

ELECTRICAL CABLES

(SINGLE AND MULTICORE)

1. INTRODUCTION:

Electrical Cables and wires are used for power distribution in electrical systems in housing sector as well as in industry. Electrical Wiring is subject to safety standards for design and installation.

Allowable wire and cable types and sizes are specified according to the circuit operating voltage and electric current capability, with further restrictions on the environmental conditions, such as ambient temperature range, moisture levels, and exposure to sunlight and chemicals. In a typical electrical code, some color-coding of wires is mandatory.

2. PRODUCT & ITS APPLICATION:

Electrical power is supplied at 230 ~ 250 voltages for single phase and these are used in normal domestic and commercial use. Industry uses power in three phases, and at higher voltages 440 V to 11 KV and distribution of power is usually done at even higher voltages up to 33 KV. These cables are normally bought by industry and utilities.

The power rating of cable consists of the voltage of supply and maximum current carrying capacity. For safety and reliability, the specifications are designed for wire and cable ratings and also provide for testing of cables at specified voltages and total power levels to certify the design and manufacture of cable.

The domestic electrical wires are manufactured as per BIS specification viz IS 694. These are consumed in huge quantity, for variety of house wiring. Other cables like submersible pumps,

domestic distribution cables of higher power ratings and Fire and smoke retardant type are also used in substantial quantity.

Flexible wires are also used in instrumentation and control systems with shielding of braided wire or aluminum foils. Medium and high voltage cables and wires are not considered in view of the lower volume and cyclic nature of market demand.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or graduate with experience in production or marketing experience.

4. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

The main consumers of the flexible wires and cables are housing and commercial building sector, industry, equipments and machinery and even in auto vehicles. The large consumers are sometimes forgotten are appliances manufacturers viz home, kitchen, office, medical, Scientific, laboratory, computer systems, network systems, etc. Each of these appliances requires power cords in varying lengths with molded or assembled plugs. Single and Multi core cables are used in large building complexes, industry for internal power distribution to consumer points.

Main consuming sectors like construction industry, industrial sector, and equipment and machinery manufacturers, auto and other vehicles and utility companies, are all growing at fast pace. In view of this ever growing demand for wires, cables and power cords demand growing.

A project with focus on specific product range including production of custom design of wires, cables including power cords has good potential.

5. RAW MATERIAL REQUIREMENTS:

Main raw materials are electrical grade copper wire rods or drawn wires of different gauges and insulation grade compounded PVC, polyethylene, Teflon, PVDF, etc. polymers and color pigment. Fire and flame retardants, compounding materials like calcium carbonate, stabilizers, and plasticizers may also be required.

Other materials are steel braiding wires, metallized paper and polyester strips, aluminum foils etc. for shielding, armoring etc. For power cords brass plug pins etc. are be required.

6. MANUFACTURING PROCESS:

The electrical wires and cables manufacturing process steps depend on the starting stages of conductor and insulation materials chosen. The conductor wires may be drawn to required gauges from wire rods of 8 mm.

PVC insulation material may be compounded in house to meet requirements of Fire and flame retardant grade, etc. The compounding process includes steps like mixing, blending and extrusion of granules for use in plastic extrusion coating.

The process steps are for wire and cable are given below.

- Wire rods are drawn in to various conductor sizes of single or multistrand as per IS 8130. The wires may be annealed in continuously by electrical annealing system in tandem soon after wire drawing stage or may have to annealed in coils separately.
- Drawn wires may be bunched together to form conductor cores in a bunching machine
- Conductor cores are fed to insulation coating line. The conductors are passed through cross head die of extruder machine, where extruder is extruding plastic material. The line speed of wire extrusion output will control the insulation thickness. Insulated

conductor cools down while passing through long cooling trough. The insulated wires may diameter may be monitored continuously by anonline gauge. These wires are also tested by an online spark tester for its insulation levels and defects in coating.

- Insulated wires may be the final products for some applications. Depending on cable construction for other power or signal applications, inculated cores cables may require bunching to form cable core. Cable core of bunched insulated wires may be wound with barrier tapes of metallized paper, polyester or aluminum tapes prior to chathing. Steel or copper coted wires may be braided on cable core before sheeting.
- Cable core are sheathed in extruder line by coating PVC or other insulating materials.
- Finished cables and wired are tested for electrical parameters and defects.
- The final cables are cut to standard lengths as per specification and packed on spools, wooden drums etc. or packed into cable coils.

