महाराष्ट्र जीवन प्राधिकरण

मुख्य अभियंता, पुणे प्रादेशिक विभाग पुणे,
नवीन प्रशासकीय इमारत, पुणे लष्कर पा.पु. केंद्र आवार,
४६३ स्टेव्हली रोड, सेंट मेरी चर्च शेजारी, कँप, पुणे-४११००१
दूरध्वनी : कार्यालयीन २६३५००६२ / २९७०६०६४
Email : cemjppn@gmail.com

जा.क्र :-मु.अ(पुणे)/चिशा/दरसूची /आधुनिक तंत्रज्ञान/ SMC Panel Tank/३७६८/२०२५ दि ११ जुलै २०२५

शुद्धीपत्रक क्र ७

विषय :- १) मजीप्राच्या सन २०२३ - २४ च्या दरसूचीमध्ये **प्रेशर फिल्टर** चा समावेश करणेबाबत

२) मजीप्राच्या सन २०२३ - २४ च्या दरसूचीमध्ये **SMC Panel Tank** चा समावेश करणेबाबत

संदर्भ :- १) शुद्धीपत्रक क्र ६, जा.क्र १६९८ दि ३ जुलै २०२५

२) अ.अ.(मु) यांचे पत्र जा.क्र :मजीप्रा/सस/तांशा -३/८७०/२०२४ दि १६/९/२०२४

३) या कार्यालयाचे पत्र जा.क्र २२४६ दि ०३ ऑक्टोंबर २०२४

४) या कार्यालयाचा डॉकेट स्वरूपातील प्रस्ताव जा.क्र ११४३ दि ०८ मे २०२५

५) म.जी.प्रा मुख्यालय (मुंबई) मा. सदस्य सचिव यांची मान्यता दि १२/०६/२०२५

भाग :-१ प्रेशर फिल्टर चा म.जी.प्रा च्या सन २०२३-२४ च्या दरसूचीमध्ये समावेश शुद्धीपत्रक क्र ६, संदर्भ क्र १ अन्वये अन्वये करण्यात आला आहे. त्यामध्ये प्रेशर फिल्टर चे description खालीलप्रमाणे नमूद आहे.

S N	Description	Unit	Qty
1	Online Hydraulically Operated Self Cleaning Pressure Filter for the flow rate of ..... with 20 hour pumping	1 unit	1 package
	FILTRATION Providing of Hydro Cyclone Centrifugal Pre Filter & **Multi-grade Pressure Filter (2 Nos)** with required accessories for connecting the filter to rising main with a maximum / minimum operating pressure of 5 Kg/ cm2 to 1.5 Kg / cm2 respectively and confirming to the following specifications: to filter water containing of suspended solids Turbidity to produce a filtrate with less than 5 ppm of suspended solids.		

सदर उपरोक्त description च्या ऐवजी आता description खालीलप्रमाणे वाचण्यात यावे.

SN	Description	Unit	Qty
1	Online Hydraulically Operated Self Cleaning Pressure Filter for the flow rate of ..... with 20 hour pumping	1 unit	1 package
	FILTRATION Providing of Hydro Cyclone Centrifugal Pressure Filter & **Multi - grade Pressure Filter (2 Nos)** with required accessories for connecting the filter to rising main with a maximum / minimum operating pressure of 5 Kg/ cm2 to 1.5 Kg / cm2 respectively and confirming to the specifications mentioned pressure filter capacity wise below. **The Pressure Filter shall be able to handle Turbidity 50 to 120 NTU at inlet and provide treated water with Turbidity less than 5 NTU at outlet.**		

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	Note: - Backwash frequency need to be increased in rainy season due to high turbidity load. Pre and Post Chemical Dosing system shall be used for high turbidity load. Hydro Cyclone Centrifugal Filter shall be used as pre ttreatment.		

या व्यतिरिक्त शुद्धीपत्रक क्र ६ मधील इतर सर्व नमूद बाबींमध्ये कोणतेही बदल करण्यात आलेले नाहीत.

