half coupling on the top of the pipe.

2.0 LIST OFSTANDARDS

Thetitles ofvarious standards referred to in the Specification are indicated hereunder for ready reference. This listdoes not necessarily cover all the Standards referredto:

STANDARD NO.	TITLE
IS5	Colors forready mixed paints and enamels
IS210	Grey IronCastings
IS318	Leaded Tin Bronze Ingots and Castings
IS325	Three Phase InductionMotors
IS14846	Sluice Valve forWater WorksPurposes
IS1239	Mild Steel tubes, tubular and other wrought steel fittings.
IS1537	Vertically castiron pressure pipes for water, gas andsewage
IS1538	Specification for cast iron fittings for pressure pipesfor water, gas andsewage
IS1554	PVC insulated(heavy duty) electric cables
IS2062	Steel for general structuralpurposes
IS2147	Degrees of protection provided by enclosuresfor low voltage switch gear and controlgear
IS3938	Electric wireropehoists
IS4029	Guide fortesting three phase inductionmotors.
IS4460	Method for rating of machine cutspur and helicalgears.
IS4691	Degrees of protection provided by enclosurefor rotating electrical machinery
IS5312	Swing type NonReturn Valve
IS8329	Centrifugally cast (spun) ductile iron pressure pipesfor water, gas andsewage
IS13349	Cast Iron Singlefaced thimble mounted sluice gates
BS436	Spur and helicalgears
BS1397	Specification for industrialsafety belts, harnesses andsafety
BS1400	Specification for copper alloyingots and copper alloy and high conductivity copper castings
BS1452	Specification for flake graphitecastiron
BS1663	Specification forhigher tensile steel chain Grade 40 (Short link and pitched or calibrated) for liftingpurposes.
BS2903	Specification for higher tensile steelhooks for chains, slings, blocks and general engineering purposes

BS4772	Specification for ductile iron pipes andfittings
BS4870	Specification for approvaltesting of weldingprocedures. Part – I :Fusion Welding ofSteel
BS4871	Specification for approval testing of welders working to approved weldingprocedures Part – I :Fusion Welding ofSteel
BS4942	Short chainlink for lifting purposes.
BS5135	Specification forarc welding of carbon and manganese steels
BS5316	Specification for acceptance tests Part – 2 forcentrifugal, mixed flow and axial pumps – Test for performance andefficiency.
BS6072	Method for magnetic particleflawdetection
IS 6595 (Part I	Horizontal Centrifugal Pumps for Clear, Cold Water –Specification

BS6405	Specification for non-calibrated short link steel chain(Grade 30) for general engineering purposes : Class 1 &2
BS6443	Method for penetrate flawdetection
ASTM A-36	Specification for StructuralSteel
IEC –189	Low frequency cables and wires with Part 1& 2 PVC insulation and PVCsheath
AWWA C501	Cast Iron SluiceGates
IS3832	Hand Operated Chain PulleyBlocks
IS3177	Code of Practice for Electrical Overhead Traveling Cranes &Gantry
IS 10553 (Part2)	Requirements for ChlorinationEquipment : Part 2 Vacuum Feed Type
IS 10553 (Part4)	Requirements forChlorination Equipment : Part 4 Gravity Feed Type
IS13538	Centrifugal mixed flow & axial Pumps – Code for hydraulic performance
IS10981	Class of acceptance test for centrifugal mixed flow &axialpumps – Class
IS9137	Class of acceptance test for centrifugal mixed flow &axial pumps – Class
IS9694	Code of Practice for the selection, installation, operation &maintenance of horizontal centrifugal pumps for agricultural applications. (Part I ,II , III &IV)
IS9542	Horizontal centrifugal monosetPumps for clear, cold, freshwater
IS9079	MonosetPumpsfor clear, cold water for agriculturalpurposes
IS14536	Selection, installation, operation &maintenance of SubmersiblePump
IS5600	Sewage &DrainagePumps
IS1710	Vertical TurbinePumps for Clear, Cold , FreshWater

SUBMERSIBLE PUMP MOTORSET

SCOPE

Thisspecificationcoversthedesign,performance,manufacture,constructionfeatures,testing, delivery, installation, and commissioning of submersible pump- motor set with all other requiredaccessories.

