

SCHEDULE OF QUANTITY			Estimated Cost: 202500			
Name of Work:- A/R & M/O LWSS Sardhar Doh & Godhani in GP Lower Rewalsar Tehsil Balh Distt. Mandi (HP) (SH:- Centrifugal Pumping Machinery with allied accessories)			Earnest Money: 4050			
			Time:- Six months			
S.NO.	DESCRIPTION	Quantity	RATE		UNIT	AMOUNT
			IN FIG	IN WORDS		
1	2	3	4	5	6	7
1	Supply of horizontal spindle horizontal/ vertical split casing Single/Multistage centrifugal / Reciprocating pumps of standard make such as KSB/Mather & Platt/Jyoti/Kirloskar/ Best & Crompton/BE/Lubbi/Grundfos/WPIL make, conforming to BIS 5120-1980 (latest with upto date ammendments) read with BIS 9137-1978 or latest to handle clear water having turbidity upto 50 PPM , with impellers, casing ring & shaft sleeves of bronze, shaft of steel with cast iron casing of suitable capacity coupled directly through a flexible coupling on a common base plate to kirloskar/NGEF/Crompton/Siemen/Jyoti/ABB/Marathan Squirrel cage screen protected drip proof induction electric motor suitable for operation on the data given below.	2 Sets			Per Set	
A)	<u>SITE CONDITIONS</u>					
i.	Location of site	Jada Ka Nahla				
ii	Thre altitude of place in which the motor is intended to work in ordinary service if it exceeds 1000mtrs	Altitude of place is 1174m above MSL				
iii.	Humidity	Weather generally remains humid during monsoon season.				
iv	Nature of atmosphere	As normally encountered in Shivalik Ranges.				
v.	Detail of quality of water	Clear cold water.				
vi	Water free from sand or not	Yes				
vii	Water corrosive or not	No				
viii	Turbidity	(if any) Clear cold water.				
ix	NPSH available	N.A.				
x.	Any other information or requirement	-				
B	<u>OPERATING CONDITIONS</u>					
I.	Type of current	A.C Three/Single phase.				

ii.	Operating frequency	50 HZ					
iii.	Rated voltage	400(+ / -) 10% volts.					
iv.	System of earthing if any to be adopted	Double loop earthing as per BIS-3043-1987 latest with upto date ammendments.					
v.	No. of working hours per day	6 Hours.					
vi	Speed of revolution in RPM	To be quoted by tenderer.					
vii	Direction of rotation	To be quoted by tenderer.					
viii	The max. Temp. of cooling air & water in the place in which the pumpset is intended to work in ordinary service.	35 degree centigrade.					
C	MOTOR						
i.	Ref. to BIS code	BIS 325-1978 raed with BIS 900-1992 (latest) with upto date ammendments.					
ii	Type of enclosure of motor	SPDP (As per BIS 4691-1985, Latest).					
iii.	Type of duty	Continuous.					
iv.	Mechanical out put in KW	Suitable for driving submersible pumps required for duties specified against pumps. To avoid overloading of motor a margin of about 15-20% may be kept in the rated out put of prime mover.					
v.	Class of insulation	Class-B/F					
vi.	Max. permissible temp. rise of motor reqd. if different from that given in B (viii) above.	To be specified by the tenderer.					
vii.	Particulars of test required & where they are to be conducted.	As per terms & conditions attached.					
viii.	Particulars as to whether voltage limiting device will be employed	ATS/Star Delta starter oil immersed, fully automatic to be installed between bus bar chamber & motor. Shunt capacitor is also proposed to be installed for improving the power factor at site.					