<u>भाग २ :-</u> मजीप्राच्या सन २०२३ - २४ च्या दरसूचीमध्ये **SMC Panel Tank** या आधुनिक तंत्रज्ञानाचा समावेश करण्याबाबतचा प्रस्ताव उपरोक्त संदर्भ क्र ४ अन्वये डॉकेट स्वरूपात म.जी.प्रा मुख्यालयास सादर करण्यात आला होता. त्यास संदर्भ क्र ५ अन्वये मान्यता प्रदान करण्यात आली असून शुद्धीपत्रक निर्गमित करणेबाबत निर्देशित करण्यात आले आहे. या अनुषंगाने आता दरसूची मध्ये (शुद्धीपत्रक क्र ७) विषयांकीत बाबीचा समावेश खालील प्रमाणे करण्यात येत आहे.

S. N.	Description	Unit	Rate (Rs) 2023 – 24	
			Complete RCC Staging Cost with SMC PT Container	Labour For RCC Staging
	Design (aesthetically) and construction of an RCC elevated service reservoir with a Hot Pressed Moulded SMC Panel Tank Container of the following capacity, with RCC staging consisting of columns and internal and external bracing spaced vertically not more than 6.5 meters center-to-center. The ESR, having a capacity of up to 200 cubic meters, includes excavation in all types of strata and foundation concrete. It also covers the cost of supply and installation of a prefabricated hot-pressed molded water storage SMC Panel tank on a flat slab, precast bottom slab, or grid slab, as per specifications and standards of all relevant IS codes. The ready-to-assemble construction consists of SMC panels with dimensions of 1m x 1m, 1m x 2m, or 1m x 0.5m, joined together with HDG/Olive Green nut-bolts using 75mm x 3mm food-grade sealant tape as an interlayer between panels to ensure the tank is leak-proof. From the outside, each panel joint must be firmly supported by MS vertical posts (using anchor fasteners in the concrete slab) with the top tied using tie rods. The tanks must conform to BIS 14399:1996 Part I & II. The tank rate will include : FRP-grade man hole, FRP ladders (inside and outside of the tank, from the base of the container to the top of the container), One manual-type water level indicator, inlet/outlet connection joint & air vent. Water tightness test ,Transportation up to site of work & with all taxes etc. complete including refilling disposing off the surplus stuff within a lead of 50 meters, all labour and material charges including lowering ,I aying, erecting, hoisting and joining of pipe assembly of inlet, outlet, washout, overflow and bypass arrangements up to 5m from periphery of tanks as per departmental design, providing and fixing accessories such as FRP Ladders from outside containers with both side GI or FRP pipe railing, lightening conductor, G.I. or FRP pipe railing around walkway and top slab, providing spiral stair case from ground level to roof level, M.S. grill gate or FRP gate of 2M height with locking arrangements of			

	approved design. B.B. masonry chambers for all valves, ventilating shafts, providing and applying three coats of Acrylic emulsion with silicon additives paint to the RCC structure including anti termite treatment for underground parts of the structure and giving satisfactory water tightness test as per I.S. code. The job to include tightness test as per I.S. code. The job to include painting the name of the scheme and to her details on the reservoir as per the directions of Engineer-in-charge			
	Notes :			
1	The design of the structure be in accordance with relevant I.S. specifications (I.S.3370-1965) or revised.			
2	The design shall satisfy the stipulations as per I.S. 1893 – 1984 and I.S. 13920 / 1993 for seismic force and I.S. 11682 / 1985 for R.C.C. staging of overhead tanks. SMC Panel Tanks Flanges as per I.S. code Pipe I.S. 1239:2004 Part 1, other steel part IS 2062 part 1 and all other related IS Codes and latest amendments.			
3	For design having more than 6 coloumns, provision of internal bracing is obligatory. External bracing is also obligatory			
4	The entire structure shall be casted in Min. M 300 mix only.			
5	Plain round mild steel bars grade-I conforming to I.S. 432 part-I or high yield strength deformed bars conforming to IS.1786 or IS 1139 shall be used, grade II mild steel bars will not be allowed.			
6	Irrespective of the type of foundation proposed in the design, one set of bracing be provided at the ground level.			
7	These rates include providing, M.S. or FRP Ladder for E.S.R's up to 2lakh liters capacity and providing spiral staircase for E.S.R. above 2lakh liter capacity.			
8	Staging shall have to design with stresses of M200 concrete for ESR .However all RCC construction should be done in M 300			
9	These rates are including the cost of uplift pressure if any and entire dewatering during execution.In case of water logging area where water is strectch shallow depth,extra provision of dewatering shall be made as per site condition.			
10	All conditions given in the Member Secretar's circular No. MJP/TS-I/350/1668 Dt. 02-08-97 and MJP/S-I/2127 Dt.13-07-99 shall be strictly followed and additional cost,if any,due to these conditions is included in the rates mentioned below.			
11	75 % part rate shall be payable till satisfactory hydraulic testing of SMC Panel tank for water tightness is given & till that work shall be treated as incomplete.			
12	The rates indicated in the table are excluding the cost of pipes, specials and valves required for inlet, outlet , washout, over flow, and bypass arrangement. The scope of work, however, includes cost of erecting			