CODES &STANDARDS

The design, manufacture and performance of Submersiblepumps shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment shall conform to the latestapplicable Indian Standards. In particularthe equipment shall conform to the latest revision of thefollowing:

IS 8034-1989(With latest revision) : For Submersiblepump

IS 9283-1995(With latest revision) : For Subpumpmotor

DOCUMENT:-TECHNICAL DATA SHEET FOR SUBMERSIBLE PUMPMOTORSET

Sr. No	Technical Description of material	Requirements	Tenderer's (Bidder's) offer
1	Make	KSB / EBARA/GRUNDFOS	
2	Duty point dischargecapacity	600 – 500 LPM	
3	Duty pointhead	70-85Mts.	
4	Minimum efficiency of pump(only) at duty point	68%	
5	Minimum efficiency of submersible motor(only) at dutypoint	82%	
6	Minimum overall efficiency of pump set at dutypoint	56%	
7	Motor rating should be higher capacity	15 %minimum	
8	Rated speed inRPM	2800	
9	OperationRating	continuous	
10	Solid handlingcapacity	fine sandparticles	
11	Maximum outside diameter – x 250>x>210	For 200 mm dia. bore well	
12	Connection	Star-Delta	
13	Sub pump set cable: PVC insulated Water proof flat copper cable of5+5 mtlength	2 x 3 x 25 Sq. mm (Double cable)	

14	Type ofpump	Mixflow	
15	Type ofimpellers	Semiopen/Enclosed	
16	Rated voltage/No. ofphases/frequency	415V/3/50Hz	
17	Variation (a) Voltage (b) Frequency (c) Combined	 +/- 10% +/-5% +/- 10%	
18	Materials ofconstruction		
	(a)Casing	C.I.FG200	
	(b)Impeller	SS 316/Crom steel/Gun Metal	
	(c)Shaft	AISI 410 or ASTMA276	
	(d)Bush/Neckring	leaded tin bronze gr 4/5	
19	Sub. motor will confirm to IS Specification no	IS :9283-1995 with latest revision	
20	Sub. pump-set will confirmedto IS specificationno	IS :8034-1989 with latest revision	
21	Pump setliquid	Bore wellwater	
22	Suctionstrainer	SS316	
23	Inspection & testing of sub-pumpset	required	
24	Minimum H.P. of submersible Motorrequired	H.P.-80	

SLUICEVALVE

SCOPE

Thisspecification coversthe design requirements, features of construction, inspection, testing, painting, delivery, installation and commissioning of sluice valves with gaskets, hardware, etc. atsite.

DOCUMENT : TECHNICAL DATA SHEET FOR SLUICEVALVE

Sr No	Technical Description ofmaterial	A.M.C.Requirements	Tenderer' s (Bidder'S) Offer
(A)	Make of CIDF sluicevalve	Geeta/ Upadhyaya, / IVC, IVI / Hawa/ Kirloskar	
1	Size of sluicevalve	65mm diaØ	
2	Standardspecification	As per IS780/1280	
3	Class ofvalve	PM-1	
4	Workingpressure	10 kg /cm^2	
5	Type	Non rising spindle type andclosing on clockwiserotation	
6	Material ofspindle	AISI416	
7	Material of Nut	Leaded gunmetal	
8	(i) Flanges of the sluice valve	Flat,Face	
	(ii) Hole oftheflanges	As per BS – table "C"	
9	ISI markembossed	Mustrequired	
10	Test certificate ofmanufacturer	Mustrequired	
11	Certification from the manufacturer's or authorized stockiest or dealers should submit by tenderer regarding purchase of the sluice valve from whom	Required	

NON RETURNVALVE

SCOPE

This specificationcovers the design requirements, features of construction, inspection, testing, painting, delivery, installation and commissioning of Dual Plate type spring operated dual plate check valves with gasket hardware, etc. atsite.

CODES ANDSTANDARDS

The design and manufactureof t hevalves shallcomply with allcurrently applicable statutes, regulations and safety codes in the locality where the equipment w illbe installed. Nothing in this specification shall relieve the vendor of this responsibility. The valveshall be conforming to API 594 and API598.

DOCUMENT : TECHNICAL DATA SHEET FOR NON RETURN VALVE

Sr No	Technical Description ofmaterial	A.M.C.Requirements	Tenderer' s (Bidder's) Offer
	C.I. Non ReturnValve:		
1	size ofNRV	65mmdia	
2	Standardspecification	As per IS1538/1993	
3	Flanges holedrilling	As per B.S. Table"C"	
4	Make	ISI	
5	ISI embossmark	Required	
6	Certification from the manufacturer's or authorized stockiest or dealer's should be submited by tenderer regarding purchase of CI 65 mm Non Return Valve from whom material has beenpurchased.	Required	

G.I. COLUMNPIPES

SCOPE :

Column pipe should be 65 mm dia. Heavy Duty galvanized, confirm to IS 1239 (Part I) of 1990 and both ends should tee have welded flanged as per attached drawing and flange to flange, length of the Column pipe should 4.0 to 4.3 mt. And total length ofColumn pipe should be 140 mts.

The Top piece should be of 0.3mt in length and 65 mm diaand one end welded flanged as per drawing and another side flange should be as per flange standard B S table -C.

