



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

19286

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
(UNIDO)

(Project No. SF/IRA/90/901
Proposal No. 90/97)

PRE-INVESTMENT STUDY FOR THE PRODUCTION
OF
DISPOSABLE SYRINGES IN THE PHILIPPINES

Final Report

Based on Technical Concept prepared by
PHARMACHIM ENGINEERING
MILAN, ITALY

prepared by

OSTERREICHISCHE PLANUNGSGES. M.B.H.
AUSTROPLAN
AUSTRIAN ENGINEERING COMPANY LIMITED

September 1991

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
(UNIDO)

(Project No. SF/IRA/90/901
Proposal No. 90/97)

PRE-INVESTMENT STUDY FOR THE PRODUCTION
OF
DISPOSABLE SYRINGES IN THE PHILIPPINES

Final Report

Based on Technical Concept prepared by
PHARMACHIM ENGINEERING
MILAN, ITALY

prepared by

OSTERREICHISCHE PLANUNGSGES. M.B.H.
AUSTROPLAN
AUSTRIAN ENGINEERING COMPANY LIMITED

September 1991



TABLE OF CONTENTS

	Page	
0	SUMMARY	
1	INTRODUCTION	
1.1	Project Idea	1/1
1.2	Project History	1/1
1.3	Objectives of the Study	1/3
2	MARKET AND PLANT CAPACITY	
2.1	Product Profiles	2/1
2.2	Demand and Market	2/4
2.2.1	Estimated Market Size	2/5
2.2.2	Approximate present Size of Demand, its past Growth, major Determinants and Indicators	2/14
2.2.3	Projected Future Demand	2/18
2.2.4	Prices and Import Tariff	2/21
2.2.5	Export Market Potential	2/22
2.3	Sales Forecast	
2.3.1	Anticipated Competition	2/23
2.3.2	Localisation of Markets	2/24
2.3.3	Sales Programme	2/25
2.3.4	Estimated Annual Sales Revenues	2/25
2.3.5	Estimated Annual Costs for Sales Promotion and Marketing	2/29
2.4	Determination of Plant Capacity	2/30
2.4.1	Feasible Nominal Plant Capacity	2/30
2.4.2	Quantitative Relationship between Sales, Plant Capacity and Material Input	2/31
3	MATERIALS AND INPUTS	
3.1	Raw Materials and Operating Supplies	3/1
3.2	Utilities	3/4
4	LOCATION AND SITE	
4.1	Economic and Social Background for Business in the Philippines	4/1
4.2	Specific Site for the Project	4/7
5	PROJECT ENGINEERING	
5.1	Conceptual Engineering of the proposed Plant	5/1
5.2	Technology and Equipment	
5.2.1	Moulding Department	5/3



5.2.2	Welding Department	5/5
5.2.3	Assembling Department	5/5
5.2.4	Packing Department	5/5
5.2.5	Sterilization Department	5/6
5.2.6	Auxiliary Equipment	5/8
5.2.7	Shelving	5/9
5.2.8	Spare Parts	5/9
5.2.9	Rough Estimate of Technology Cost	5/10
5.3	Flow of Production and Quality Control	
5.3.1	Flow of Production	5/10
5.3.2	Quality Control	5/14
5.4	Equipment List	5/16
5.5	Civil Works	
5.5.1	Description of Civil Works	5/23
5.5.2	Civil Engineering Works	5/25
6	PLANT ORGANISATION AND MANPOWER	
6.1	Personnel Requirements	6/1
6.2	Salaries and Social Charges	6/3
6.3	Training	
6.3.1	Training Programme	6/5
6.3.2	Training Cost	6/7
7	PROJECT IMPLEMENTATION SCHEDULE	
8	COST AND REVENUE ESTIMATES	
8.1	Total Initial Investment	
8.1.1	Total Fixed Investment	8/1
8.2	Pre-production Capital Expenditures	8/5
8.3	Working Capital Requirements	8/8
8.4	Depreciation and Amortization	8/11
8.5	Compilation of Operational Input Cost	8/12
8.5.1	Raw Materials, Operating and Utilities Supplies	8/12
8.5.2	Personnel Requirements	8/15
8.5.3	Non-labour Maintenance and Spares, Administrative Overheads and Distribution	8/17
8.6	Sales Prices and Annual Revenue Projection	8/20
9	FINANCIAL ANALYSIS	



- 0/1 -

0. SUMMARY

General:

No disposable syringes of whatsoever size are currently manufactured in the Philippines and their use, particularly important in the treatment of contagious diseases, is constantly spreading. The production of disposable syringes is one of five Filipino-Italo joint venture investment projects identified by the United Nations Industrial Development Organization (UNIDO) for the promotion of industrial development in the Philippines. The joint venture of Ferpharma from the Philippines and Pharmachim from Italy is envisaged to implement this project with the support of the Board of Investments (Philippines), the Investment Promotion Office (IPO-UNIDO), and the Italian Government.

The original project idea was the realisation of a plant for the annual production of 15 million of 5 ml and 5 million of 1 ml disposable syringes in the Republic of the Philippines. Due to market considerations it was decided to include also the production of 2.5 ml syringes. Consequently the plant was laid out to produce

20 mio disposable syringes, therefrom
15 mio 2.5 and 5 ml syringes and
5 mio 1 ml syringes.

In the following table 0.1 the estimated local market volumes and the anticipated production and sales are presented for the period 1993 to 2007.



- 0/2 -

Table 0.1: Market and sales volumes 1993-2007 of the future plant (in mio. pieces per year)

Year	Local market volume		Production and sales	
	1 ml	2.5+5 ml	1 ml	2.5+5 ml
1993	4.7	11.6	3.3	10.0
1994	5.9	14.4	4.0	12.0
1995	7.1	16.8	5.0	15.0
1996	7.5	16.9	5.0	15.0
1997	7.8	17.8	5.0	15.0
1998	8.2	18.6	5.0	15.0
1999	8.6	19.6	5.0	15.0
2000	9.1	20.5	5.0	15.0
2001	9.5	21.6	5.0	15.0
2002	10.0	22.7	5.0	15.0
2003	10.5	23.7	5.0	15.0
2004	11.0	25.3	5.0	15.0
2005	11.6	26.4	5.0	15.0
2006	12.1	27.5	5.0	15.0
2007	12.8	28.9	5.0	15.0

Location:

The project is not developed to a stage that a specific site was already selected. However, the joint venture partners have agreed to rent a suitable production building in one of the industrial parks and not to build a new building. Presently a site in the industrial park of Canlubang is under discussion.



- 0/3 -

Engineering:

The engineering of the plant, the technical lay-out and the equipment selection is based upon the technical concept prepared by PHARMACHIM ENGINEERING of Milan, Italy the technical joint venture partner.

The proposed plant will produce the plastic parts of the syringes, whereas all other parts of the syringes will be imported. The plastic parts are cylinders and pistons for 1 ml, 2.5 ml and 5 ml size. In addition caps and needle/caps for the 1 ml syringes are also produced, whereas the needles for the 2.5 and 5 ml syringes complete with cap and needle/cap are imported.

The production is subdivided into 4 sections, i. e.:

- 1) Cylinder, piston, caps and needle/caps for 1 ml syringes moulding
- 2) Serigraphic processing of cylinders
- 3) Assembly
- 4) Ethylene Oxide sterilization

The manufacturing process commences with the moulding of the plastic parts, i. e. cylinders, pistons, and protectors, which make up the syringes. The moulded parts are then placed in special containers for forwarding to the next following process. The pistons and the protectors are forwarded to the assembly line and semi-finished products warehouse, the cylinders to the offset processing department, where a graduated scale in cubic centimetres is engraved with ink.

At the offset processing the needles are welded into the 1 ml cylinders by monocomponent resins and reach together with the 5 ml cylinders and separate needles for this size of syringes the assembly department.



- 0/4 -

In the assembly department all parts are put together. The assembled syringes are placed in carton containers, which are closed before being forwarded to the sterilization department. The automatic sterilization cycle lasts approximately 10 hours, after which the autoclaves are opened to release the sterile product.

Before placing these products in the finished products store and preparing them for shipment, samples are selected for laboratory analysis for testing sterility and apyrogenity at the local university.

Clean room environment is necessary in the pre-sterilisation stage, i. e. in the assembling and packaging departments. The air intake is treated in a conditioning system by passing through depyrogenising filters which keep air clean and pyrogen free.

Cost and Revenue Estimates:

The terminology and methodology used in the study corresponds to COMFAR (»Computerized Model for Feasibility Analysis and Reporting«), developed by the Feasibility Studies Branch of the Department of Industrial Operations of UNIDO.

The determination of foreign equipment expenditure requirements is based on the list of plant machinery and equipment, including related facilities for the production, processing and operational control as presented by PHARMACHIM ENGINEERING SRL, of Milan, Italy to ST. MARTIN PHARMACEUTICAL LAB. Metro Manila, on September 11 th, 1989. This offer has been used to elaborate the equipment list. To take care for US \$ devaluation and inflation the prices have been adjusted.

The following table 0.2 depicts the total initial investment cost of the project.



- 0/5 -

Table 0.2: Total Initial Investment in US\$

Year	1991.1	1991.2	Total
Fixed investment costs			
Land, site preparation, development	0.00	0.00	0.00
Buildings and civil works	0.00	0.00	0.00
Auxiliary and service facilities	0.00	0.00	0.00
Incorporated fixed assets	479700.00	246792.0	726492.0
Plant machinery and equipment	623218.00	1600811.00	2224029.0
	-----	-----	-----
Total fixed investment	1102918.00	1847603.0	2950521.0
Pre-production capital expenditures.	92000.00	181675.00	273675.0
Net working capital	0.00	0.00	0.00
	-----	-----	-----
Total initial investment costs	1194918.00	2029278.00	3224196.0

Break-Down of Total Production Costs Covering a Normal Production Year

The total production costs have been calculated on the basis of the annual consumption figures, personnel requirements, maintenance costs, etc. given in the previous subchapters, and include also financial costs and are presented in the following table for the first six years of production.



- 0/6 -

Table 0.3: Total Production Costs In US\$

Year	1992	1993	1994-96	1997
% of nom. cap.(single product).	0.00	0.00	0.00	0.00
Raw material 1	392895.00	472320.00	590400.00	590400.00
Other raw materials	0.00	0.00	0.00	0.00
Utilities	567.84	578.20	593.00	593.00
Energy	50292.00	59040.00	72000.00	72000.00
Labour, direct	232683.80	251550.00	279500.00	279500.00
Repair, maintenance	3330.00	3600.00	4000.00	4000.00
Spares	0.00	0.00	46800.00	46800.00
Factory overheads	9300.00	9300.00	9300.00	9300.00
	-----	-----	-----	-----
Factory costs	689068.60	796388.20	1002593.00	1002593.00
Administrative overheads.	151800.00	151800.00	151800.00	151800.00
Indir. cost, sales+distribution	20000.00	20000.00	20000.00	20000.00
Direct cost, sales+distribution	0.00	0.00	0.00	0.00
Depreciation	414488.80	414488.80	414488.80	414121.70
Financial costs	0.00	0.00	0.00	0.00
	-----	-----	-----	-----
Total production costs	1275358.00	1382677.00	1589882.00	1588515.00

Sales Revenues:

For the calculation of the yearly sales revenues the following ex-factory sales prices were assumed per 1000 pieces for the various sizes of syringes:

Product	(US\$/1,000 p.)
1 ml syringe (domestic sales)	117
2.5 and 5 ml syringe (domestic sales)	127



- 0/7 -

The estimated prices for domestic sales correspond to 90 % of the actual wholesale prices. The ex factory sales price of 2,5 ml syringes is assumed to be the same as of 5 ml syringes. The sales revenues estimates are based on the assumption that the whole production of syringes can be sold on the local market.