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	,laying ,joining of pipes and valves incl uding cost of joining materials upto 5M beyond outer face of outermost column.			
13	C.I./D.I. double flanged pipes upto 300mm dia shall be provided and C.I./D.I. special shall be used with proper anti-corrosive epoxy treatment from inside and outside.			
14	Below mentioned rates are for foundations with individual footing with bearing capacity of 20 ton per square meter ,for raft foundations, these rates shall be increased by 7.5% where safe bearing capacity(SBC) is more than 5MT / Sqm and up to 10MT/sqm. This % of 5% or 7.5% is applicable for estimation of amount of lump sum item of ESR or extra item due to change from individual foundation to raft, actual increase in concrete and steel be paid as per relevant DSR item.			
15	The rate shall be increased by 30% for bearing piles upto depth 10M and for further increased in depth by 5 M each, it shall be increased by another 10%.These rates are applicable where raft is not feasible. For pile foundations sulphate resistant cement shall only be used. Single pile for the column is not permitted. Group of piles shall be designed with pile cap for each column of ESR.			
16	The rates are applicable for staging height of 12M.These rates shall be increased or decreased for per meter variation in this staging height as below.			
	12 to 16 M Staging - 2% per meter.			
	16 to 20 M staging - 3% per meter.			
	20 M and above - 4% per meter.			
	For 17 M staging height, % calculation will be like below			
	12 to 16 M -- 4x2 = 8%			
	16 & 17 M -- 1x3 =3 % Total = 11 %			
	For 21 M staging height, % calculation will be like below			
	12 to 16 M -- 4x2 = 8 %			
	16 & 20 M -- 1x 3 % = Total = 12 %			
	20& 21 M -- 1x4 % = 4 % Total = 24 %			
	20& 21 M -- 1x 4% = 4 % Total = 24 %			
17	Following rates are for seismic Zone III. For zone IV these rates shall be increased by 5% and for zone II these rates shall be decreased by 5% concerned executive engineer shall confirm the seismic zone for the scheme for seismic zones plan before estimation and adopt appropriate rates as per actual seismic zones.(Seismic maps attached in this SSR.)			
	Notes			
	Conditions from Sr. No.1 to 11 shall from a part and parcel of the tender and must be included the draft tender papers for works of SMC Panel Tank.			

	Conditions from Sr. No. 12 to 17 are for estimation purpose only and shall not appear in the tender.			
	Rates for RCC ESR's with SMC Panel Tank Container			
1	Up to 25000 Litre Capacity	Lit.	39.02	13.02
2	Cost of 25000 Litre Capacity	Job	975465	325464
3	Add for capacity above 25000 up to of 50000 Litre	Lit.	20.39	6.49
4	Cost of 50000 Litre Capacity	Job	1485227	487737
5	Add for capacity above 50000 up to 75000 Litre	Lit.	14.40	4.64
6	Cost of 75000 Litre apacity	Job	1845104	603790
7	Add for capacity above 75000 up to 100000 Litre	Lit.	13.40	10.93
8	Cost of 100000 Liter Capacity	Job	2180003	877059
9	Add for capacity above 100000 up to 150000 Litre	Lit.	10.57	3.42
10	Cost of 150000 Liter Capacity	Job	2708273	1048185
11	Add for capacity above 150000 up to 200000 Liter	Lit.	9.62	3.80
12	Cost of 200000 Liter capacity	Job	3189433	1238379