		NOTE:- Start delta starter upto 37.5KW & ATS for 37.5 KW to 50KW & stator rotor starter with slip ring motor beyond 50 KW.					
ix	Motor whether squirrel cage or slipring	Squirrel cage:- Note:- Squirrel cage upto 65HP & slipring above 65HP					
x.	Details of shaft extension required.	Just sufficient to provide direct drive by flexible coupling to pump.					
xi.	Type of slipring gear whether continuously rated or for starting purposes only and whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are required.	Continuously rated for squirrel cage motor.					
xii.	Breakway torque in terms of rated load torque & the corresponding breakway starting current which may be taken from the supply with the starting apparatus in circuit.	Breakway torque to be given by the tenderer but the starting current should not exceed 2.5 times of the full load current.					
xiii.	Nature of load & any information regarding the driven machine which has a bearing upon the torque required during the accelerated period. The kinetic energy of the moving parts to be accelerated & No. of starts during a specified period.	To work the pump offered.					
xiv.	Where possible fault capacity of the system to which the motor is connected.	The motor should be able to withstand initial current of 2.5times the rated current for two minutes without suffering damages of permanent deformations.					
D	PUMPS:BIS 1520-1980,READ WITH BIS 9137-1978 BOTH LATEST WITH UPTO DATE AMMENDMENTS.						
a	Nos of pumps reqd.	2 No. pumps (one will act as stand by).					
b	Spare parts required	For Two years normal maintenance as recommended by manufacturer.					
c.	Optional fittings reqd.	Air cock for exhausting air from each stage.					
C	<u>Pump operating conditions.</u>						
i.	Capacity	2.31 LPS/ Set					
ii.	Total head in Mts.	261.11 Mtrs.					
	(If total head in not known then following details be provided):						

i.	Static Head	190.00 Mtrs.					
ii.	Minimum depth of waterMtrs.					
iii.	Variation in water level.Mtrs.					
iv.	Ground level to max. water levelMtrs.					
v.	Ground level to delivery pointMtrs.					
vi.	Pressure in the suction tankKg/cm ²					
vii.	Pressure in the delivery tankKg/cm ²					
iii.	Length of R/main	1056 mtrs.					
iv.	Dia of R/main	50 mm Dia (MC)					
v.	Drive arrangement	Direct through flexible coupling on a common base plate.					
vi.	Drive type	Electric driven					
vii.	NPSH required:	To be quoted by tenderer.					
viii.	Limits of total head in which the pump is reqd. to operate.	(-)15% to (+) 10% of total head.					
ix.	Suction/delivery size of pump	To be specified by the tenderer.					
x.	Efficiency of pump at	To be specified by the tenderer.					
	a. duty head.						
	b.(+) 10% head						
	c. (-)15% head.						
xi.	Material of construction	To be specified by the tenderer(Manufacturers certificate to be appended).					

2	Supply of suitable DOL starter /oil immersed Star delta starter/ATS/stator rotor starter of standard make such as MEI/Kilburn/Jyoti/Siemens conforming to BIS-8544-1979 latest with upto date amendments for squirrel cage/ slipring motor (Make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot, time lag under voltage release with initial oil filling. Note:- Star delta starter upto 37.5KW, ATS between 37.5 KW to 50 KW and stator rotor starter with slipring motor beyond 50KW.	2Nos			Each	
3	Providing MS sheet 16 SWG steel fabricated floor mounted closed almirah type switch board including angle iron post of suitable height and size ISA 40x40x6mm duly painted comprising and capable of mounting the following accessories with all internal electric connections. The drawing of panel board shall be subject to approval of Engineer-in-charge.	1No			Each	
a.	P/F Digital VAF meter, of Enercon make , for above motor with selector switches conforming to BIS 1248-1983 latest with up to date amendments.	2Nos			Each	
b.	ICTP switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemen make and having capacity 30% extra of the operational rating of motor as per BIS 4064-1978 with upto date amendments immediately after the power meter of HPSEB.	2Sets			Per Set	
c.	Busbar chamber having 3 copper bars of suitable rating for full length equal to width of board of 3 live phases and one copper bar of half rating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto date amendments.	1No			Each	
d.	MCB / Oil Circuit breaker of suitable capacity of Kilburn/LT/LK/MEI/Standard make on in coming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with upto date amendments with neutral linked under voltage release.	1No			Each	
e.	3 Phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 Part 1 & II latest with up to date amendments.	2Nos			Each	
f.	Earth leakage circuit breaker of recommended (Kilburn/L&T/MEI/GEC as per BIS-2516-1977 with upto date amendments and of suitable range with which should have control box , operating handle and trip/reset bush button on/off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted with earth fault for tripping of breaker on occurrence of earth fault on/off breaker load side.	1No			Each	
g.	Hour run meter of reputed make of four digit capacity conforming to BIS-722 (Latest edition) recommendations.	2Nos			Each	
h.	Suitable three phase voltage monitor relay with all protections & usual indications with electrical sirens against single phasing.no voltage, high voltage & overloading & phase voltage difference.	1No			Each	
i.	Change over switch of reputed make & suitable capacity.	1No			Each	