The expected annual sales revenues are presented in the Table 0.4.

Table 0.4: Sales revenues 1993 - 2007 (in US\$ per year)

Year	Sales (mio p./y)		Sales revenues		Total sales revenues
	1 ml syr.	2.5 + 5 ml syr.	1 ml syr. US\$/y	2.5 + 5 ml syr. US\$/y	US\$/y
1993	3.3	10	386,100.00	1,270,000.00	1,656,100.00
1994	4.0	12	468,000.00	1,524,000.00	1,992,000.00
1995	5	15	585,000.00	1,905,000.00	2,490,000.00
1996	5	15	585,000.00	1,905,000.00	2,490,000.00
1997	5	15	585,000.00	1,905,000.00	2,490,000.00
1998	5	15	585,000.00	1,905,000.00	2,490,000.00
1999	5	15	585,000.00	1,905,000.00	2,490,000.00
2000	5	15	585,000.00	1,905,000.00	2,490,000.00
2001	5	15	585,000.00	1,905,000.00	2,490,000.00
2002	5	15	585,000.00	1,905,000.00	2,490,000.00
2003	5	15	585,000.00	1,905,000.00	2,490,000.00
2004	5	15	585,000.00	1,905,000.00	2,490,000.00
2005	5	15	585,000.00	1,905,000.00	2,490,000.00



- 0/9 -

Cashflow from operations

Year:	1	2	3
operating costs:	860868.60	968188.20	1174395.00
depreciation :	414488.80	414488.80	414488.80
interest :	0.00	0.00	0.00

production costs	1275357.00	1382677.00	1588882.00
thereof foreign	60.60 %	61.56 %	63.83 %
total sales :	1656100.00	1992000.00	2490000.00
gross income :	380742.60	609323.00	901118.30
net income :	380742.60	609323.00	901118.30
cash balance :	528685.50	985810.70	1200637.00
net cashflow :	528685.50	985810.70	1200637.00

Net Present Value at: 10.00 % = 3378372.00

Internal Rate of Return: 28.68 %

Return on equity 1: 19.89 %

Return on equity 2: 28.56 %

Conclusion:

Based on the good results of the financial project analysis the implementation of the project, under the same conditions as assumed in the present report, can be recommended.



1. INTRODUCTION

1.1 PROJECT IDEA

The original project idea was the realisation of a plant for the annual production of 15 million of 5 ml and 5 million of 1 ml disposable syringes in the Republic of the Philippines. No disposable syringes of whatsoever size are currently manufactured in the Philippines and their use, particularly important in the treatment of contagious diseases, is constantly spreading.

The production of disposable syringes is one of five Filipino-Italo joint venture investment projects identified by the United Nations Industrial Development Organization (UNIDO) for the promotion of industrial development in the Philippines. The joint venture of Ferpharma from the Philippines and Pharmachim from Italy is envisaged to implement this project with the support of the Board of Investments (Philippines), the Investment Promotion Office (IPO-UNIDO), and the Italian Government.

1.2 PROJECT HISTORY

In cooperation with the Government of the Philippines UNIDO had organized the Philippines Investors Forum which was held in Manila from 7th to 10th November 1988. The primary objective of the Forum was to attract flow of foreign resources needed for the realization of specific industrial projects.

As a result of the promotion effort undertaken by UNIDO, 244 foreign industrialists from 29 countries participated in the Forum. The response of the Italian business community to the event was very positive as the IPO, Milan arranged for the participation of 35 Italian industrialists, the largest single delegation of those participating.



- 1/2 -

One of the companies attending this Forum was Pharmachim Engineering SRL, 9 Via Appiani, 20121 Milan, Italy (Pharmachim). This company is specialised in providing know how, engineering and consultancy services for chemical and pharmaceutical industry. Eng. E. Pasquino, Chairman of Pharmachim, participated in this Forum where he had the opportunity to meet several Filipino entrepreneurs from the pharmaceutical sector. He set up a joint venture registered as Ferpharma to develop projects in the pharmaceutical sector.

In this context he investigated with Mr. Bravo, Director of St. Martin (Manila, Philippines) the possibility of local manufacturing of disposable syringes. St. Martin is a company specialised in the pharmaceutical sector which produces and distributes pharmaceutical products.

The next step was the establishment of a joint venture agreement between Pharmachim and Ferpharma to develop the syringes production project. St. Martin is supposed to acquire shares of this venture.

In this connection, UNIDO engaged the services of Austroplan, Austrian Engineering Co. Ltd. of Vienna, Austria, to prepare the pre-investment study on the production of disposable syringes in the Philippines in order to assist Ferpharma and Pharmachim in finalizing the terms of a cooperation agreement.

Austroplan in turn contacted SGV Consulting to conduct market research activities in the Philippines. This market survey primarily covers the demand and supply aspects of disposable syringes (especially 1 ml and 5 ml) in the Philippines. It includes the following information on the domestic market:

- o Estimated market size;
- o Major importers/distributors;
- o Country sources of disposable syringes;
- o Historical and projected future demand; and



- 1/3 -

- o Prices and import tariff.

Information on the export market, on the other hand, is limited to indications on the potential of exporting disposable syringes (1 ml and 5 ml) to the United States market from the Philippines.

1.3 OBJECTIVES OF THE STUDY

The aim of the pre-investment study is

- to assess the market potential for the production of disposable syringes in the Philippines, i.e.
 - to analyze the past and present demand for disposable syringes (1 ml and 5 ml) in the Philippines;
 - to assess the future domestic market potential of disposable syringes (1 ml and 5 ml) in the Philippines
 - to assess the export potential of disposable syringes (1 ml and 5 ml) and their anticipated competition in local and foreign markets with other sources of supply and
- to finalize the technical elements of the project



2 MARKET AND PLANT CAPACITY

2.1 PRODUCT PROFILES

A syringe is an apparatus commonly made from glass or plastic, fitted snugly onto a hollow needle. A syringe is used for subcutaneous and intramuscular injections of fluids for diagnostic or therapeutic purposes and is also known as hypodermic syringe.

The medical industry has already completely switched to the production of disposable syringes. Disposable syringes made from plastic materials save quite a number of expensive and costly production and handling operations in comparison with the production and use of syringes made from glass.

Disposable syringes are produced either without (Type A) or with (Type B) sealing ring between the piston and the cylinder. The production programme as originally agreed by the joint venture partners envisages the production of

1 ml syringes according to a PE patent and
5 ml syringes (standard type).

Figure 2.1 presents a drawing of the patented PE 1 ml syringe and figure 2.2 standard type syringes of various sizes.

According to PE syringes with sealing ring (Type B, three parts syringes) are preferred by doctors because of their easier and smooth handling. On technical side this type of syringe has a tighter holding.



- 2/2 -

Figure 2.1: Patented PE 1 ml Syringe

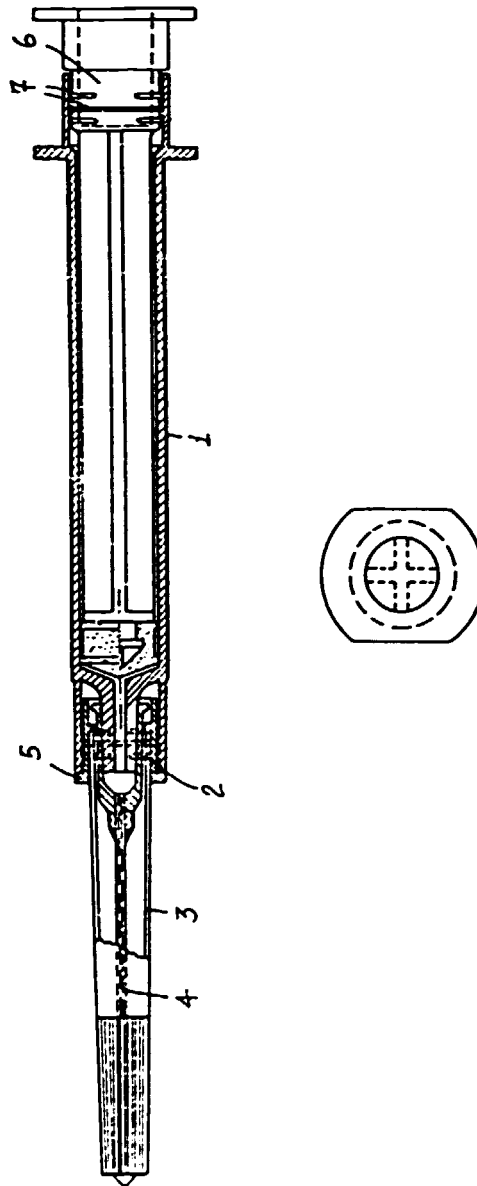
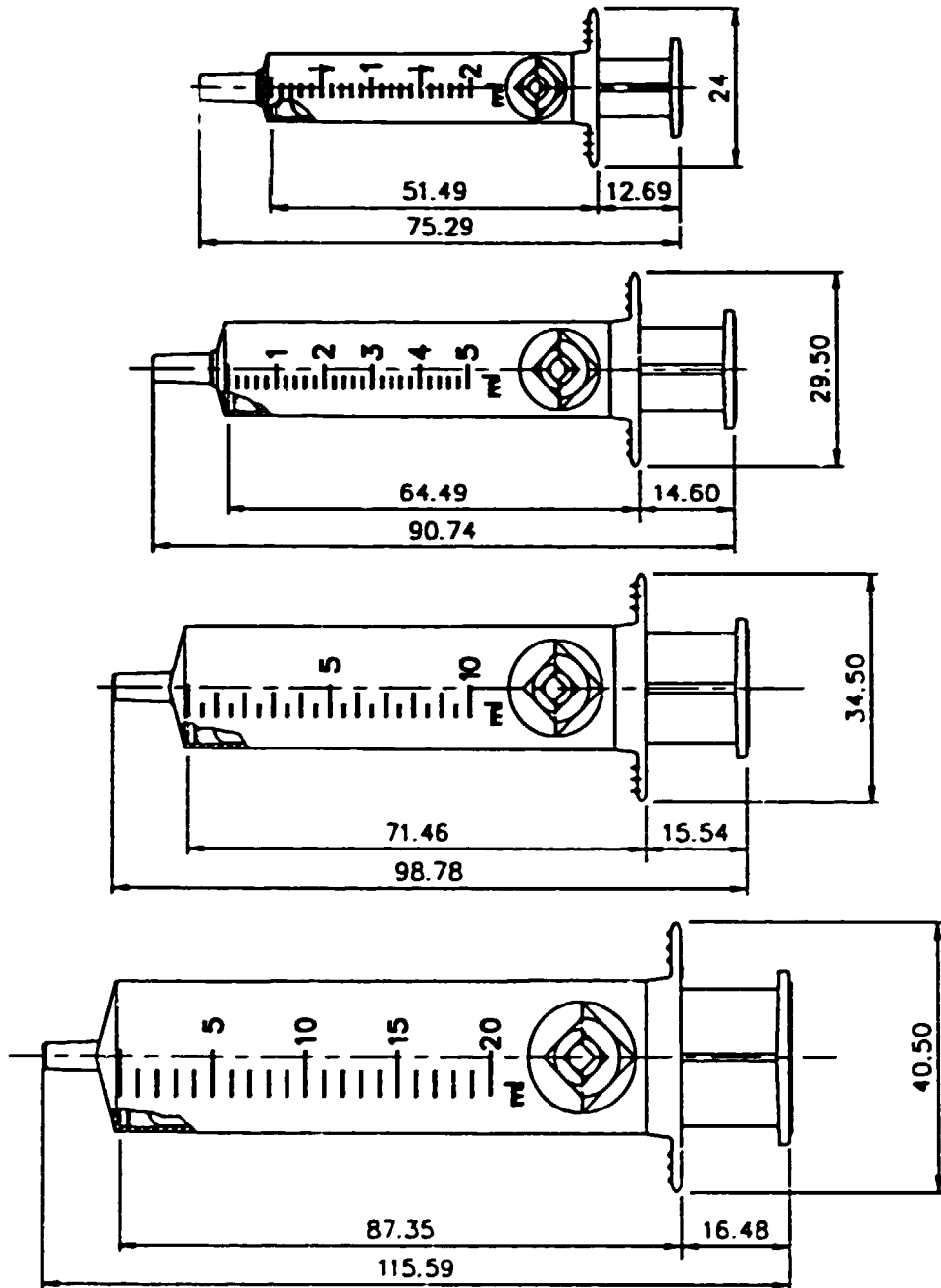