Sr. No.	Description	Unit	Rate (Rs) 2023/24	
			Complete RCC Flat Base Cost with SMC PT Container	Labour For RCC Staging
1	Designing (aesthetically), and constructing Ground Service Reservoirs (GSR) of Hot Press Molded - SMC Panel Tank of required capacity including excavation in all types of strata, foundation concrete, SMC PT container, bottom slab RCC slab. It includes the cost of supply and installation of a prefabricated hot-pressed molded water storage SMC Panel tank on a flat slab, precast bottom slab, or grid slab, as per specifications and standards of all relevant IS codes. The ready – to - assemble construction consists of SMC panels with dimensions of 1m x 1m, 1m x 2m, or 1m x 0.5m, joined together with HDG/Olive Green nut - bolts using 75mm x 3mm food-grade sealant tape as an interlayer between panels to ensure the tank is leak-proof. From the outside, each panel joint must be firmly supported by MS vertical posts (using anchor fasteners in the concrete slab) with the top tied using tie rods. The tanks must conform to BIS 14399:1996 Part I & II. The tank rate will include: FRP-grade manhole (600mm dia.), FRP ladders (inside and outside of the tank, from the base of the container to the top of the container), One manual-type water level indicator, inlet /outlet connection joint & air vent. Also including			

	giving satisfactory hydraulic test and water tightness test as per IS code etc. complete as per design data, criteria, obligatory requirements and detailed specifications. Anti-termite treatment shall be given for underground portion of the structure.			
	Notes			
1)	The design shall be in accordance with various relevant I.S. specification (I.S. 456 / 1978, I.S. 875 - 1987, I.S. 3370 - 1965 or revised.)			
2)	Only M.S. bars grade I conforming to I.S. 432 part-I or high yield strength deformed bars conforming to I.S. 1786 or I.S. 1139 shall be used. Grade -II M.S. bars shall not be used.			
3)	Entire structure shall be in M – 300 only.			
4)	The scope of pipe assembly work shall be up to 5 metre beyond outside face of the wall, cost of pipes valves and specials is not included in the rate but labour cost for laying and jointing is included			
5)	The GSR / Sump above 15 lakh litres capacity shall be in two compartment.			
6)	The Job includes designing the structure for uplift pressure and dewatering if required during entire execution and disposal of surplus excavated stuff within lead of 50 metres as directed by Engineer in - charge. If uplifts considered in design, then these rates shall be increased by 7.5 %.			
7)	G.S.R. outlets shall be with bell mouth of approved pattern in bottom slab and cost of designing bell mouth is included in the rate. Sump well includes cost of suction pit required at bottom.			
8)	For pipe diameters upto 300 mm only CI pipes and CI specials shall be used. For pipe diameters above 300 mm, M.S. pipes and specials minimum 10 mm thick shall be used with proper anti corrosive epoxy treatment from inside and outside.			
9)	Cost of pump house is not included in these rates.			
10)	Above rates are applicable for Seismic Zones 2, 3 and 4.			
11)	75 % part rate shall be payable for reinforcement, concrete and plastering items of all types of G.S.R.s and sumps till satisfactory hydraulic testing of SMC Panel container for water tightness test is given and till that work shall be treated as incomplete.			
	Note : Conditions from Sr. No. 1 to 11 shall form a part and parcel of tender and must be included in the draft tender papers for work of SMC PT GSRs and sumps.			
1)	Up to 25000 Litre Capacity	Lit	19.35	7.59
2)	Cost of 25000 Litre Capacity	Job	483748	189787
3)	Add for capacity above 25000 up to of 50000 Litre	Lit	11.48	4.38
4)	Cost of 50000 Litre Capacity	Job	770682	299172
5)	Add for capacity above 50000 up to 75000 Litre	Lit	9.33	3.62
6)	Cost of 75000 Litre apacity	Job	1003880	389723
7)	Add for capacity above 75000 up to 100000 Litre	Lit	8.26	3.24
8)	Cost of 100000 Liter Capacity	Job	1210287	470735

