Brief Project Profile for Alkyd Resins Unit (India)

September 2025

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 alkyd resin. Two plant scales are assessed: **5-ton/batch** and **20-ton/batch**. This Profile covers chemistry, process, markets, capex/opex, unit economics, and expected returns under present cost conditions.

Chemistry

Alkyd resins are prepared by the polycondensation of polyols, fatty acids/vegetable oils and polyacids until predetermined values for viscosity, acid value or theoretical water loss are obtained.

Alkyd resins are widely used in surface coatings, paints, enamels, varnishes, adhesives, and composites due to their good film-forming ability, flexibility, gloss, and compatibility with pigments and other resins. Based on the amount of oil incorporation into the resin, they are broadly divided into 3 categories –

- Long oil alkyds - air drying and aliphatic solvent compatible, excellent gloss and pigment wetting>55% drying oil
- Medium drying alkyds – air and oven drying, aliphatic and aromatic solvent compatible, higher viscosity and good gloss, 45-55% drying oil
- Short oil alkyds – aromatic solvent compatible, high viscosity, good substrate adhesion and hardness. Good flexibility, water and weathering resistance, <45% drying oil.

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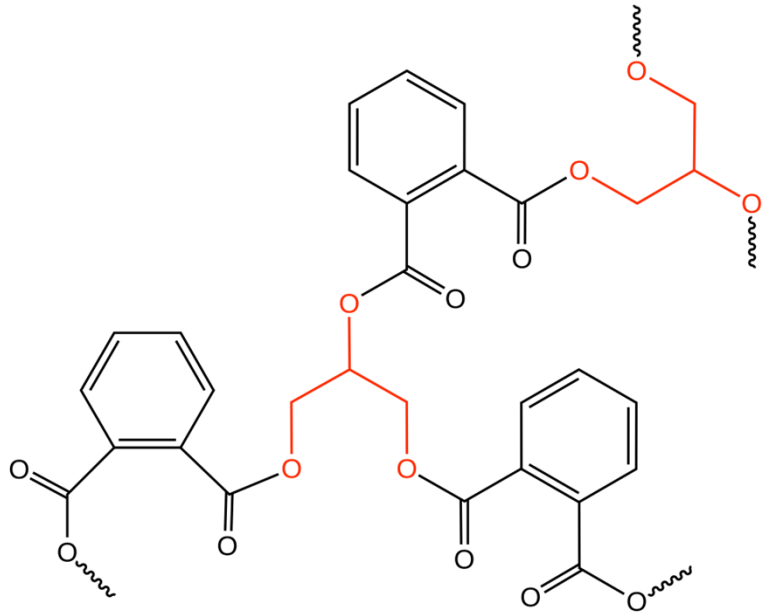

Structure of an idealized alkyd resin derived from glycerol and phthalic anhydride.
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A. Market & Applications

- Anti-corrosive primers
- Finishes
- Stoving enamels
- Agricultural machinery finishes
- Commercial and car refinishes
- DIY household radiator finishes
- Road paints
- Gloss, matt and satin finish paints
- Industrial stoving enamels
- Wood stains and varnishes

B. Capacity & Throughput Assumptions

Batch cycle time (PVAc)	14-16 hours, including pre-feed, heating, continuous monomer feed, final hold
On stream days	300 days/year
Average batches/day	1 (allowing for maintenance and grade change)
Annual capacity nameplate (emulsion)	
	5 t/batch line: ~1500 TPA
	20 t/batch line: ~6000 TPA

C. Capital Costs – 5 tons/batch line

Item	₹ Lakh
Reactor	16
Reflux condenser, Packed column	10
Dean Stark trap	6
Blending tank	20
Filter	4
Vacuum pump	3
Vacuum receiver	2
Solvent secondary condenser, receiver	10
Storage Tanks	40
Pumps (flameproof), valves, instruments, PLC	20
Cooling tower	5
Thermopack	12
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	8
Fire hydrant system	12
PCB CTE/CTO, Fire NOC, EC, PESO licenses	15
Erection, freight, contingencies (~15%)	34
GST	47
Civil construction	75
Total Capital Costs excl. Working Capital	**₹ 384 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 – 20 tons/batch line

Item	₹ Lakh
Reactor	45
Reflux condenser, Packed column	16
Dean Stark trap	10
Blending tank	45
Filter	10
Vacuum pump	10
Vacuum receiver	6
Solvent secondary condenser, receiver	20
Storage Tanks	90
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	8
Fire hydrant system	18
PCB CTE/CTO, Fire NOC, EC, PESO licenses	15
Erection, freight, contingencies (~15%)	78
GST	107
Civil construction	200
Total Capital Costs excl. Working Capital	**₹ 903 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 – 5 tons/batch line

Sales volume	1275 tons/year (@85%)
Revenue	₹ 1530 Lakhs
Cost of Goods Sold	₹ 1280 Lakhs
Gross Margin	₹ 250 Lakhs
QC + Compliance Costs	₹ 20 Lakhs
Rent	₹ 22 Lakhs
EBITDA	₹ 208 Lakhs (13.59%)
Depreciation	₹ 58 Lakhs
EBIT	₹ 150 Lakhs
Interest (@10%; 60% debt)	~₹ 23 Lakhs
Profit Before Tax	₹ 127 Lakhs
Estimated Return on Equity	Approx. 62%

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 12000 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 5 tons setup - 18 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!

Ergo Engineers

We look forward to hearing from you.

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

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