Figure 2.2: Standard Syringes (various sizes)





- 2/4 -

2.2 DEMAND AND MARKET

General Remark:

Prior to analysis of the demand and market in detail, it is helpful to define the terms »demand« and »market« with regard to the envisaged products, i.e. disposable syringes of various sizes.

A market is the set of all actual and potential buyers of a product, whether individuals or organizations.

The major markets for the envisaged products, are consumer markets, as pharmacies and supermarkets, as well as the private and governmental hospitals and other health care facilities.

The term market demand or shortly demand of a product is the total volume that would be bought by all important defined customer groups, (market segments) in a defined geographical area, in a defined time period, in a defined marketing environment under a defined marketing programme.

The market can be divided into:

- Actual Market: which comprises the set of buyers who actually buy the products or will buy these products in the future for the actual uses.
- Potential Market: which comprises the set of potential buyers who will buy these products in the future who are actually not yet using these products.

The principal aim of the market analyses was to investigate the domestic market of disposable syringes. However, due to the obviously small volume of the



- 2/5 -

actual disposable syringes market in the Philippines it has become necessary to check also other markets in order to identify export opportunities.

The information presented in this study was gathered principally from available secondary sources such as trade statistics compilations. Key informant interviews with selected importers/distributors and government agencies were likewise conducted to substantiate/verify data and to obtain better indications of future demand.

2.2.1 ESTIMATED MARKET SIZE

There are no known existing local manufacturers in the Philippines. Two joint venture companies are entering the market only in 1991 (see chapter 2.3.1)

Therefore, the import volumes up to 1990 can be set equal to the consumption of disposable syringes in the Philippines.

This fact has also been confirmed by interviews with selected importers/ distributors and government agencies. There is currently no local manufacturer of disposable syringes. The country has therefore sourced all its requirements through imports, while re-exports have been of insignificant volumes.

Any volumes that enter the market through illicit means (i.e. smuggling) are considered to be negligible by the importers/distributors interviewed.

Thus the import figures can safely be assumed to constitute the consumption of disposable syringes in the Philippines.

Table 2.1 and figure 2.3 present a summary of the imports of disposable syringes of all sizes in the Philippines during 1990.



- 2/6 -

Table 2.1: Imports of disposable syringes of all sizes in the Philippines in 1990 (Volume in pieces, Value in US\$)

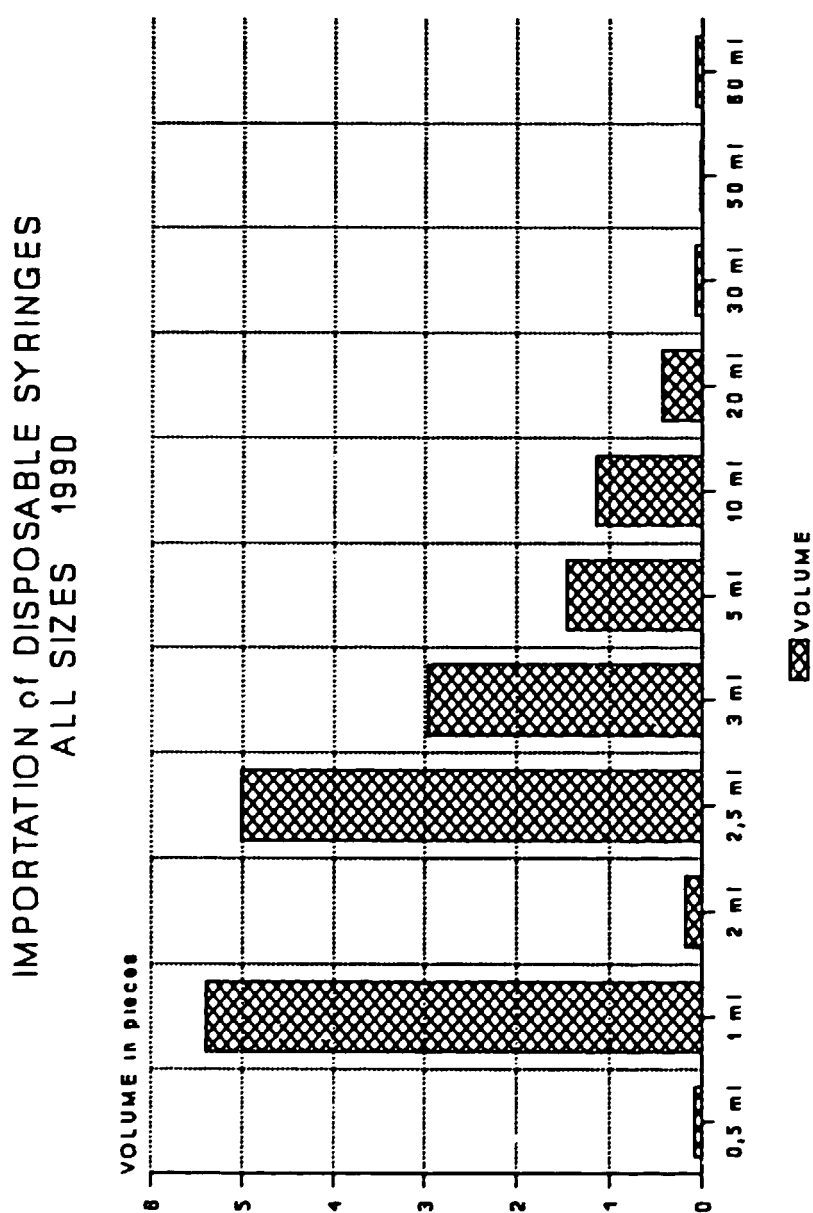
Size	Volume	Value	%
0.5 ml	80,000	2,380.00	0.5
1 ml	5,405,850	202,563.90	32.1
2 ml	180,000	4,698.00	1.1
2.5 ml	5,015,900	216,535.76	29.8
3 ml	2,965,000	113,647.09	17.6
5 ml	1,461,500	63,436.02	8.7
10 ml	1,134,400	59,033.37	6.7
20 ml	425,800	46,005.06	2.5
30 ml	72,600	6,146.89	0.4
50 ml	19,750	5,352.68	0.1
60 ml	65,000	2,052.70	0.4
Total	16,825,800	721,851.47	100.0

Source: Trade Statistics

As can be seen from the above table disposable syringes of 5 ml and 1 ml accounted for 41 per cent of total imports of all sizes in 1990. The other more popular sizes were the 2.5 ml (30% of total volume), 3 ml (18%) and 10 ml (7%).



Figure 2.3: Imports of Disposable Syringes 1990



Source: Trade Statistics



Table 2.2 depicts the imports of 5 ml and 1 ml syringes in 1990 in the Philippines, which are the envisaged production sizes of the future plant. The apparent domestic demand for disposable syringes of 5 ml and 1 ml volume in 1990 was about 6.9 million pieces.

Table 2.2: Imports of 5 ml and 1 ml disposable syringes in the Philippines in 1990 (volume in pieces, value in US\$)

Size	Total		% of Total Volume	With Needles		Without Needles	
	Volume	Value		Volume	Value	Volume	Value
5 ml	1,461,500	63,436.02	21.3	1,241,800	51,781.59	219,700	11,654.43
1 ml	5,405,850	202,563.90	78.7	5,403,350	202,496.40	2,500	67.50
Total	6,867,350	265,999.92	100.0	6,645,150	254,277.99	222,200	11,721.93
% of Total Volume	100.0			96.8		3.2	

Source: Trade Statistics.

The above table demonstrates that about 80% of the total of the 1 ml and 5 ml import volume are 1 ml syringes and about 20% 5 ml syringes. Apparently, almost all the syringes (97%) came with needles.

Major Importers/distributors

The top three importers/distributors of disposable syringes (all sizes) in 1990 were:



- 2/9 -

Blue Sky Trading Co., Inc.
Dispo Philippines, Inc.
Becton Dickinson Philippines, Inc.

In the 5 ml category, however, the major importers/distributors in 1990 were:

Dispo Philippines, Inc.
Zuellig Pharmaceuticals Corp.
Philippine Union Commercial, Inc.
Becton Dickinson Philippines, Inc.

On the other hand, for the 1 ml category, the major importers/distributors in 1990 were:

Blue Sky Trading Co., Inc.
Medical Center Trading Corp.
Zuellig Pharmaceuticals Corp.

The table 2.3 and the corresponding figure 2.4 provide a summary of major importers/distributors of disposable syringes (all sizes; 5 ml; 1 ml) in 1990, including their import volumes and values.



