Brief Project Profile for Polyvinyl Acetate Emulsion & Wood Glue Manufacturing 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 Polyvinyl Acetate (PVAc) emulsion via aqueous free-radical polymerization of vinyl acetate monomer (VAM), and to formulate downstream PVAc wood glue (PVA wood adhesive) and PVAc textile sizing agent.

Two plant scales are assessed: **2-ton/batch** and **10-ton/batch**. It covers chemistry, process, markets, capex/opex, unit economics, and expected returns under present cost conditions.

Chemistry

Vinyl acetate is characterized by having an activated double bond. While being an acceptably stable material under normal ambient storage, it is readily attacked by a free radical. This simple addition gives another free radical, and the addition of a series of monomer units results in a polymer chain.

Vinyl acetate monomer is polymerized in water using partially hydrolyzed polyvinyl alcohol (PVA) as protective colloid and surfactants as emulsifiers. Ammonium/Potassium persulfate (or redox systems) initiate polymerization. Optional chain transfer agent (CTA) sets molecular weight.

We, Ergo Engineers Pvt. Ltd., are glad to assist and support you to set up such a unit whether in India or abroad.

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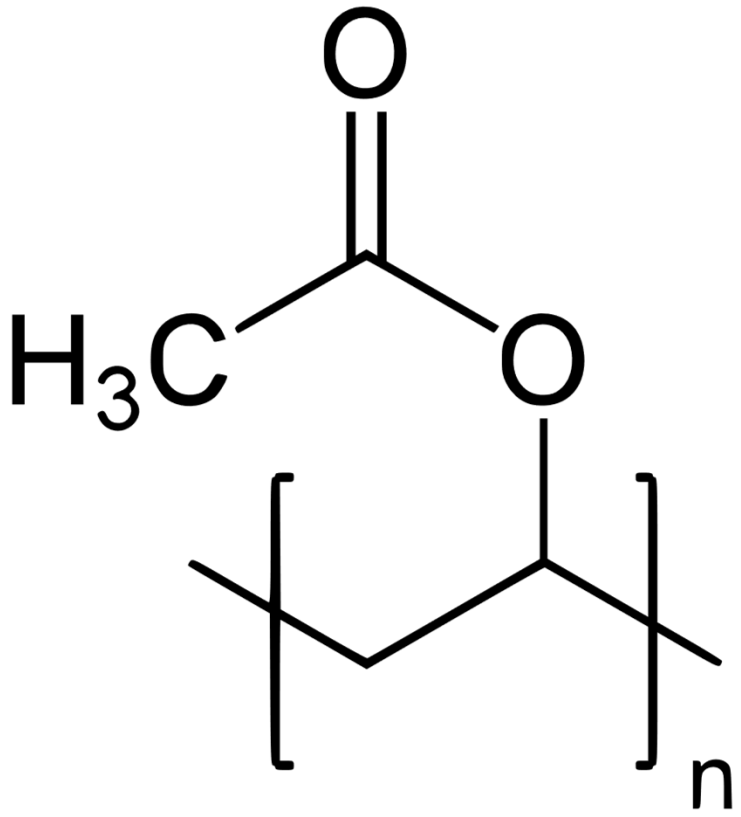

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A. Market & Applications

Woodworking/Carpentry	Interiors, furniture, plywood/laminates, edge bonding
Paper & Packaging	Laminating, labelling
Textiles & Nonwovens	Binders / lamination
Paints/Construction	Primer binders, RDP precursors

B. Capacity & Throughput Assumptions

Batch cycle time (PVAc)	12–14 h including heat up, feeds, conversion, cooling, transfer, CIP
On stream days	300 days/year
Average batches/day	1.3 (allowing for maintenance and grade change)
Annual capacity nameplate (emulsion)	
	2 t/batch line: ~780 TPA
	10 t/batch line: ~3900 TPA

C. Capital Costs – 2 tons/batch line

Item	₹ Lakh
PVAc Reactor	8
Reflux condenser, Packed column	6
Monomer/initiator feed tank, fume hood	8
PVA dissolution tank, blend tank	14
Filter	2
VAM storage	10
Pumps (flameproof), valves, instruments, PLC	20
Cooling tower	5
Thermopack & DM plant	14
Air compressor & N_2 manifold, 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%)	25
GST	34
Civil construction	60
Total Capital Costs excl. Working Capital	**₹ 286 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 – 10 tons/batch line

Item	₹ Lakh
PVAc Reactor	40
Reflux condenser, Packed column	14
Monomer/initiator feed tank, fume hood	20
PVA dissolution tank, blend tank	45
Filter	7
VAM storage	35
Pumps (flameproof), valves, instruments, PLC	45
Cooling tower	15
Thermopack & DM plant	35
Air compressor & N_2 manifold, tonners	25
Vent scrubber & VOC controls	12
Electricals, cabling, earthing, lighting (FLP), UPS	45
Piping, insulation	45
QA/QC lab setup	8
Fire hydrant system	15
PCB CTE/CTO, Fire NOC, EC, PESO licenses	20
Erection, freight, contingencies (~15%)	64
GST	88
Civil construction	200
Total Capital Costs excl. Working Capital	**₹ 778 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	663 tons/year (@85%)
Revenue	₹ 630 Lakhs
Cost of Goods Sold (blended)	₹ 464 Lakhs
Gross Margin	₹ 166 Lakhs
QC + Compliance Costs	₹ 20 Lakhs
Rent	₹ 18 Lakhs
EBITDA	₹ 128 Lakhs (20.31%)
Depreciation (P&M only)	₹ 43 Lakhs
EBIT	₹ 85 Lakhs
Interest (@10%; 60% debt)	~₹ 17 Lakhs
Profit Before Tax	₹ 68 Lakhs
Estimated Return on Equity	Approx. 45%

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; Product mix = 50% PVAc bulk, 50% converted to wood glue; 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
  - Factory license
  - Consent to Establish/Operate (SPCB)
  - Petroleum & Explosives approvals for VAM storage (PESO)
  - Fire NOC.
- HSE
  - Classified area zoning
  - Intrinsically safe instruments
  - Earthing, PPE, Spill control
  - VOC capture
  - Process safety (MOC, SOPs, HAZOP).

- Staffing
  - For 2 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 a Polyvinyl Acetate plant.

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