9)	Add for capacity above 100000 up to 150000 Litre	Lit	8.04	3.16
10)	Cost of 150000 Liter Capacity	Job	1612485	628935
11)	Add for capacity above 150000 up to 200000 Liter	Lit	7.02	2.77
12)	Cost of 200000 Liter capacity	Job	1963580	767612

(note: -Specifications आणि वि.का.अ. तथा मुख्य अभियंता, पा.पु. व स्व.वि. तसेच अ.अ. (मु) मजीप्रा, मुंबई यांच्या समितीने दिलेली निरीक्षणे निविदेमध्ये समाविष्ट करण्यासाठी सोबत जोडली आहेत.

वैशाली आवटे

(वैशाली आवटे)
मुख्य अभियंता (प्र)

प्रत:- मा. सदस्य सचिव, म.जी.प्रा. मुंबई - यांना माहितीसाठी सविनय सादर.

प्रत:- मुख्य अभियंता, मजीप्रा प्रा.वि. ठाणे/नाशिक/छ.संभाजी नगर/ अमरावती/नागपूर – माहीती, कार्यवाहीसाठी

प्रत:- अ.अ.(मु) /अ.अ. म.नि.सं.व सं. कक्ष, मजीप्रा, मुंबई - यांना माहितीसाठी

प्रत :- अ.अ.मजीप्रा, मंडळ, पुणे, सांगली - यांना माहीती आणि पुढील कार्यवाहीसाठी

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Item No	Description	Unit	Rate for 2025-26
1	**SMC Panel Overhead tank with RCC Slab / MS Structural Grillage on RCC Staging (Description of item for turnkey tender)**		
	Water Tank Container as per IS 14399 Hot Pressed Moulded Thermosetting Glass Fiber Reinforced Polyester Resin (GRP) Sectional Water Storage Tank as specified below. - Raw Material : Hot press moulded Sheet moulding compound (SMC) / Fibreglass Reinforced Plastic. - Storage Medium: Raw or filtered Water/Liquid Storage (pH range 5-8.5) - SMC Panels Sizes as per the detail specifications - Hot Pressed Molded SMC Pre Drilled Corner Pieces with built-in ribs of the size minimum 70mm X 70 mm should be provided for 90 degree joints of tank walls or wall to base or wall to roof joints complete with nuts, bolts and washers. The shape should be Trunked type for extra strength and 90 degree flanges Pre-drilled for bolting. The nominal external size of the unit panels shall be 1.0 m x 1.0 m or 1.0 m x 0.5 m or 0.5 m x 0.5 m or 1.0 m x 2.0 m should have holes as per tank standards. - ISI Logo & CML number must be printed on all Panels as per ISI Standards. - SMC Panel Tanks meets all specified test as per ISI standard as e.g.-Hydro static pressure test, Deflection test & Manufacturer must have NABL accredited QC lab equipped with all testing machines and report can be submitted as required or client can get the test done at their own from any independent certified agency.		
	Accessories with the tasks: - Sealant, Air vent, Water Level indicator with required indication. - Sealants used are UV & weather resistant. - Fasteners utilized for the panel joints-Nut-Bolt with 2 washers M10/12 with Hot-dip Galvanization/Olive Green Bolt. All connection bolts (for external panel assembly) should be of 8.8 grade. Bolts which are in direct contact of water must be of SS 316 grade with EPDM / equivalent strength rubber washer. - Roof Support Pipe : The tank will have FRP roof support square pipes every internal tap joints, to avoid sagging of the roof panels. - Ladders (Internal and External) made of FRP material. - Manhole made of GRP material having minimum 600 mm of Diameter (Qty as per requirement to be provided) **External Support:** - For Tank side support of MS Vertical/Horizontal Member confirming to IS:2062 & IS:4923 with Primer Coated/HDG. Vertical Support should be fixed using anchor fastner with minimum grade of 5.8 - Tank assembled using SMC/ HDG Corner angles and cleat fasteners. - Opposite vertical post must be connected with MS Tie-Rods of approved diameter across the tank. - Inlet, Outlet, Overflow & Wash out minimum one number of each provided & dimension should be as per hydraulic design.		
	List of Indian Standards for design of ESR:		
	Note: The structural design of ESR shall be in accordance with provisions of relevant Indian Standards		
	I.S. 3370 part I & II 2009 or Its latest revision		
	I.S. 3370 part III & IV 1965 or Its latest revision		
	IS 456-2000 or Its latest revision		
	IS 11682- 1985 or Its latest revision		
	IS 1893-2002 part I to V or Its latest revision		
	IS 13920-1993, or Its latest revision		
	IS 875 part I to III,1987 or Its latest revision		
	IS 11089- 1987 or Its latest revision		
	IS 2062-2011 or Its latest revision (Hot rolled medium & high tensile structural steel)		
	IS 4923-1997 or Its latest revision (Hollow steel sections for structural used)		
	IS 1161-2004 or Its latest revision (Steel tubes for structural purpose)		