- 2/10 -

Table 2.3: Major Importers/Distributors of Disposable Syringes in the Philippines in 1990, (volume in pieces, value in US\$)

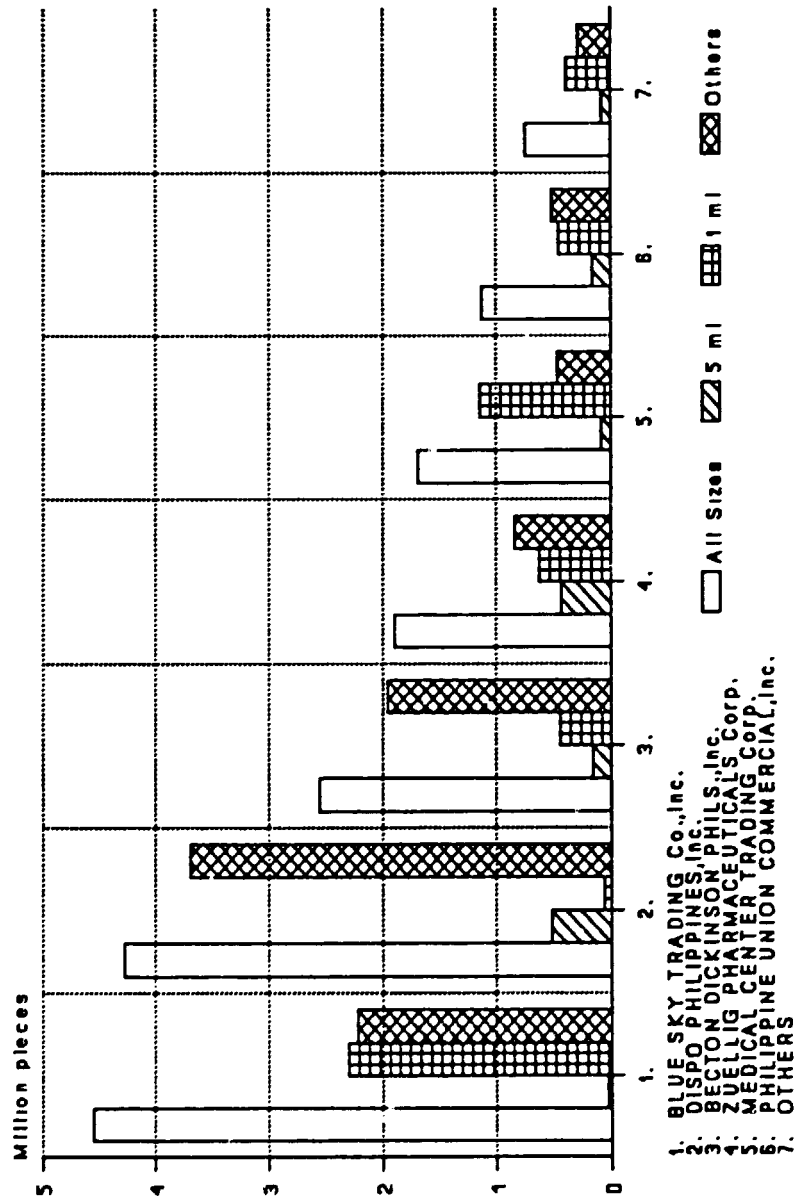
Major Importers	A1 Sizes		5 ml		1 ml		Others	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Blue Sky Trading Co., Inc.	4,550,000	180,920.70	30,000	1,475,000	2,300,000	73,803.00	2,220,000	105,642.70
Dispo Philippines, Inc.	4,276,300	199,978.17	516,000	31,348.28	64,000	4,312.80	3,696,300	164,317.09
Becton Dickinson Phils., Inc.	2,557,000	85,068.13	160,000	4,081.20	440,000	15,765.00	1,957,000	65,241.93
Zuellig Pharmaceuticals Corp.	1,890,250	88,995.27	433,000	13,742.70	624,000	29,851.92	833,250	45,400.65
Medical Center Trading Corp.	1,684,400	97,639.32	82,000	5,018.40	1,142,000	44,340.63	460,400	48,280.29
Philippine Union Comm'l, Inc.	1,125,500	39,253.40	160,500	6,097.15	452,500	15,217.50	512,500	17,938.75
Others	742,350	29,976.48	80,000	1,673.29	383,350	19,273.05	279,000	9,030.14
Total	16,825,800	721,851.47	1,461,500	63,436.02	5,405,850	202,563.90	9,958,450	455,851.55

Source: Trade Statistics.



Figure 2.4: Major Importers/Distributors of Disposable Syringes In the Philippines In 1990

MAJOR IMPORTERS/DISTRIBUTORS
 for DISPOSABLE SYRINGES 1990





- 2/12 -

Country sources

Japan was the top country source of disposable syringes imported by the Philippines in 1990. South Korea and Singapore were the next largest country sources in 1990, while Hongkong was a major source particularly for 1 ml syringes.

Table 2.4 and figure 2.5 provide a characterisation of all country sources in 1990 in terms of import volume and value.

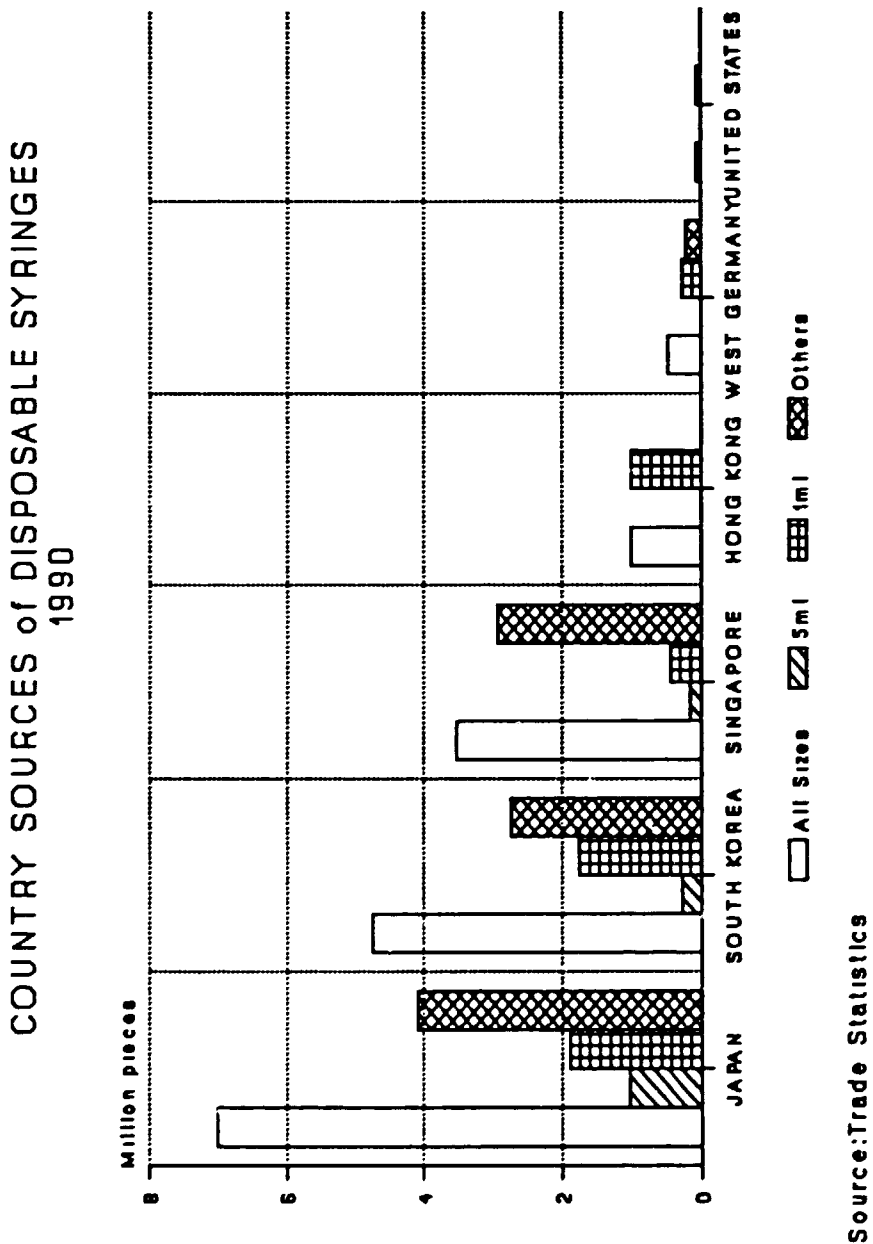
Table 2.4: Country sources of disposable syringes, 1990 exports to the Philippines (volume in pieces, value in US\$)

Country Sources	All Sizes		5 ml		1 ml		Others	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Japan	7,010,950	367,478.66	1,031,000	50,109.38	1,890,000	80,575.15	4,089,950	226,794.13
South Korea	4,755,500	210,847.39	270,500	9,245.44	1,752,500	78,020.50	2,732,500	132,581.45
Singapore	3,527,000	118,187.13	160,000	4,081.20	440,000	15,765.000	2,927,000	98,340.93
Hongkong	1,000,000	11,000.00	-	-	1,000,000	11,000.000	-	-
West Germany	471,500	23,121.29	-	-	262,500	15,986.25	209,000	7,135.04
United States	60,850	1,217.000	-	-	60,850	1,217.00	-	-
Total	16,825,800	721,851.47	1,461,500	63,436.02	5,405,850	202,563.90	9,958,450	455,851.55

Source: Trade Statistics.



Figure 2.5: Country Sources of Disposable Syringes





- 2/14 -

2.2.2 APPROXIMATE PRESENT SIZE OF DEMAND, ITS PAST GROWTH, MAJOR DETERMINANTS AND INDICATORS

Figure 2.6 traces the apparent demand for disposable syringes since 1984. There is no discernible pattern regarding the change in annual import volumes of disposable syringes regardless of size.

What is evident in the chart, however, is the sudden dramatic increase in import volumes that occurred in 1990. Imports of all sizes of disposable syringes in 1990 increased by more than four times the volume registered in 1989. This was true also for the 5 ml and 1 ml sizes.

Interviews with importers/distributors, government agencies, and a few major hospitals attributed the dramatic increase in 1990 to the following:

1. the requirements for the Philippine government's Expanded Programme on Immunization (EPI);
2. the shift from reusable to disposable syringes as a result of an increased awareness regarding the risk of AIDS and Hepatitis B contamination through re-used needles and syringes; and
3. the larger than usual purchases by importers/distributors in anticipation of a Peso devaluation vis-a-vis the US Dollar.

The Expanded Programme on Immunization (EPI) is a major component of the Primary Health Care Programme of the Department of Health. Initiated in 1976, the EPI aims to immunize children under five years of age against six diseases, namely diphtheria, pertussis, poliomyelitis, tuberculosis, measles and tetanus. While this may indicate a potentially large requirement for disposable syringes, the Department of Health pointed out that its annual budget for the



- 2/15 -

purchase of disposable syringes was limited to Peso 7 million. This fact was confirmed by the distributors although they (the distributors) also informed that the provincial hospitals are able to purchase their own requirements using their own miscellaneous funds once the centrally provided DOH funds have been used up.

In 1989 and 1990, the Department of Health embarked on an intensive AIDS information campaign. At about the same time, some private drug manufacturing companies launched an information drive on Hepatitis B as part of their efforts to market their respective vaccines. These measures increased the awareness of the general public regarding risks of contamination and led to a shift to disposable syringes from reusable syringes.