j.	Single phase preventor of reputed make & suitable capacity.	1No				
4(a)	Supply of Kirloskar/Kilburn/IVC/Fouress./Gled/Bhel/Leader/Pelican/KSB make of suitable size Cast iron double flanged sluice valve, Class-PN-1 , having size one step higher to delivery of pump and capable of withstanding nominal seat pressure as per BIS. Note:- The sluice valve shall confirm to IS:780-1984 latest with upto date amendments . However, If the seat pressure exceeds the limits prescribed in BIS 780 then the sluice valve shall be of cast steel confirming to class 150 ASA (Seat pressure 21 Kg/cm²) or class 300 ASA (seat pressure 52 Kg/cm²) or class 600 ASA(Seat pressure 104Kg/cm²) as per BIS 1414 (API 600).	2Nos			Each	
4(b)	Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader Cast iron double flanged swing check type reflux valve, class PN-1 having bye pass arrangement & size one step higher than the delivery of pump for withstanding nominal seat pressure as per BIS. NOTE:- The reflux valve shall conform to BIS 5312-1984(Part-1) latest with upto date ammendments . However if the seat pressure exceeds the limits prescribed in BIS 5312 then the reflux valves shall be of cast steel conforming to class 150ASA (Seat pressure 21Kg/cm²) or class 300ASA(Seat pressure 52 Kg/cm²) as per BS 1414(API 600).	2Nos			Each	
4(c)	Supply of Kirloskar/Kilburn/ IVC/Fouress/Gled/Bhel/Leader/ Kartar make of suitable size Cast iron double flanged swing check type reflux valve, Class PN-1 , having bye pass arrangement & size equal to dia of rising main for withstanding nominal seat pressure as per BIS. Note:- The reflux valve shall conform to BIS 5312-1984(Part-I) latest with up to date ammendments. However if the seat pressure exceeds the limits prescribed in BIS 5312 then the reflux valves shall be of cast steel conforming to class 150ASA (Seat pressure 21Kg/cm²) or class 300 ASA (Seat pressure 52 Kg/cm²) as per BIS414 (API 600).	1No			Each	
4(d)	Supply of Kirloskar/Kilburn/IVC/Fouress./Gled/Bhel/Leader/ Kartar make of suitable size cast iron double flanged sluice valve, class PN-1 , having size equal to dia of suction pipe and capable of withstanding nominal seat pressure as per BIS. Note:- The sluice valve shall confirm to IS:780-1984 latest with upto date amendments . However, If the seat pressure exceeds the limits prescribed in BIS 780 then the sluice valve shall be of cast steel confirming to class 150 ASA (Seat pressure 21 Kg/cm²) or class 300 ASA (seat pressure 52 Kg/cm²) or class 600 ASA(Seat pressure 104Kg/cm²) as per BIS 1414 (API 600).	2Nos			Each	
5(a)	P/L suitable size copper PVC insulated armoured power 3. 1/2 core cable confirming to BIS 1554(Part-I)-1988 latest with up to date ammendments of Siemen/ Gloster/ ICC/ Havells/ Finolex make from meter of HPSEB to OCB & from OCB to Busbar switch & starter (One cable carrying all three Phases) including all other electrical equipment/accessories such as thimbles flexible pipe , solder, nuts & bolts, cable glands etc. laid in pipes or trenches under floor. The type, size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	10 Rmt			Per Meter	