All the Column pipe should he assembled by 3.0 mm thick rubber Insertion sheet with MShexagonal headed 12 mm Ø x 45 mm nut bolts and plain washer at bothends.

DOCUMENT : TECHNICAL DATA SHEET FOR G.I.COLUMN PIPES

Sr. No.	TechnicalDescriptionofMaterial	A.M.C Requirements	Tenderer's
1	Make of galvanized pipe forcolumnpipe	Jindal, Lioyds, Prakash Surya, Ajanta, Tata, Asian	
2	Minimum wall thickness of columnpipe	minimum 5.0mm	
3(I)	Size ofthe columnpipe	65mmdia	
3(II)	Quality of the pipe for the columnpipe	NewPipe	
4(a)	Length of the Coolumpipe	4.3meter	
4(b)	Minimum length ofthecolumnpipe	4.0meter	
4(c)	Pieces of pipe for columnpipe	One piece (Jointless)	
4(d)	I.S Specification of pipe for columnpipe	I.S. 1230 part I1990	
4(e)	I.S.I mark-	Confirmed(must)	
4(f)	Makers embossmark	Required	
4(g)	Negative tolerance inthickness	Notallowed	
5	Rates of column pipe tobefurnished	Permeter	

6	Flange of the column pipe a. no. offlanges b. Type ofcolumnpipe flanges c. P.C.D. of the 8 no. of the holes at equal Distance	Bothends (2nos) As per attached drawing 8-5/2.5” dia8 nos	
7	Gusset for jointingflange with thepipe		
	a. No. ofgusset	8nos	
	b. Size ofgusset	80mm	
8	Welding of flange withthepipe		
	a. Welding of rodmake	Sunarc	
	b. Weldingprocess	In both sides of flange	
9	Face of the column pipeflanges	? grooves.	
	a.Machining	Faces dutyturned on lathem/c	
	b. Faces offlange	Both the flanges must be parallel and right angle to the axisofthe	
10	Drawing	Required	
11	Color ofthe columnpipe	Three coat of black coloranti-corrosive	
12	Inspection &Testing of pipe forcolumnpipes	Required	

7.0 C.I.D.F. PIPES ANDSPECIALS

C.I.D.F.PIPES

SrNo	Technical Description ofmaterial	A.M.C.Requirements	Tenderers ' (Bidders')
(I)	C.I.D.F. pipesrequired	Forwater	
1	Size	65 mm dia (2.5"dia)	
2	Length	1.0meter	
3	Type ofcasting	Horizontally or vertically cast doubleflanged	
4	Standardspecification	As per IS7181/1986	
5	Flanges holedrilling	As per B.S. Table'C'	
6	Marking onpipe	As per class 'B' of IS 7181/198	
7	Make	Tenderer shouldmention	
8	ISI embossmark	Preferred	
(II)			
A	M.S. Nut bolts size	16 mm dia(5/8")	
B	Make	GKW/TVS/DELTA/ISWP	
C	Standard I.S.Specification	As per IS1363	
D	Emboss mark of make & mechanicalproperties	Required	
E	Type ofhead	Hexagonal	
F	Plainwasher		
	(i)Size	5/8"	
	(ii)Material	M.S.	

CIDF SHORTBEND

Sr No	Technical Description ofmaterial	A.M.C.Requirements	Tenderer'S(Bidder'S) Offer
	C.I.D.F. shortbend:		
1	(i) size of sluice valve	65mmdia	
	(ii) benddegree	90º(short)	
2	Standardspecification	As per IS1538/1993	
3	Flanges holedrilling	As per B.S. Table'C'	
4	Marking onpipe	As per chass 'B' of IS 1538/1993	
5	Make	ISI	
6	ISI embossmark	Mustrequired	
7	Certification from the manufacturer's or authorized stockiest or dealer's should submit by tenderer regarding purchase of CIDF 150 mm diashort bend from whom material has been purchased.	Required	

8.0 LIST OF APPROVEDVENDORS

SR.NO.	ITEMS	APPROVED MAKE
1.	SUBMERSIBLE PUMPMOTOR	KSB/EBARA/GRUNDFOS
2.	SLUICEVALVES	IVC / KIRLOSKAR / UPADHYA / IVI/HAWA/GEETA
3	NON RETURNVALVES	IVC / KIRLOSKAR / UPADHYA / IVI/HAWA/GEETA
4	C.I.D.F PIPE ANDBENDS	IVC / KIRLOSKAR / UPADHYA / IVI/HAWA/GEETA
5	M.S. CASINGPIPES	AJANTA / JINDAL / LIOYDS / SURYA /ROSHNI WELSPUN /ASIAN
6	G.I. COLUMNPIPES	JINDAL / LIOYDS /PRAKASH /SURYA / AJANTA/TATA/ASIAN