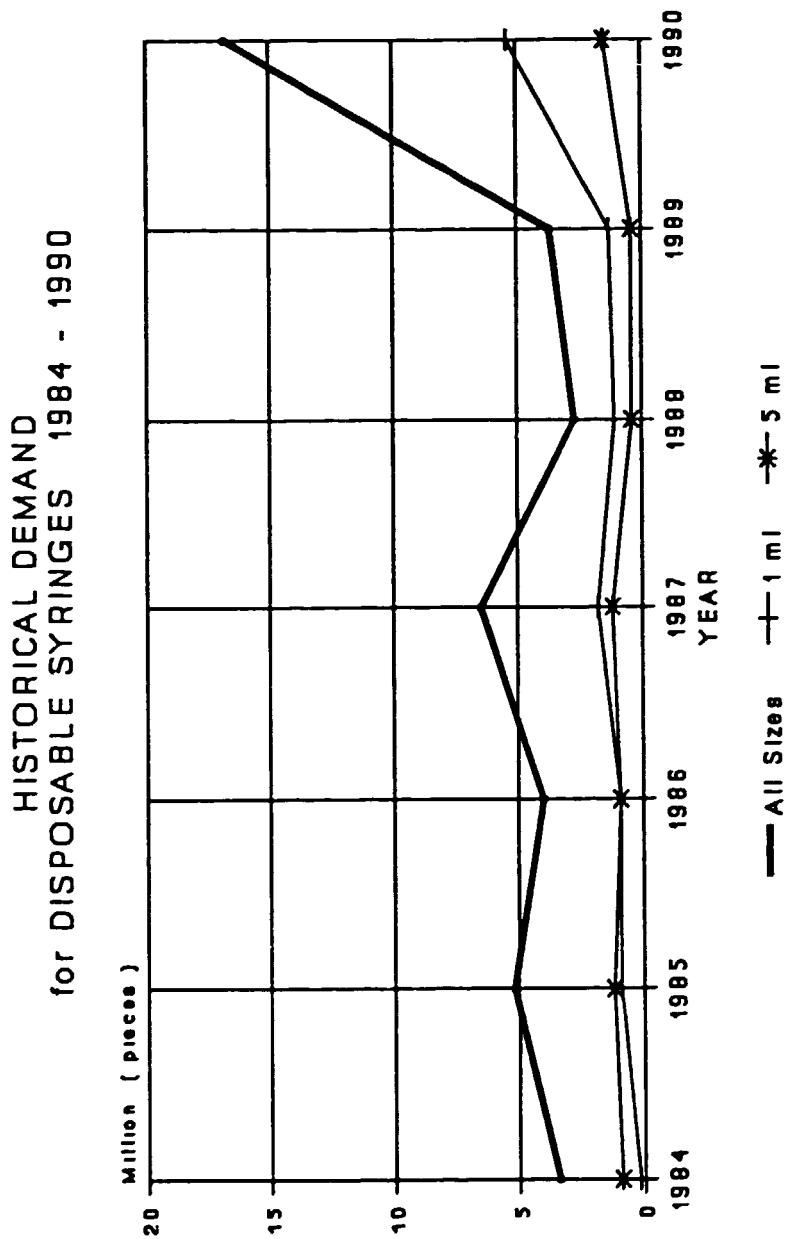
Telephone interviews with major hospitals in Metro Manila revealed that their purchases of disposable syringes in 1990 increased by anywhere from 10 to 70 per cent over the previous year attributable only in part to the increased awareness regarding AIDS and Hepatitis B. The use of reusable glass syringes and the reuse of disposable syringes are in fact still prevalent in the government hospitals where the charity wards abound.

The Philippine Peso devalued by 24 per cent against the US Dollar in 1990. The Peso-Dollar exchange rate was unstable throughout the first ten months of the year causing much speculation especially among importers. On October 31, 1990, monetary authorities announced a nine per cent de facto Peso depreciation versus the Dollar temporarily easing the speculative pressure against the Peso.

Given the uncertain exchange rate environment, it is highly probable that the importers/distributors of disposable syringes significantly increased their imports to hedge against the anticipated Peso devaluation. Disposable syringes, after all, have relatively long shelf lives.



Figure 2.6: Demand of Disposable Syringes (1984 - 1990)





- 2/17 -

The average consumption level of about 5 mio. p./y syringes of all sizes during the last years (without considering 1990) corresponds to a per capita consumption of approximate 0.1 disposable syringes/year.

$$\frac{5 \text{ mio p./y}}{61,5 \text{ mio}^*} = 0,1 \text{ p./c.y.}$$

* The population of the Philippines in 1990 is estimated at 61.5 millions.

According to WHO-guidelines the per capita consumption in developing countries should be 3-5 disp. syringes/year. If the projection method, presented in chapter 2.2.3, is to be followed, the Philippines will attain a per capita consumption level of 3-5 disposable syringes per year way past the year 2000. Should there be significant developments in the industry, however, such as a drastic reduction in prices, the likelihood of the Philippines reaching the WHO-guidelines sooner will be increased. Lower prices will alter consumption patterns such as limiting the re-use of glass or even disposable syringes which is quite a common practice in the Philippine setting.

This per capita consumption of 0.1 p./y is comparable with the following information on the disposable syringes demand in the People's Republic of China (Source: Chimica 264, p.17, 1987).

"The potential demand for plastic disposable syringes in the People's Republic of China is 3,700 mio p./y according to the Chinese State Pharmaceutical Association. This figure corresponds to a per capita consumption of approx. 1 p./y. However the domestic supply (1987) was less than 200 mio.p. and it was planned at that time to increase the production to 700 mio p./y by 1990."



- 2/18 -

200 mio.p./y correspond to a per capita consumption of approx. 0.06 p./y and 700 mio.p./y. to a per capita consumption of approx. 0.2 p./y.

2.2.3 PROJECTED FUTURE DEMAND

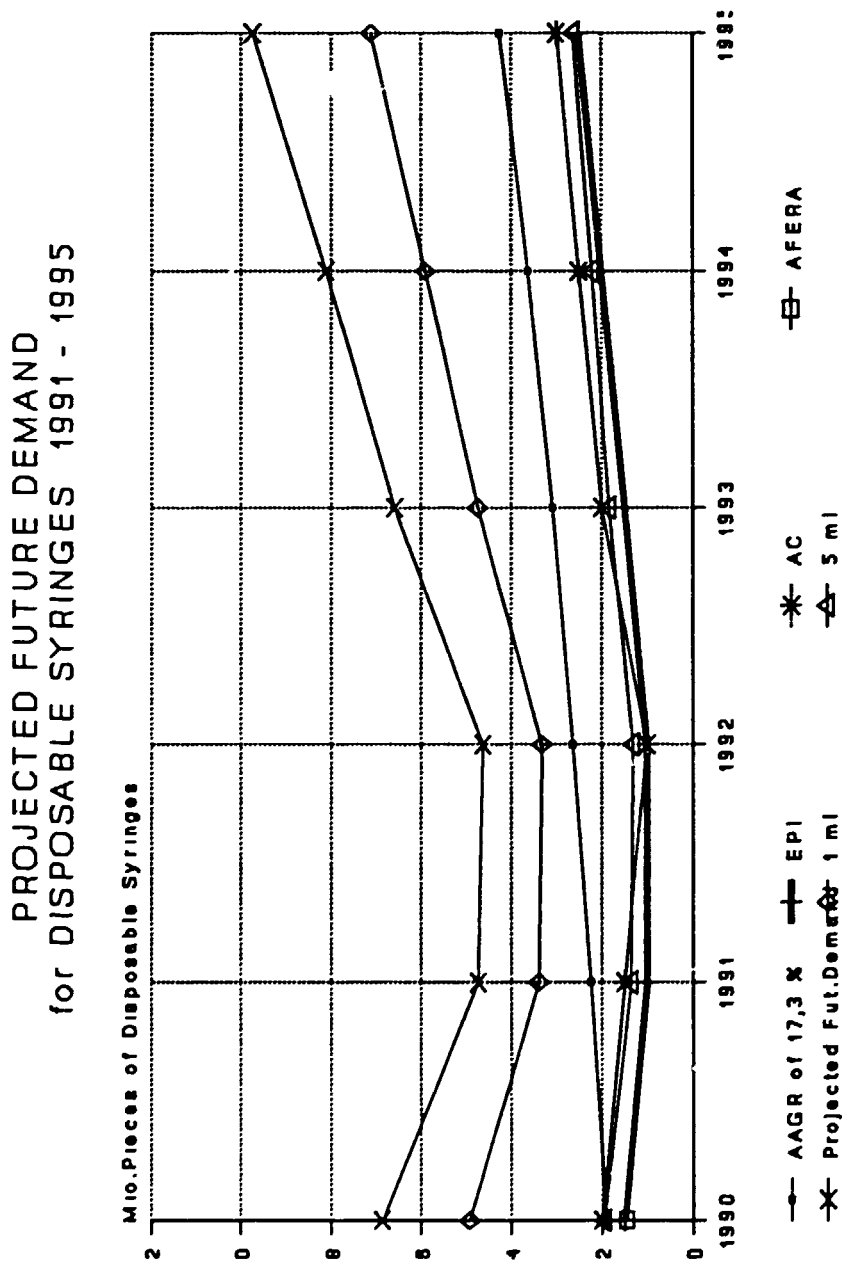
The demand for disposable syringes (1 ml and 5 ml) is projected to decline initially in 1991 to 4.7 million pieces but eventually to rise to 9.8 million pieces by 1996. Table 2.5 and figure 2.7 show the projected demand for each of the years from 1991 to 1995 and their breakdown among the two sizes.

Table 2.5: Projected Future Demand for 1 ml and 5 ml Disposable Syringes (1991 - 1995)

	1990 (Actual)	1991	1992	1993	1994	1995
Projected Future Demand (Based on Average Annual Growth Rate of 17.3 %)	1,912,112	2,243,600	2,632,556	3,088,943	3,624,450	4,252,794
Adjustments:						
Expanded Programme on Immunization	1,500,000	1,000,000	1,000,000	1,500,000	2,000,000	2,500,000
Awareness Campaign	2,000,000	1,500,000	1,000,000	2,000,000	2,500,000	3,000,000
Anticipation of Foreign Exchange Rate Adjustments	1,455,238	-	-	-	-	-
Projected Future Demand (Adjusted Demand)	6,867,350	4,743,600	4,632,556	6,588,943	8,124,450	9,752,794
By Size: 1 ml	4,923,345	3,387,702	3,316,877	4,745,775	5,906,231	7,125,899
5 ml	1,944,005	1,355,898	1,315,679	1,843,168	2,218,219	2,626,895



Figure 2.7: Projected Future Demand for 1 ml and 5 ml Disposable Syringes





- 2/20 -

To estimate the future demand, the average annual growth rate (AAGR) of 17.3 per cent from 1984 to 1989 was first applied to arrive at what may be considered the normal import levels from 1990 to 1995. The growth rate for 1989-1990 was excluded in computing the AAGR since this period experienced an unusually high growth.

As shown in the table, the difference between the actual demand and the projected demand based on the AAGR in 1990 is accounted for by increased imports/purchases as a result of the Expanded Programme on Immunization, the AIDS-Hepatitis B Awareness Campaign, and the Anticipation of Foreign Exchange Rate Adjustments. The first two factors are still expected to influence import decisions in varying degrees from 1991 to 1995.

For 1991 and 1992, it is expected that there will be less purchases by provincial hospitals because of budget tightening measures to be observed strictly by all levels of government. This constriction, however, is anticipated to loosen from 1993 onwards.

As much as the AIDS-Hepatitis B Awareness Campaign may have altered individual and institutional preferences for the type of syringes, socio-economic conditions were still a more overriding concern and dictated whether glass syringes would be used more often or disposable syringes would actually be re-used. In view of the general economic slowdown forecasted over the next 18 months, the incremental purchases as a result of increased public awareness are expected to slow down as well with a marked recovery seen by 1993. One importer/distributor in fact said that the demand for all sizes of disposable syringes will definitely decline significantly in 1991.