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	IS 14399 part I & II 1996 & IS 4249 Confirming 1967(for SMC Panel Tank)
	IS 808-2021 or Its latest revision
	General specification:
	(1) The Min. concrete grade for RCC shall be M :25. Proportion of concrete ingredients shall be as per Mix design using weigh batching.
	(2) HYSD (Fe 500D) or higher grade reinforcing bars confirming to IS 1786/1139 or CRS /TMT bars shall be used as per detailed specification.
	(3) In case of column –brace type staging having more than 6 columns internal horizontal bracing is obligatory. One bracing shall be at foundation level in case of Individual footings .
	(4) Min. size/thickness of various components shall be provided as per design criteria/specifications/IS Code (or as per std. practice). Capacity of the ESR shall be considered excluding free board.
	(5) Minimum dimensions specified for various components in tender data /specifications should be provided.
	(6) The Safe bearing capacity (SBC) /allowable pressure on soil shall be referred from latest SBC test report or tender datasheet. During execution If poor soil strata or ground water table is encountered, the SBC shall have to be re ascertained and the design should be revised accordingly.
	(7) Maximum spacing between horizontal bracings shall be 5 m (storey height).
	(8) RCC Staircase/ MS Staircase shall be provided and fixed for access to platform when height of platform from G.L. is up to 10 m. For ESR having more than 10 m height proper RCC staircase shall be constructed. Railing should be provided throughout the staircase and around the Platform.
	(9) Water level indictor shall be provided (as specified).
	(10) The rate shall include providing and fixing pipes, specials, and valves required for inlet, outlet, wash out, over flow and bye pass arrangement. The scope of work includes constructing supporting RC pillars, erecting, laying, fixing and joining pipes and specials etc up to 5m length from face of staging (outer most column).
	(11) DI pipes & specials shall only be used.
	(12) The rate shall include cost of dewatering during execution making all arrangement with any dewatering technique.
	(13) The tank and supporting structure of tank should be designed as per IS standard. It should be vetted from reputed institute / registered consultant (Whenever required by client).
	(14) The structure shall be designed properly for uplift due to Ground water table specified in data or GWT encountered during execution No extra payment shall be paid for the same.
	(15) Effective curing shall be carried out up to required period as per specifications.

