Brief Project Profile for
Unsaturated Polyester Resin Unit (India)

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Ergo Engineers Private Limited

DESIGN | ENGINEERING | SUPPLY | COMMISSIONING

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Introduction & Chemistry

This Brief Project Profile outlines a compact, scalable plan to manufacture Unsaturated Polyester Resin (UPR).

Two plant scales are assessed: **3-ton/batch** and **15-ton/batch**. This Profile covers chemistry, process, markets, capex/opex, unit economics, and expected returns under present cost conditions.

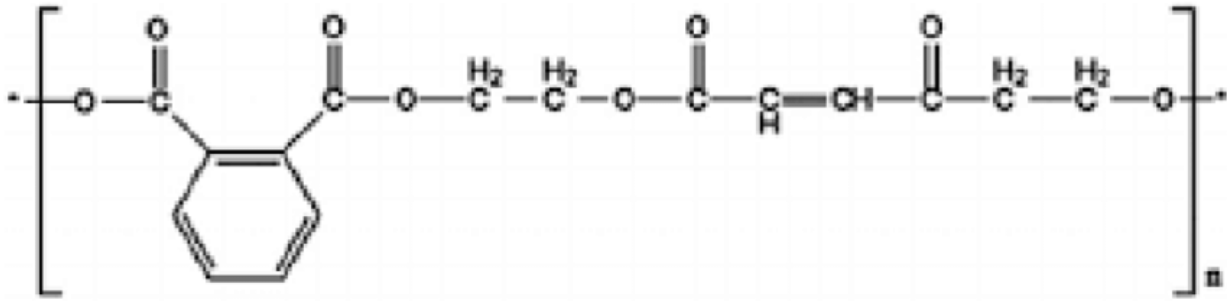
Chemistry

Unsaturated Polyester Resin (UPR) is a polymer formed by polycondensation of glycols with unsaturated acids / anhydrides (Maleic Anhydride, Phthalic Anhydride, Isophthalic Acid) followed by dilution in styrene monomer.

Reaction Chemistry: Polyacids + Glycols → Polyester (water by-product)

The resin is subsequently diluted with 35–45% styrene monomer (with inhibitor) to obtain liquid UPR.

Contents



Unsaturated polyester resin (UPR)

A. Market & Applications

- FRP pipes & tanks (chemicals, water supply)
- Marine & automotive composites
- Construction (artificial marble, adhesives, panels)
- Electrical insulation & laminates

B. Capacity & Throughput Assumptions

Batch cycle time	12 hours
On stream days	300 days/year
Average batches/day	1.5 (allowing for maintenance and grade change)
Annual capacity nameplate (emulsion)	
	3 t/batch line: ~1350 TPA
	15 t/batch line: ~6750 TPA

C. Capital Costs – 3 tons/batch line

Item	₹ Lakh
Reactor	8
Reflux condenser, Packed column	6
Fume hood	3
Dean Stark trap	5
Blending tank	14
Filter	2
Vacuum pump	3
Vacuum receiver	2
Storage Tanks	20
Pumps (flameproof), valves, instruments, PLC	18
Cooling tower	5
Thermopack	9
Air compressor & N_2 tonners	8
Vent scrubber & VOC controls	7
Electricals, cabling, earthing, lighting (FLP), UPS	15
Piping, insulation	15
QA/QC lab setup	5
Fire hydrant system	12
PCB CTE/CTO, Fire NOC, EC, PESO licenses	15
Erection, freight, contingencies (~15%)	26
GST	36
Civil construction	75
Total Capital Costs excl. Working Capital	**₹ 308 Lakh**

Note: Indicated Capital Costs are indicative for a plant set up in India. Actual costs may vary considerably. Land costs are not included since land prices vary on the basis of location.

D. Capital Costs – 15 tons/batch line

Item	₹ Lakh
Reactor	35
Reflux condenser, Packed column	14
Dean Stark trap	10
Blending tank	45
Filter	7
Vacuum pump	10
Vacuum receiver	6
Storage Tanks	60
Pumps (flameproof), valves, instruments, PLC	50
Cooling tower	15
Thermopack	25
Air compressor & N_2 tonners	20
Vent scrubber & VOC controls	15
Electricals, cabling, earthing, lighting (FLP), UPS	50
Piping, insulation	50
QA/QC lab setup	5
Fire hydrant system	18
PCB CTE/CTO, Fire NOC, EC, PESO licenses	15
Erection, freight, contingencies (~15%)	68
GST	93
Civil construction	200
Total Capital Costs excl. Working Capital	**₹ 811 Lakh**

Note: Indicated Capital Costs are indicative for a plant set up in India. Actual costs may vary considerably. Land costs are not included since land prices vary on the basis of location.

E. Operating Economics P&L – 2 tons/batch line

Sales volume	1147.5 tons/year (@85%)
Revenue	₹ 1205 Lakhs
Cost of Goods Sold	₹ 1033 Lakhs
Gross Margin	₹ 172 Lakhs
QC + Compliance Costs	₹ 20 Lakhs
Rent	₹ 18 Lakhs
EBITDA	₹ 134 Lakhs (11.12%)
Depreciation	₹ 46 Lakhs
EBIT	₹ 88 Lakhs
Interest (@10%; 60% debt)	~₹ 18.5 Lakhs
Profit Before Tax	₹ 69.5 Lakhs
Estimated Return on Equity	Approx. 42%

Note: The operating economics is indicative. It is for second year with operations having achieved a steady state. Actual operational P&L may vary considerably.

Assumptions: 85% capacity utilization; Working days 300; Debtor days 45; creditor days 30; GST netted out. Cost of land assumed to be 10000 sqft @ 1,50,000 per month.

F. Approvals, Health Safety & Environment (HSE) & Staffing

- Approvals
  - Environmental clearance
  - Factory license
  - Consent to Establish/Operate (SPCB)
  - Petroleum & Explosives approvals for Nitrogen and other storage (PESO)
  - Fire NOC.
- HSE
  - Classified area zoning
  - Intrinsically safe instruments
  - Earthing, PPE, Spill control
  - VOC capture
  - Process safety (MOC, SOPs, HAZOP).

- Staffing
  - For 3 tons setup - 14 persons;
    (3 shift operations, QA/QC, utilities, stores, admin).

G. Timeline

Month	1	2	3	4	5	6	7	8	9	10
BED/FEED										
EC										
PCB CTE AND OTHER LICENSES										
PROCUREMENT										
DETAILED ENGINEERING										
CIVIL CONSTRUCTION										
ERECTION										
PCB CTO AND OTHER COMPLIANCES										
COMMISSIONING AND HANDOVER										

Thanks!

We look forward to hearing from you.

We look forward to helping you set up an Unsaturated Polyester Resin plant.

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