While foreign exchange rate adjustments may be inevitable over the next five years, it is more the uncertain environment which causes undue speculation among importers. It would be extremely difficult to predict how monetary



- 2/21 -

authorities will react to probable external macroeconomic imbalances in the future assuming that such imbalances will indeed recur. For conservatism purposes, therefore, no sudden incremental increase in imports of disposable syringes is assumed over the next five years as a result of importers' anticipation of unfavourable exchange rate adjustments.

2.2.4 PRICES AND IMPORT TARIFF

As shown in table 2.6, local suppliers sell disposable syringes either with or without needles. The price of 1 ml syringes with needles ranges from ₱ 3.11 to ₱ 4.70 a piece while the 5 ml syringes with needles are sold from ₱ 3.70 to ₱ 5.00 per piece.

For syringes without needles, on the other hand, the 1 ml size sells at ₱ 2.70 per piece, while the 5 ml size ranges from ₱ 3.47 to ₱ 4.00 per piece.

Table 2.6: Comparative Local Prices of Disposable Syringes as of January 1991 (in Pesos)

Company	with needles		without needles	
	5 ml	1 ml	5 ml	1 ml
Becton Dickinson, Phils., Inc.	3.70	3.60	3.47	2.70
Blue Sky Trading Co., Inc.	4.40	4.40	4.00	n.a.
Medical Center Trading Co., Inc.	5.00	4.70	n.a.	n.a.
Philippine Union Comm'l, Inc.	3.80	3.20	n.a.	n.a.
Zuellig Pharmaceuticals, Corp.	3.73	3.11	n.a.	n.a.

Source: Interviews.



- 2/22 -

Imports of syringes, with or without needles, are subject to a 10 per cent tariff duty and a 10 per cent value-added tax. An additional import tariff of nine per cent has likewise recently been levied on all imports.

2.2.5 EXPORT MARKET POTENTIAL

The manufacture of disposable syringes in the Philippines for export to the United States markets is an opportunity that should be considered because of the continued preferential trade treatment that the country enjoys. The Philippines still qualify under the U.S. Generalized System of Preferences (GSP), a programme of tariff preferences accorded to beneficiary developing countries to assist in their economic development. Four newly-industrialized Asian countries, namely Hongkong, South Korea, Singapore, and Taiwan, have been removed from the list of GSP beneficiary developing countries since January 1, 1988.

Syringes are included among the items/products which are allowed to enter the U.S. market on a duty free basis provided they originate from GSP-eligible countries. If the syringes are sourced from non-GSP countries, however, a duty rate of 8.4 per cent or higher is applicable to such importations. This preferential tariff treatment gives GSP-eligible countries like the Philippines a built-in advantage.

The list of country sources of Philippine imports of syringes indicates that Japan, South Korea, Singapore, and Hongkong are producers of disposable syringes. Manufacturers in these four countries may consider plant relocations to GSP-eligible countries if they still desire to sell to the U.S. market on a duty free basis. The Philippine Board of Investments (BOI) in fact approved in mid-1990 the investment incentive applications of two firms, Hanako Medical Philippines (a P 57 million, 60-40 Filipino-Japanese venture) and Kayphil Medical Corporation (a P 32 million, 60-40 Filipino-Korean venture), which will



- 2/23 -

engage in the production of disposable syringes for export as well as for domestic use.

2.3 SALES FORECAST

2.3.1 ANTICIPATED COMPETITION FOR THE PROJECT FROM EXISTING AND POTENTIAL LOCAL AND FOREIGN PRODUCERS/IMPORTERS.

The main competitors can be divided into two groups:

Group A: Actual importers of disposable syringes

Group B: Prospective producers of disposable syringes.

Group A - competitors have been presented in chapter 2.2.

Group B - competitors are identified in the following.

The following Table 2.7 presents a characterization of these two projects which have been granted pioneer status by the BOI, and which are very similar to the Ferpharma project.



- 2/24 -

Table 2.7: Characterisation of two Disposable Syringes Projects, namely Hanako Medical Phils. Inc. and Kayphil Medical Corp.

	Hanako Medical Phil. Inc.	Kayphil Medical Corp.
Annual production capacity * (in million pieces)	12	21
Export: Domestic market ratio	50:50	70:30
Plant location	Carmona, Cavite (about 55 kms away from Manila)	San Fernando, Pampanga (about 75 kms away from Manila)
Proposed start-up date	March 1991 **	June or July 1991
Ownership structure	60 % - Filipino 40 % - Japanese	60 % - Filipino 40 % - Korean

* Annual production capacity by size of syringes is not available

** According to the BOI, the project has not started operation

Operating at full capacity, both companies will produce 20,7 mio. pieces/y for the export market and 12,3 mio pieces/y for the domestic market.

2.3.2 LOCALISATION OF MARKETS

The proposed plant under investigation would deliver its products to private and governmental hospitals, as well as to pharmacies and to supermarkets.

The main market will be the most populated areas, i.e. Metro Manila and the other big cities in the Philippines.



- 2/25 -

2.3.3 SALES PROGRAMME

It has originally been planned by the joint venture partners to produce

15,000,000 5 ml syringes/year and
5,000,000 1 ml syringes/year,

because this production seemed to be easily marketable regarding to the number and size of syringes, as well as the minimum economic size of a disposable syringes production plant. However, the results of the market investigations indicated a smaller market volume for these sizes of disposable syringes in the Philippines than anticipated. Consequently it was recommended, and accepted by the joint venture partners, to include also the production of other sizes. Since the 2.5 ml syringes have a market volume of about 30 % it was decided that the production programme should be extended by this size.

From a technical point of view it can be stated that the injection moulding machines are equipped with tools to change the moulds. No changes in conceptual engineering of the plant would be necessary. Only the scope of supply has to be extended by moulds for the production of 2.5 ml syringes.

2.3.4 ESTIMATED ANNUAL SALES REVENUES FOR PRODUCTS

Price is the only element in the marketing mix that produces revenues; the other elements represent costs.

Therefore, to set a price is a problem which must be carefully considered, first of all, when a newly established company has to introduce its product onto the market where these products already are offered.

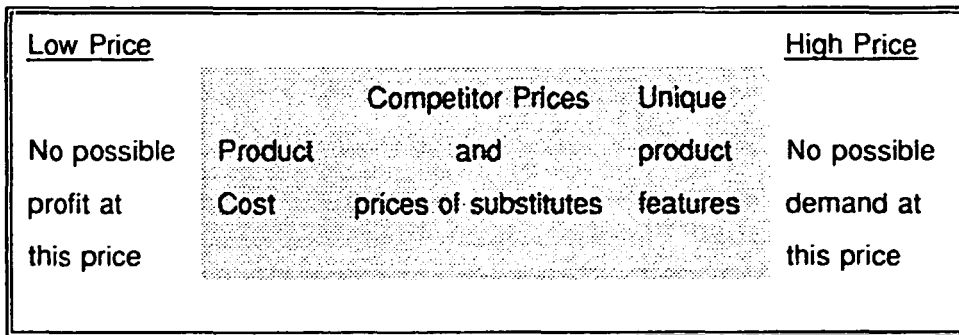


While market demand might set a ceiling and costs set a floor to pricing, the following analyses of competitors prices will help to establish where the prices might be set.

The price must principally be somewhere between one that is too low to produce a profit and one that too high to produce any demand.

Figure 2.8 summarizes these major considerations in price setting.

Fig. 2.8: Major Considerations In Setting a Price



Production costs set a floor to the price. Competitors prices as mentioned in chapter 2.2.4 provide an orientation point that the company will have to consider in setting its price.

The price analysis is executed in the following by starting on one hand from the import prices and on the other hand from whole sale prices. The results of this analysis is presented in table 2.7.



- 2/27 -

Table 2.7: Average prices 1991 for 1 ml and 5 ml syringes in the Philippines

Product	Average Prices 1990/1991			
	A	B	C	
	Import price without taxes US\$/1,000 p.	CIF with taxes US\$/1,000 p.	Whole sale price	
			US\$/1,000 p.	₱/1,000 p.
1 ml syringe	37.50	48.40	129.36	3,622
5 ml syringe	43.40	56.00	140.79	3,942

Remark:

Import of syringes, with or without needles are subject to 10 + 9 per cent import tariff duty and 10 per cent value-added tax, total 29 %.

The average prices, level A and C has been cross-checked with Austrian Level A and C prices for 2 ml and 5 ml syringes (Prices for 1 ml syringes have not been available).

The results are presented in the following table 2.8.

Table 2.8: Average prices 1991 for 1 ml and 5 ml syringes in Austria

Product	A Import prices without taxes US\$/1,000 p.	C Wholesale prices US\$/1,000 p.
2 ml	43.00	62.50
5 ml	55.00	84.20



- 2/28 -

As can be seen the import prices to Austria are higher than those to the Philippines, whereas the wholesale price levels in Austria are considerably lower than those in the Philippines.

The annual sales revenues based on the three levels of average prices 1990/1991 as indicated in the foregoing table 2.7 are presented in table 2.9.

Table 2.9: Annual sales revenues for the envisaged production programme;

Product	Annual Sales Revenues US\$/y		
	Price Level		
	A	B	C
1 ml syringe	187,500.-	242,000.-	646,800.-
5 ml syringe	651,000.-	840,000.-	2,111,850.-
Total	838,500.-	1,082,000.-	2,758,650.-

As it is shown in chapter 8 the production cost at a normal year of production will be in the order of magnitude of 1.5 mio US\$/y.

Therefrom it is evident that in order to have a financial viable production it is necessary to obtain ex works prices which are in the range of the whole sale price levels indicated in the above table.



- 2/29 -

2.3.5 ESTIMATED ANNUAL COSTS FOR SALES PROMOTION AND MARKETING

One of the definitions of marketing is the following:

»Marketing is getting the right goods and services to the right people at the right place at the right time at the right price with the right communication and promotion«.

Although the direct market for the envisaged products are commercial and institutional customers, it is obvious that marketing must be done with regard to the needs of the end-user (consumer).

Marketing generally comprises the strategic-conceptual aspects of selling, whereas selling is very often done in a separate sales department.

For smaller companies marketing and sales department can be concentrated in one department.

Sales promotion consists of a wide variety of promotional tools designed to stimulate earlier and/or stronger market response. They include tools for:

- consumer promotion (samples, prices off, premiums, etc.)
- trade promotion (buying allowances, free goods, advertising, etc.) and
- sales-force promotion (bonuses, contests, etc.)

All marketing and sales promotion efforts have one common thing; they cost money.

Concerning the marketing of syringes (including sales promotion) the marketing and sales promotion cost have been estimated as a lumpsum at US\$ 20,000.- per year.



- 2/30 -

2.4 DETERMINATION OF PLANT CAPACITY

2.4.1 FEASIBLE NOMINAL PLANT CAPACITY

To find an optimum plant capacity, is of greatest importance for project profitability. The increase of plant capacity is very often a good measure to reduce production costs, since investment cost and other fixed costs are not increased in direct proportion of plant capacity.

On the contrary the market size must be taken into consideration and may require to reduce the plant capacity to the smallest economically feasible plant size, as it is the case of the projected plant.