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Item No	Description of Item	Unit	Rate for 2025-26
2	**SMC Panel Tank on Ground level (GSR) / Slab level (Description of item for turnkey tender)**		
	Water Tank Container as per IS 14399 Hot Pressed Moulded Thermosetting Glass Fiber Reinforced Polyester Resin (GRP) Sectional Water Storage Tank as specified below. - **Raw Material :** Hot press moulded Sheet moulding compound (SMC)/Fibreglass Reinforced Plastic. - **Storage Medium:** Raw or filtered Water/Liquid Storage (pH range 5-8.5) - SMC Panels Sizes as per the detail specifications. - Hot Pressed Molded SMC Pre Drilled Corner Pieces with built-in ribs of the size minimum 70mm X 70 mm should be provided for 90 degree joints of tank walls or wall to base or wall to roof joints complete with nuts, bolts and washers. The shape should be Trunked type for extra strength and 90 degree flanges Pre-drilled for bolting. The nominal external size of the unit panels shall be 1.0 m x 1.0 m or 1.0 m x 0.5 m or 0.5 m x 0.5 m or 1.0 m x 2.0 m should have holes as per tank standards. - ISI Logo & CML number must be printed on all Panels as per ISI Standards. - SMC Panel Tanks meets all specified test as per ISI standard as e.g.-Hydro static pressure test, Deflection test & Manufacturer must have NABL accredited QC lab equipped with all testing machines and report can be submitted as required or client can get the test done at their own from any independent certified agency.		
	Accessories with the tasks: - Sealant, Air vent, Water Level indicator with required indication. - Sealants used are UV & weather resistant. - Fasteners utilized for the panel joints-Nut-Bolt with 2 washers M10/12 with Hot-dip Galvanization/Olive Green Bolt. All connection bolts (for external panel assembly) should be of 8.8 grade. Bolts which are in direct contact of water must be of SS 316 grade with EPDM / equivalent strength rubber washer. - Roof Support Pipe : The tank will have FRP roof support square pipes every internal tap joints, to avoid sagging of the roof panels. - Ladders (Internal and External) made of FRP material. - Manhole made of GRP material having minimum 600 mm of Diameter (Qty as per requirement to be provided) **External Support:** - For Tank side support of MS Vertical/Horizontal Member confirming to IS:2062 & IS:4923 with Primer Coated/HDG. Vertical Support should be fixed using anchor fastner with minimum grade of 5.8 - Tank assembled using SMC/ HDG Corner angles and cleat fasteners. - Opposite vertical post must be connected with MS Tie-Rods of approved diameter across the tank. - Inlet, Outlet, Overflow & Wash out minimum one number of each provided & dimension should be as per hydraulic design.		
	List of Indian Standards for design of GSR:		
	Note: The structural design of GSR shall be in accordance with provisions of relevant Indian Standards		
	I.S. 3370 part I & II 2009 or Its latest revision		
	I.S. 3370 part III & IV 1965 or Its latest revision		

	IS 456-2000 or Its latest revision		
	IS 1893-2002 part I to V or Its latest revision		
	IS 875 part I to III,1987 or Its latest revision		
	IS 2062-2011 or Its latest revision (Hot rolled medium & high tensile structural steel)		
	IS 4923-1997 or Its latest revision (Hollow steel sections for structural used)		
	IS 1161-2004 or Its latest revision (Steel tubes for structural purpose)		
	IS 14399 part I & II 1996 & IS 4249 Confirming 1967(for SMC Panel Tank)		
	IS 808-2021 or Its latest revision		
	General specification:		
	(1) The Min. concrete grade for RCC shall be M :25. Proportion of concrete ingredients shall be as per Mix design using weigh batching.		
	(2) HYSD (Fe 500D) or higher grade reinforcing bars confirming to IS 1786/1139 or CRS /TMT bars shall be used as per detailed specification.		
	(3) Water depth in container shall be as per BIS Standard. Capacity shall be calculated excluding free board of the reservoir.		
	(4) Size shall be fixed as per availability of space (land area) at site / acceptable engineer in charge.		
	(5) Effect of overlapping of pressure bulbs on soil due near by structure and proposed sump should be considered.		
	(6) The Safe bearing capacity (SBC) /allowable pressure on soil shall be referred from latest SBC test report or tender datasheet. During execution If poor soil strata or ground water table is encountered, the SBC shall have to be re ascertained and the design should be revised accordingly.		
	(7) Appearance of structure should be aesthetically good looking acceptable to authority.		
	(8) Internal and External ladder made of FRP material should be provided.		
	(9) Water level indictor shall be provided (as specified).		
	(10) The rate shall include providing and fixing pipes, specials, and valves required for inlet, outlet, wash out, over flow and bye pass arrangement.		
	(11) DI pipes and special shall only be used if type is not specified in tender.		
	(12) The rate shall include cost of dewatering during execution making all arrangement with any dewatering technique.		
	(13) The tank and supporting structure of tank should be designed as per IS standard. It should be vetted from reputed institute / registered consultant (Whenever required by client).		
	(14) The structure shall be designed properly for uplift due to Ground water table specified in data or GWT encountered during execution No extra payment shall be paid for the same.		
	(15) Effective curing shall be carried out up to required period as per specifications.		