5(b)	P/L suitable size copper PVC insulated armoured power three core cable conforming to BIS 1554(Part-I)-1988 or latest with upto date ammendments Siemen/Gloster/ICC/Havells/Finolex make from switch to starter & starter to motor (One cable for carrying all three phases) including all other electrical equipment/accessories such as thimbles, flexible pipes, solder, nuts & Bolts, cable glands etc. laid in pipes or trenches under floor. The type size & make will be subject to approval of HPSEB authorities . In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	10 Rmt			Per Meter	
5 (c)	P/L double loop earthing with GI plate 600x600x3mm thick electrode complete with material such as charcoal, common salt, GI pipes, thimbles, nuts & bolts ,digging of pits, GI wiring & 25x5mm GI strips of required capacity conforming to BIS 3043-1987 latest with upto date ammendments for above motors & other electrical equipment.	1Job			Per Job	
5(d)	Supply & erection of floor/wall mounted power factor shunt capacitor conforming to BIS 2834-1986 latest with upto date ammendments of BHEL /GEC /Machneil / Mager / Bajaj make to raise the prevailing power factor at site to 0.95 for direct connection to iduction motor individually of required KVAR according to HP of motor offered including cable of siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS-4064-1978 or latest with HRC fuses (Range to be specified by the tenderer).	2 Nos of 2 KVAR			Each	
6	Supply of standarad make 100mm dia circular dial pressure gauge of suitable range of Fiebeg/Bourden/ Precision make with all accessories such as stop cock, copper tubing etc conforming to BIS 3624-1987 latest with upto date ammendments.	2Nos			Each	
7	Supply of Kirioskar/Jyoti/Standard /Kilburn make cast iron flanged strainer of dia equal to dia of suction pipe conforming to BIS 4038-1986 latest withupto date ammendments.	2No			Each	
8	Poviding, Laying,Jointing GMS/MSERW pipe for suction, delivery pipe considering site requirements, NPSH required & available & common header having area equal to two times the area of delivery branch of pump or equal to dia of rising main (which ever is higher) including tapers , flanges, rubber gaskets 3mm thick as per BIS-2712-1978, nuts and bolts as per 1364-1983 & special upto 5mtrs away from the outer wall of pump house as per layout drawings approved by Engineer-in-charge. The pipes shall be capable of withstanding 1.5 times the total pressure indicated in them no 1C(ii) Note:- Actual laying to be done as per final drawings to be approved by the Engineer-in-charge.					
i)	Suction side	10 Rmt			Per Rmt	
ii)	Delivery side	4 Rmt			Per Rmt	
iii)	Common Header	10 Rmt			Per Rmt	
9	Erection of all equipments from S.No.1 to 4,6,8 including cost of tees, bends, tapers & any other fittings required as per site conditions & as per directions of Engineer-in-charge.	1Job			Per Job	

Executive Engineer

IPH Division Baggi

Terms and Conditions for Pumping Machinery (Annexure-A.

Annexure-A

- 1 The firm shall forward a copy of supply order/ indent placed by it for the supply of pumps and motors on the manufactures/ authorized dealers of the pumps and motors to the consignee within 30 days after the issue of the letter of intent/ award by the Engineer-in-charge. The copy of the supply order/intent to the consignee should also accompany the dealership certificate of the dealer for the pumping machinery in case the pumps and motors are arranged from the authorized dealers.
- 2 The firm shall arrange dispatch of offered pumps and motors to the consignee direct from the manufacturers/ their authorized dealers of the pumping machinery for which the supply order/ indent has been placed by the firm. The packing slip should indicate the details of materials in the package and material of construction of pumps and motors.
- 3 The shop test for pumps and motors shall be carried out at manufactures works in the presence of representative of the department as per IS 325-1978. The test performance certificate of the pumping machinery shall be arranged by the firm fro the manufactures and get it approved from the Engineer-in-charge before actual dispatch of the pumping machinery.
- 4 The firm shall supply the recommended list of spares and quantities required for normal working of the pumping machinery (Two years) from the manufactures of the aforesaid equipment at the time of quoting rates and shall quote items rate for the same also.
- 5 The firm shall supply the manufacturer's manual for the operation and maintenance of the pumping equipment.
- 6 The firm shall arrange operation and maintenance training to the operating staff for the pumping machinery (without extra cost) for a period of seven days i.e. during the testing period.
- 7 The characteristics curves of the pumping equipment shall be supplied with the offer, otherwise, the tender shall be rejected.
- 8 The firm shall supply layout drawing in respect of various components, such as suction pipes, valves, cable trenches, control panel etc. from the foot valve location to the common header which shall extend up to 5 meters from the outer walls of the pump house towards rising main. The details of foundations required for various components shall also be supplied by the firm within 30 days of the letter of intent/award.
- 9 The installation of pumping machinery above 100 HP shall be inspected by the technical representative of the manufacturers, of rank not less than that of a service Engineer, at the work site and inspection certificate shall be supplied to the Engineer-in-charge. This inspection shall be in addition to the test report and nothing extra shall be paid on this account.
- 10 All the civil works shall be constructed by the department/Contractor.
- 11 The wiring and installation of electric equipment shall be as per HPSEB rules and regulations and subjected to the approval of the Chief Electrical Inspector and or his authorized officer. Any defect pointed out shall be rectified by the firm without any extra cost. The wiring and installation of all electrical equipment shall be done by a licensed contractor of approved class of HPSEB authorities on their approved format (Form D) for release of power connection by the firm without extra cost.