The nominal capacity of the projected plant which corresponds to the smallest economically feasible plant has been fixed at

**20,000,000 syringes per year, therefrom
15,000,000 5 and 2.5 ml syringes and
5,000,000 1 ml syringes.**

Concerning the envisaged type of products - pertaining to the health care sector - special attention must be paid to the fulfilment of quality requirements by GMP (Good Manufacturing Practices). These GMP are also of highest importance for project profitability. The sales targets - even at relatively small capacities - can only be reached if high quality products are produced and a constant high quality level can be assured to the customers over long periods.



- 2/31 -

2.4.2 QUANTITATIVE RELATIONSHIP BETWEEN SALES, PLANT CAPACITY AND MATERIALS INPUT

The sales of the future plant are based on the following schedule of realisation until full production at nominal capacity:

- 1992: Design, delivery, erection and commissioning of the plant
- 1993: First year of operation (at 2% of nominal capacity), corresp. to a production of
3.3 Mio 1 ml syringes and
10.0 Mio 2.5 and 5 ml syringes.
- 1994: Second year of operation (at 80 % of normal capacity), corresp. to a production of
4.0 Mio 1 ml syringes and
12.0 Mio 2.5 and 5 ml syringes.
- 1995 - 2007: Full operation in accordance with nominal capacity.

The theoretical market volumes and the 1 ml, 2.5 ml and 5 ml syringes sales of the future plant are presented in table 2.10.



Table 2.10: Market and sales volumes 1993-2007 of the future plant (in mio. pieces per year)

Year	Local market volume			Local sales		
	1 ml	5 ml	2.5 ml	1 ml	5 ml	2.5 ml
1993	4.7	1.8	9.8	3.3	1.8	8.2
1994	5.9	2.2	12.0	4.0	2.2	9.8
1995	7.1	2.6	14.2	5.0	2.6	12.4
1996	7.5	2.7	14.2	5.0	2.7	12.3
1997	7.8	2.9	14.9	5.0	2.9	12.1
1998	8.2	3.0	15.6	5.0	3.0	12.0
1999	8.6	3.2	16.4	5.0	3.2	11.8
2000	9.1	3.3	17.2	5.0	3.3	11.7
2001	9.5	3.5	18.1	5.0	3.5	11.5
2002	10.0	3.7	19.0	5.0	3.7	11.3
2003	10.5	3.8	19.9	5.0	3.8	11.2
2004	11.0	4.4	20.9	5.0	4.4	11.0
2005	11.6	4.2	22.0	5.0	4.2	10.8
2006	12.1	4.4	23.1	5.0	4.4	10.6
2007	12.8	4.7	24.2	5.0	4.7	10.3

The local market volumes up to 1995 correspond to the projected future demand as presented in table 2.5. From 1995 up to 2007 an AAGR (average annual growth rate) of 5 % has been assumed.

The estimates of local market volumes are based on the market share of the envisaged sizes (1 ml, 2.5 ml and 5 ml) of the syringes in 1990, as indicated in table 2/1 assuming that the proportion of market shares 5 ml (and 2.5 ml) syringes will remain unchanged over the period 1993-2007.



- 2/33 -

As a result of these considerations the nominal capacity of the future plant is defined as follows:

20,000,000 syringes per year, therefrom
15,000,000 2.5 ml + 5 ml syringes and
5,000,000 1 ml syringes.



- 3/1 -

3. MATERIALS AND INPUTS

3.1 RAW MATERIALS AND OPERATING SUPPLIES

The following materials are necessary for the production of disposable syringes:

Raw material:	Polypropylene
Semi-finished products:	Needles, rubber plugs
Auxiliary materials:	Films, boxes for 100 bags mastercar- tons, ethylene oxide with freon, sili- cone, ink, sticky-printing tape roll

All of these materials will have to be imported.

Raw material specifications

Cylinders and pistons are made from PP (Polypropylene). Due to the required higher slidability of the surface, the PP must meet special qualifications:

Homopolymeric polypropylene, especially modified for low surface friction (by means of an internal lubricant which diffuses to the surface after conditioning). The material must correspond to the following specifications (according to DIN 13 098, the German specification for disposable syringes, or to equivalent standards):



- 3/2 -

ITEM	SPECIFICATION
Melting index	230 °C/21.6 N = 12 g/10 min 230 °C/50 N = 43 g/10 min
Density	0.9 g/cm ³
Vicat softening point	at 10 N 151 °C at 50 N 85 °C
Heat deformation temperature	at 0.46 MPa 80 °C at 1.82 MPa 52 °C

Rough estimates of annual costs of raw materials and operating supplies

The unit price estimates are presented in the following Table 3.1.

Table 3.1: Unit price estimates for raw material, semi-finished products and auxiliary materials for disposable syringes production

Designation	Unit price (US\$/unit)
Polypropylene	1.20 per kg
Film	4.65 per kg
Needles (Canula for 1 ml)	0.0075 each
Needles complete for 5 ml	0.014 each
Rubber plugs (for 1 ml syringes)	0.0062 per plug
Rubber plugs (for 5 ml syringes)	0.00865 each



- 3/3 -

Designation	Unit price (US\$/unit)
Boxes of 100 bags	0.42 each
Ethylene oxyde with freon	2.23 per kg exclud. bottle cylinder
Silicone	9.23 per kg
Ink	13.84 per kg
Sticky-printing tape roll	2.30 per roll

Source: PE

The estimates of annual raw material and operating supplies costs are presented in Tables 3.2 and 3.3.

Table 3.2: Raw materials and operating supplies costs per 1000 pieces 5 ml syringes In US\$ and corresponding annual costs

<u>DESCRIPTION</u>	<u>US\$/1000 p</u>
Cylinder, plunger and cap (polypropylene)	5.24
Needle	14.00
Rubber plug	8.65
Polyethylene film	2.98
Cardboardbox *	0.42
Ethylene oxide	0.49
Other materials (ink, silicone, adhesive, analysis materials, etc.)	0.53
Total	32.31

* Remark:

Costs for mastercartons are supposed to be included in other materials costs.



- 3/4 -

Planned production at a normal year of production: 15,000,000 pieces.

Corresponding raw materials and operating supplies costs: 484,650.- US\$/y.

Table 3.3: Raw materials and operating supplies costs per 1000 pieces 1 ml syringes in US\$ and corresponding annual costs

<u>DESCRIPTION</u>	<u>US\$/1000p</u>
Cylinder, plunger and cap (polypropylene)	3.36
Needle	7.50
Rubber plug	6.20
Polyethylene film	2.73
Cardboardbox *	0.42
Ethylene oxide	0.44
Other materials (ink, silicone, adhesive analysis materials, etc.)	0.50
Total	21.15

Planned production at a normal year of production: 5,000,000 pieces.

Corresponding raw materials and operating supplies costs: 105,750.- US\$/y.

* Remark:

Costs for mastercartons are supposed to be included in other materials costs.

3.2 UTILITIES

Electricity

The Manila Electric Company (MERALCO) supplies the electricity requirements of industrial users in the Laguna area. As shown in table 3.4 the monthly electricity rate is made up of a generation charge and a distribution charge. The applicable charges/rates are also reflected in table 3.4.



Table 3.4: Electricity Rates for Industrial Users (In Pesos)

<p>Generation Charge</p> <p>Applicable generation charge per KWh for the billing month. For the month of December 1990, the generation charge was P 1.87 per kilowatt hour.</p>							
<p>Distribution Charge</p> <ul style="list-style-type: none"> o Demand Charge P 25.00 per kilowatt of billing demand. (Please refer to the table under Energy Charge to determine whether the project is small, medium or large industrial user.) o Energy Charge <table style="margin-left: 20px;"> <tr> <td>Small (5 KW < Demand < 40 KW)</td> <td>: P 0.30 per KWh</td> </tr> <tr> <td>Medium (40 KW <= Demand <= 200 KWh)</td> <td>: P 0.27 per KWh</td> </tr> <tr> <td>Large (200 KW < Demand)</td> <td>: P 0.24 per KWh</td> </tr> </table> o Currency Exchange Rate Adjustment (CERA) Applicable currency exchange rate adjustment for the billing month. The average monthly CERA rate for 1990 was 20.24 percent. The CERA rate is multiplied by the sum of the demand and energy charge to get the CERA. <p>Note: KWh = kilowatt hour</p>		Small (5 KW < Demand < 40 KW)	: P 0.30 per KWh	Medium (40 KW <= Demand <= 200 KWh)	: P 0.27 per KWh	Large (200 KW < Demand)	: P 0.24 per KWh
Small (5 KW < Demand < 40 KW)	: P 0.30 per KWh						
Medium (40 KW <= Demand <= 200 KWh)	: P 0.27 per KWh						
Large (200 KW < Demand)	: P 0.24 per KWh						

Source: Manila Electric Company

With regard to the determination of operating costs an average unit price of 2.8 P/KWh can be used according to SGV without considering fixed and cost variable cost components.

Water

Water for the Laguna area is provided by the Local Water Utilities Administration (LWUA). Table 3.5 presents the water rates of LWUA for commercial/industrial users, broken down into fixed and commodity (variable) charges.



Table 3.5: Water Rates for Commercial/Industrial Users (In Pesos)

Size of Meter	Fixed Charge Cost for 1 st 10 m ³	Commodity (Variable) Charge	
		Range (m ³)	Cost per m ³
1/2	84.00	11-12	5.70
3/4	134.00	21-30	6.80
1	268.80	31-50	8.20
1-1/2	672.00	more than 50	9.60
2	1,680.00		

Source: Local Water Utilities Administration

Regarding the determination of operating costs an average unit price of 1.249 P/m³ has been calculated plus a fixed charge of 134.00 P.



4. LOCATION AND SITE

4.1 **ECONOMIC AND SOCIAL BACKGROUND FOR BUSINESS IN THE PHILIPPINES**

The following tables characterize the economic (Table 4.1) and social (Table 4.2) climate in the Philippines and present the ranking of the Philippines relative to all countries regarding the economic performance profile (fig. 4.1).

Table 4.1: Economic Indicators of the Philippines

ECONOMIC INDICATORS: January 1, 1991 Production, Inflation, Growth	1986	1987	1988	1989	1990
GDP (\$bn)	30.76	34.44	39.15	44.35	45.19e
Per Capita (\$)	550	600	665	750	735e
Real Growth Rate (%)	1.9	5.8	6.7	5.7	3.5e
Inflation Rate (%)	.8	3.8	8.7	10.6	14.5e
Capital Investment (\$bn)	3.98	4.95	5.99	7.69	7.82e
Budget Balance (\$bn)	-1.50	0.81	0.96	0.88	-2.44e
LABOUR Change in Real Wages (%)	n.a.	n.a.	n.a.	n.a.	n.a.
Unemployment Rate (%)	11.8	11.3	9.6	9.2	9.3e
INTERNATIONAL Debt Service Ratio (%)	34.0	33.2	30.2	25.3	28.8e
Current Account (\$bn)	0.95	0.44	0.39	-1.47	-2.98
Exports (\$bn)	4.84	5.72	7.07	7.82	8.60e
Imports (\$bn)	5.04	6.74	8.16	10.42	13.00e
Currency Change (%)	-9.6	0.9	-2.6	-3.0	-7.3e



- 4/2 -

e = estimated

n.a. = not available

Principal exports: sugar, copra, logs and lumber, copper concentrates, abaca, nickel, garments and electrical components; mainly to the US, Japan and the Netherlands

Principal imports: petroleum, machinery, transport equipment and grains; mainly from the US, Japan and Saudi Arabia

Source: Frost & Sullivan Ltd.

