

# TABLE OF CONTENTS

## BASIC ANALYSIS

About This Report.....	1
Executive Summary.....	3
About Propionic Acid.....	6
Introduction.....	6
Commercial Forms & Applications.....	7
Propionic Acid Production Pathways.....	8
Process Overview.....	9
Product(s) Generated.....	9
Process Inputs.....	9
Technology Maturity Assessment.....	11
Highlights & Remarks.....	13
Industrial Site.....	14
Introduction.....	14
Process Unit Description.....	16
Site Infrastructure Description.....	21
Key Process Input and Output Figures.....	25
Labor Requirements.....	25
Capital Investment.....	26
Fixed Capital.....	27
Working Capital.....	29
Additional Capital Requirements.....	30
Total Capital Investment.....	31
Operating Costs.....	32
Operating Variable Costs.....	34

Operating Fixed Costs.....	35
Depreciation.....	35
Total Operating Cost.....	35
Product Value Analysis.....	37
Corporate Overhead.....	38
Return on Capital Employed (ROCE).....	38
Process Economics Summary.....	39
Product Value Composition.....	39
Economic Datasheet.....	39
Economic Remarks.....	41
References.....	42
Analysis Methodology.....	44
APPENDIX A - ABOUT INTRATEC.....	A-1
APPENDIX B - TERMS & CONDITIONS.....	B-1
APPENDIX C - REPORT SHARING TERMS.....	C-1

## LIST OF TABLES

Economic Analysis Summary.....	5
Process Technology Maturity Scale.....	12
Raw Materials Consumption.....	25
Labor Requirements.....	25
Plant Cost Estimate Accuracy Range (USD Million).....	28
Owner's Cost Summary.....	28
Fixed Capital Summary.....	29
Working Capital Breakdown.....	29
Additional Capital Requirements Breakdown.....	30
Operating Variable Costs Breakdown.....	34
Operating Fixed Costs Breakdown.....	35
Operating Cost Summary.....	35
Corporate Overhead Costs Breakdown.....	38
Propionic Acid Production from Ethylene - Economic Datasheet.....	40
Process Contingency Factor Estimation Methodology.....	49
Project Contingency Factor Estimation Methodology.....	50
Fixed Capital Estimate Accuracy Range.....	54
Maintenance Cost Estimation Methodology.....	57
Marketing & Advertising Cost Estimation Methodology.....	59
Research & Development Cost Estimation Methodology.....	59
Expected ROCE Factor Estimation Methodology.....	60

## LIST OF FIGURES

Process Schematic Diagram.....	4
Propionic Acid Production Pathways Diagram.....	8
Industrial Site Configuration.....	15
Ethylene Hydroformylation Unit - Block Flow Diagram.....	17
Plant Cost Summary (USD Million).....	27
Capital Investment Summary (USD Million).....	31
Operating Cost Breakdown (USD/mt).....	36
Product Value Composition (USD/mt).....	39
Production Cost Report Development Methodology.....	45