Observations and recommendations of committee of C.E. And OSD(WSSD, GOM)&S.E .(HQ)-MJP :

Based on the presentation made by Sintex (Welspun Group) & followed by further discussionand checking the design of different capacity of elevated storages reservoirs in which the RCC was used up to staging height and base slab and then Pannels were used for walling and roof slabs, it is recommended as follows:

1. Construction of composite structure i.e., SMC (GRP) elevated water Panels Tanks with RCC staging takes less construction time of 30 to 60 days depending on the capacity of the tank as compared to construction of RCC elevated water tank. RCC PRECAST Slab or Grid can be used instead of Conventional RCC Base Slab for SMC (GRP) Elevated Water Tank.

2. Various components of RCC staging, such as beams, columns, and braces, must adhere to the minimum dimensions specified in the Schedule (DSR)and the current circulars for RCC ESR/ GSRissued by MJP.

3. The foundation must be designed based on the soil's bearing capacity, wind loadand seismic activity and taking consideration of the empty SMC Panel Tank.

4. Roof Design of tank should be of load bearing capacity of 200 kg/sqm& using same SMC(GRP) Panels having support of FRP pultruded vertical poles & SMC plates inside the tank as per prescribed standards.

7. It is mandatory to provide saddle support for the inlet & outlet pipes & to encase the duck foot bend with thrust blocks both below & above the ground. Additionally, the vertical assembly of the pipe must be supported by a tie beam.

8. It is mandatory to construct an elevated SMC tank with RCC staging up to a maximum capacity of 200KL(following IS:14399) & the height of the staging should be maximum upto15mtr height.

9. Top cover construction having manhole with cover of minimum diameter800 mm & Internal & external ladder should be provide of FRP Material.

10. It is mandatory to obtain approval for the design of elevated SMC Panel tank with RCC staging at the level of concerned Supt. Engineer.

11. The thickness of the leveling course below the tank shall be at least 125 mm & the grid type platform should be 200X200 mm. (To be verified with the structure drawing).

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12. Minimum freeboard should be required for SMC tank is 300mm.
13. The SMC Panel Tank & roofing should be designed to withstand all wind load & other load accordingly.
14. The work should be carried out in accordance with detailed specifications, method of construction and other technical aspects.
15. Under the Jal Jeevan Mission program, RCC staging and SMC Panel Tank for ESR/GSR structure can be adopted to ensure that water supply scheme projects are completed quickly and on time.
16. As per the above, the drawings and designs for the construction of the tank should be certified (vetted) through government engineering colleges.
17. Till the time the performance of tanks is validated, the maximum capacity for the SMC (GRP) panel tank may be restricted up totwo lakh liter only.
18. The connections of the SMC Panel tanks shall be ensured to resist uplift due to design wind pressure when the tank is empty.
19. The staging shall be designed in M25 however casting shall be done in M30.
20. The vertical center to center distance between the braces shall not be more than 4.5m. There shall be a prior agreement between contractor and manufacturer of this tank that manufacturer is equally responsible regarding connectivity with RCC structures and Sintex SMC tank. This shall be submitted to the department prior to doing the work.
21. The vendor of the tank shall ensure proper connection with the RCC staging. All the connections pockets etc. shall be made prior to casting of top framework checked and confirmed by the vendor.
22. It is also recommended that this type of SMC Panel tank shall also be included in MJP SSR.

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