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TECHNICAL PROPOSAL
FOR
VISTA CHEMICAL COMPANY
CONCERNING
EUROPEAN VINYL CORPORATION
PVC SLURRY STRIPPING TECHNOLOGY

Engineering-Licensing Dept.
Report No. 89-24
August, 1989

The information contained in this report is preliminary and provided for the purpose of technology evaluation only. It is offered in good faith for this purpose but no representation is made as to its accuracy for final plant cost, design configuration, yields, or economics. These factors will be affected by the particular site requirements and conditions, raw materials, product specification and other pertinent factors.

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I. INTRODUCTION

This report presents a brief description and economics for a stripping unit with a 12 ton/hr capacity for treating PVC resin.

European Vinyls Corporation (EVC) is Europe's largest producer of PVC, and one of the largest in the world, having 16 PVC plants located in four different European countries with over 200 scientists working in two main research centers. EVC, the joint venture company of ICI (UK) and Enichem (Italy) has the most advanced VCM/PVC technologies and is constantly developing and improving its processes and products.

EVC's basic design will contain information pertinent to the actual job to fit licensee requirements. EVC's scope of supply could include, but not be limited to, the following:

- Process Flow Diagrams
- Piping and Instrument Flow Diagrams
- Typical Plot Plan
- Equipment Specifications
- Instrument Specifications
- Materials of Construction
- Review of Selected Client's Detailed Engineering Documents
- Operator Training
- Operating and Laboratory Manuals
- Start-up Assistance
- Performance Demonstration Run
- Ongoing Improvements Exchange and Consultation

Should the client's review of this report develop favorable interest to proceed further toward obtaining rights to the technology under a license agreement, EVC will be pleased to provide the complete license package.

EVC

II. OBJECTIVE OF CONTINUOUS STRIPPING

The objective of continuous stripping is to reduce the VCM content of PVC resin in a slurry from about 30,000 ppm to below a value which ranges from 1 to 3 ppm maximum depending upon resin grade and porosity. The advantages of continuous stripping over batch stripping are:

1. Lower residual VCM in slurry
2. Higher quality product
3. Consistent and reproducible VCM levels
4. Lower steam usage
5. Less operator attention required

The particular continuous stripping process employed is an innovative development using a special column design.

III. FEATURES AND ADVANTAGES OF EVC TECHNOLOGY

Distinctive features of the design are:

- The lowest VCM content in comparison to the other stripping columns;
- Flexibility in homopolymer grades, K57 to K71.
- Flexibility in operating rates, 100 tonnes per day to 300 tonnes per day (as PVC).
- Minimum of operator attention.
- Very easy grade changes requiring no maintenance input.
- No contamination
- Unlike other PVC stripping columns on the market, EVC's does not need scheduled washing operations.

IV. PROCESS DESCRIPTION

The plant is designed to strip slurry from the stripper feed tanks at a solids design rate of 288 T/day (12 tonnes/hr) with an upper limit of up to 300 T/day (12.5 tonnes/hr) and lower limit of 150 T/day (6.25 tonnes/hr).

The battery limits of the plant commence with slurry leaving the stripper feed tanks and finish with stripped slurry entering the stripped slurry tanks (see attached flowsheet).

Slurry from the selected feed tank (Item 1) passes through the appropriate valve to the lump breaker machine (Item 2). The purpose of the lump breaker is to reduce the dimensions of any lumps or scales of PVC to a maximum of 4 mm to prevent blockages in the heat exchanger and column internals. Slurry is pumped to the stripping column by the slurry feed pump (Item 3).

The slurry is metered and preheated in a slurry/slurry heat exchanger (Item no. 4) by the slurry leaving the stripping column. Preheated slurry from the slurry/slurry heat exchanger is distributed within the column (Item 5). The controlled steam flow enters at the base of the column. The steam flow rate controls the time taken for the slurry to pass down the column (mean residence time) and is varied for the different grades of PVC. A condenser (Item 7) at the top of the column condenses excess steam and also cools the VCM which has been stripped from the column before passing to the monomer recovery system. The level of slurry in the sump of the column is measured and controlled. The stripped slurry is pumped from the column by the slurry discharge pump (Item 6), through the slurry/slurry heat exchanger and through a slurry cooler (Item 8) to the stripped slurry tank (Item 9). Then the slurry can be fed to the centrifuges and dryers.

For start-up, shutdown, standby and abnormal conditions, process water is directed to selected points via a programmable logic controller (PLC).

V. EXPECTED OPERATING REQUIREMENTSUtilities and Supplies (per metric ton PVC)1. Steam

0.2 tons

2. Cooling Water

110,000 Kcal (30°C)

20°C rise 110,000,000 cal / $\frac{30^\circ\text{C}}{1^\circ\text{C}} = 110,000,000 \text{ cal}$ 3. Electricity

15 KWH

4. Process Water

1 liter

VI. EQUIPMENT SPECIFICATIONS

<u>EQUIP. NO.</u>	<u>EQUIPMENT NAME</u>	<u>SPECIFICATIONS</u>
2	Lump Breaker	60m ³ /hr PVC slurry Des. Press: 10 kg/cm ² g 4 mm spacing Est. BHP = 60 KW Mechanical Seal
3	Stripping Column Feed Pump	60 m ³ /hr X 50 m head Horizontal, Centrifugal 316 S.S. Est. BHP = 25 KW Mechanical Seal
4	Slurry-Slurry Exchanger	70 m ² , Spiral Tube Stainless Steel Material 316L Des. Press: 7 kg/cm ² g Des. Temp: 98°C
5	Slurry Stripper	1,600 mm X 15,000 mm t/t Shell & Internals: Sandvik 3RE60 (ASTM A669)* Des. Press: 2 kg/cm ² g and full vacuum Des. Temp: 150°C
6	Slurry Discharge Pump	60 m ³ /hr X 50 m head Horizontal, Centrifugal 316 S.S. Est. BHP = 25 KW Mechanical Seal
7	Stripper Condenser	60 m ² , Spiral type Stainless Steel 316 L Des. Press: 2 kg/cm ² g and full vacuum Des. Temp: 150°C
8	Slurry Cooler	30 m ² , double pipe Des. Press: kg/cm ² g External Tubes: 5 Internal Tubes: 5 Des. Temp: Est/Int-60/90°C

* Please note that the column material is proprietary information.