- 12 The temporary electric connection, if required during installation shall be arranged by the firm at its own cost and energy charges shall also be paid directly by the firm to the HPSEBL.
- 13 Prices of all items shall be F.O.R site of work inclusive of all leads and shall be inclusive of all charges of transportation, insurance, packing, taxes and duties such as sales tax, excise duty and local taxes etc.
- 14 The rates shall be quoted only on the format of schedule of quantities which is attached with the tender document giving all specified data so desired therein.
- 15 The rates offered for the specified makes in the schedule of quantities only shall be considered. Rates quoted for the part or non specified makes shall lead to rejection of the tender.
- 16 The location of site can be ascertained from the concerned Assistant Engineer & the rates quoted by the firm shall be inclusive of all mechanical and manual transport within all leads and lifts to the site of work.
- 17 All the equipment/material shall conform to the relevant BIS specifications wherever applicable and in its absence to any accepted National/ International standards.
- 18 The general specifications of the work shall conform to HP.PWD/Punjab PWD specifications as per direction of the Engineer-in-charge
- 19 The validity of the tender shall not be less than 90 days, otherwise, the tender shall be summarily rejected.
- 20 All the equipment shall be guaranteed against any manufacturing defect including metallurgy and its performance for a period of 12 (twelve) months from the date of commissioning / 15(fifteen) months from the date of supply which ever is earlier. Any defect if noticed within the stipulated period shall be rectified by the firm at its own cost within 15 days of bringing the same to its notice. The guarantee clause shall be substantiated by a guarantee bond of a nationalized bank for an amount equal to the cost of pumping and electrical equipment (accessories included) pledged in the name of the Executive Engineer in charge at the time of applying for refund of security deposits. The guarantee bond shall be released after the expiry of the guarantee period.
- 21 The installed pumping machinery and other allied accessories shall be tested daily for stipulated pumping hours in the N.I.T for a period of seven days without extra cost. However, the cost of electricity and water shall be borne by the department. During the guarantee period efficiency of the pumping and the electric equipment should not vary beyond the range of (+/-) 2.5%. If during guarantee period, the efficiency falls beyond 2.5% to a maximum of 5%, 1% cost of the pump set for 1% fall of the efficiency shall be deducted. In case of fall of efficiency beyond 5% the pump set shall be rejected and cost of the effected pump set recovered from the pledged bank guarantee and or from the security deposit as the case may be.
- 22 80% (Eighty percent) payment of the cost of pumping machinery and equipment less 10% security and other statutory recovery shall be made after receipt of complete pumping machinery i.e. pump and motors received together at site of work in good condition. The balance 20% cost after deduction of the security and other recoveries shall be released after successful and satisfactory installation, testing of the entire equipment. Ten percent security deposits shall be released as stipulated in the agreement.
- 23 90% (Ninety percent) installation charges shall be released after satisfactory installation of all the pumping and electrical equipment. Remaining 10% of installation charges shall be released after testing of the entire equipment.

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