Selection of product mix and meeting or exceeding specification ensures high profitability and success for the project.

7. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 8 employees initially and increase to 23 or more depending on business volume.

Sr No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	3	6	8	12	12
2	Semi-Skilled/ Helpers	7000	6	10	12	16	24
3	Supervisor/ Manager	30000	2	3	5	6	6
4	Accounts/ Marketing	16000	2	2	3	4	4
5	Other Staff	7000	2	2	4	4	4
	TOTAL		15	23	32	42	50

8. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

Sr No	Activities	Time Required in Months
1	Acquisition of Premises	2
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Some Activities run concurrently)	6

9. COST OF PROJECT:

The unit will require total project cost of Rs 182.71 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	25.00
2	Building	40.00
3	Plant and Machinery	66.60
4	Fixtures and Electrical Installation	11.00
5	<i>Other Assets/ Preliminary and Preoperative Expenses</i>	3.50
6	Margin for working Capital	36.61
	TOTAL PROJECT COST	182.71

10. MEANS OF FINANCE:

The project will require promoter to invest about Rs 73.14 lakhs and seek bank loans of Rs 109.71 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	73.14
2	Loan Finance	109.58
	TOTAL :	182.71

11. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	17.95	40	7.18	10.77
2	Receivables	35.27	40	14.11	21.16
3	Overheads	4.56	100	4.56	0.00
4	Creditors	26.92	40	10.77	16.15
	TOTAL	84.69		36.61	48.08

12. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Wire Drawing and annealing Tandem line	Nos	1	750000	750000
2	Wire Rod Breaking Machine	Nos	1	650000	650000
3	Wire pointing and welding m/c	Nos	1	60000	60000
4	Wire / Cable Pay off	Nos	2	150000	300000
5	Wire/ cable Coating Extruder line 35, 65 mm with cross head Dies	Nos	2	750000	1500000
6	On line Spark tester/ dia gauge	Nos	2	250000	500000
7	Coil /Drum take up units	Nos	2	180000	360000
8	Wire Bunching M/cs	Nos	2	300000	600000
9	Insulated wire cutting and bunching M/c	Nos	1	180000	180000
10	Wire Die Repair& Polishing M/c	Nos	1	150000	150000
11	Cable test Set up	Nos	1	300000	300000
12	Shield/ Armor Braiding machine	Nos	1	350000	350000
13	Tape /Foil Lapping units	Nos	1	190000	190000
14	Packing Machine	Nos	1	200000	200000
15	Plug molding M/c	Nos	1	120000	120000
	<u>subtotal :</u>				<u>6210000</u>

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Tools and Ancillaries				
1	Misc. equipment Dies tools etc.	LS	1	300000	300000
2	Tools and gauges	LS	1	150000	150000
	<u>subtotal :</u>				<u>450000</u>
	Fixtures and Elect Installation				
	Bobbins/spools, transport trolleys	LS	1	500000	500000
	Office Furniture	LS	1	50000	50000
	Telephones/ Computer	LS	2	50000	100000
	Electrical Installation	LS	1	450000	450000
	<u>subtotal :</u>				<u>1100000</u>
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	350000	350000
	TOTAL PLANT MACHINERY COST				8110000

13. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	30	40	50	60	70
2	Sales	Rs Lakhs	282.14	376.19	470.24	564.29	658.34
3	Raw Materials & Other Direct Inputs	Rs Lakhs	215.35	287.13	358.91	430.70	502.48
4	Gross Margin	Rs Lakhs	66.80	89.06	111.33	133.59	155.86
5	Overheads Except Interest	Rs Lakhs	21.13	21.13	21.13	21.13	21.13
6	Interest	Rs Lakhs	15.34	15.34	15.34	15.34	15.34
7	Depreciation	Rs Lakhs	12.11	12.11	12.11	12.11	12.11
8	Net Profit Before Tax	Rs Lakhs	18.21	40.48	62.74	85.01	107.27

14. BREAKEVEN ANALYSIS:

The project is can reach break-even capacity at 21.82 % of the installed capacity as depictedhere below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	940.48
2	Variable Costs	Rs Lakhs	717.83
3	Fixed Cost incl. Interest	Rs Lakhs	48.58
4	Break Even Capacity	% of Inst Capacity	21.82