Table 4.2: Social Indicators of the Philippines

<p>Population</p> <p>Annual growth: 2,4 %</p> <p>Infant deaths per thousand: 46</p> <p>Persons under age 15: 43 %</p> <p>Urban population: 39 %</p> <p>Urban growth: 3.8 %</p> <p>Literacy: 88 %</p>
<p>Work force distribution</p> <p>Agriculture: 50 %</p> <p>Industry-commerce: 18 %</p> <p>Services: 32 %</p> <p>Union: 18 %</p>

Source: Frost & Sullivan Ltd.



- 4/3 -

Figure 4.1 presents the economic performance profile of the Philippines regarding the country's ranking relative to all countries covered by political risk services during 1986 - 1990.

The figures 4.2 and 4.3 on the following pages depict the real GDP growth and inflation forecast according to Frost & Sullivan Ltd.

ECONOMIC PERFORMANCE PROFILE
 Country's Ranking Relative to All Countries
 Covered by Political Risk Services
 1986 - 1990

INDICATOR	Best 25%	Next 25%	Next 25%	Worst 25%
GDP PER CAPITA (\$)				658
REAL GDP GROWTH (%)	4,7			
INFLATION (%)		7,7		
UNEMPLOYMENT (%)			10,2	
CAPITAL INVESTMENT (% of GDP)				15,5
BUDGET BALANCE (% of GDP)		-3,4		
CURRENT ACCOUNT (% of GDP)		-1,8		
DEBT SERVICE RATIO			30,3	
CURRENCY CHANGE (%)			-4,7	





Fig.4.2: Forecast of real GDP Growth

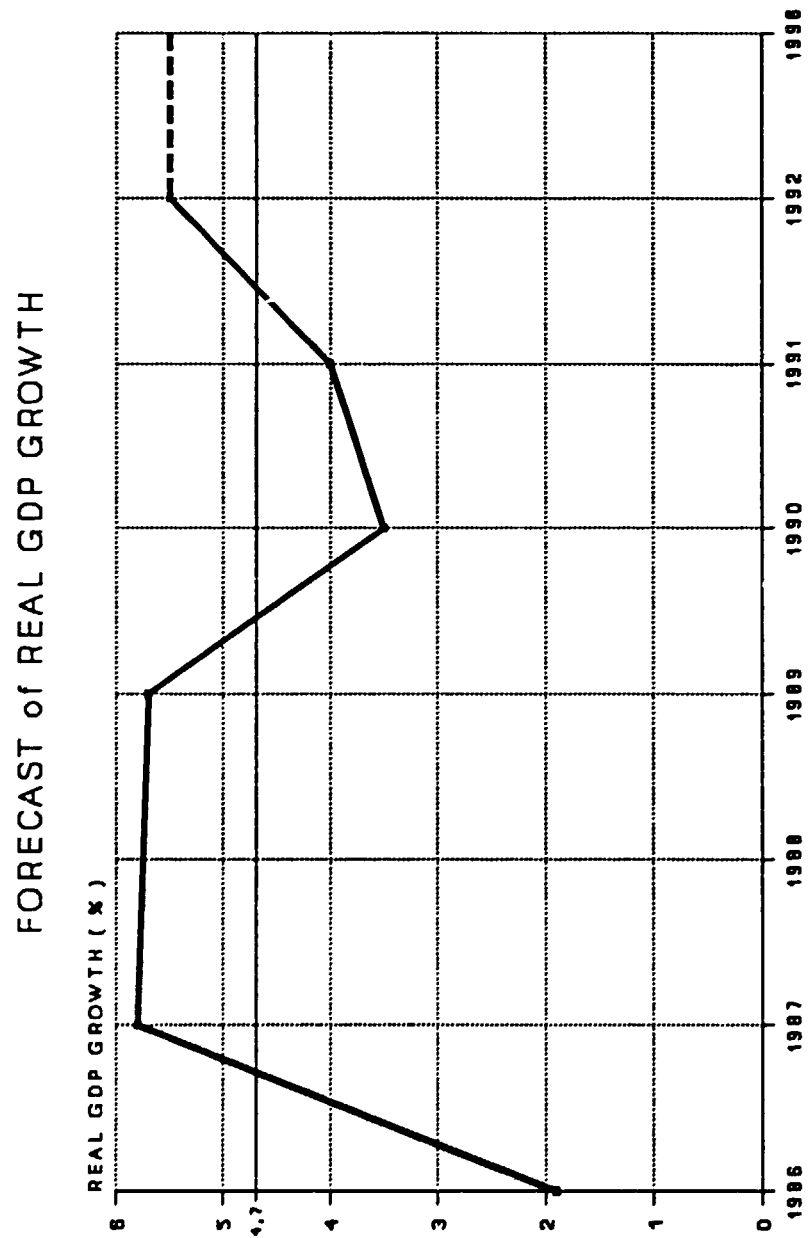
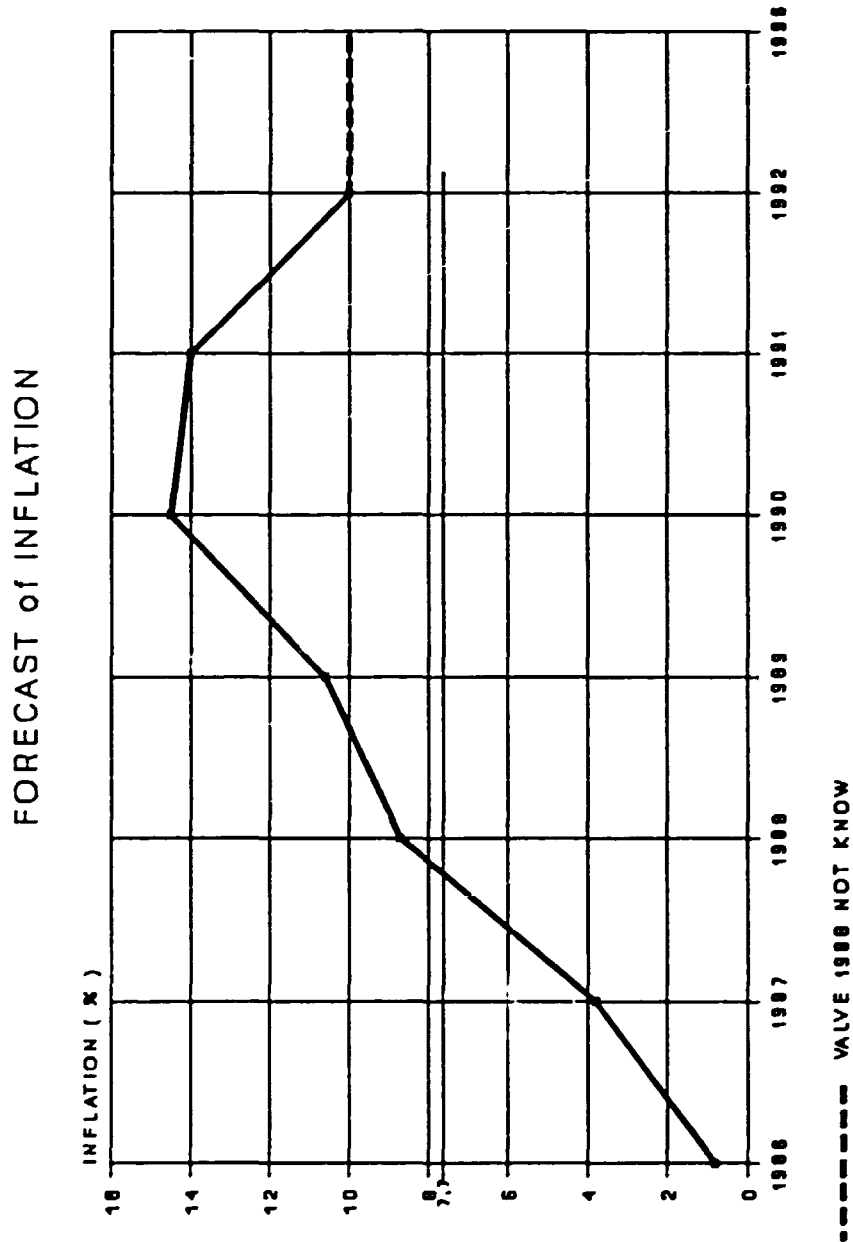




Fig.4.3: Forecast of Inflation



Head office

Linke Wienzeile 234
 A 1153 Vienna AUSTRIA

Phone (internal)

+43 1 89 1 89 0

Telex

132997 aaw a

Cable

Austroprojekt Wien

Teletax

+43 1 89 1 89 296

Bank

Österreichische Landesbank
 Account 235 100 83A



- 4/7 -

4.2 SPECIFIC SITE FOR THE PROJECT

The project is not yet developed to a stage that binding commitments regarding the selection of an appropriate site are already made.

However, the joint venture partners intend to rent a suitable production building and not to construct a new one. The question has been obviously raised in the course of the discussions of the joint venture partners whether to locate the projected plant in an industrial park near Canlubang.



5. PROJECT ENGINEERING

5.1 CONCEPTUAL ENGINEERING OF THE PROPOSED PLANT

The engineering of the plant, the technical lay-out and the equipment selection is based upon the technical concept prepared by PHARMACHIM ENGINEERING of Milan, Italy the technical joint venture partner.

The plant will be devised for an annual production of 20 millions disposable syringes, in the sizes of 1 ml, 2.5 ml and 5 ml:

1 ml : 5,000,000 pieces/year

2.5 and 5 ml : 15,000,000 pieces/year

The proposed plant will produce the plastic parts of the syringes, whereas all other parts of the syringes will be imported. The plastic parts are cylinders and pistons for 1 ml, 2.5 ml and 5 ml size. In addition caps and needle/caps for the 1 ml syringes are also produced, whereas the needles for the 2.5 and 5 ml syringes complete with cap and needle/cap are imported.

	<u>Produced parts</u>	<u>Imported parts</u>
1 ml syringe	cylinder, piston, cap, needle/cap	rubber plug, needle (canula)
2.5 + 5 ml syringe	cylinder, piston	rubber plug, needle (complete with cap)

The production is subdivided into 4 sections, i. e.:

- 1) Cylinder, piston, caps and needle/caps for 1 ml syringes moulding
- 2) Serigraphic processing of cylinders



- 5/2 -

- 3) Assembly
- 4) Ethylene Oxide sterilization

The manufacturing process commences with the moulding of the plastic parts, i. e. cylinders, pistons, and protectors, which make up the syringes. The moulded parts are then placed in special containers for forwarding to the next following process. The pistons and the protectors are forwarded to the assembly line and semi-finished products warehouse, the cylinders to the offset processing department, where a graduated scale in cubic centimetres is engraved with ink.

At the offset processing the needles are welded into the 1 ml cylinders by monocomponent resins and reach together with the 5 ml cylinders and separate needles for this size of syringes the assembly department.

In the assembly department all parts are put together. The assembled syringes are placed in carton containers, which are closed before being forwarded to the sterilization department. The automatic sterilization cycle lasts approximately 10 hours, after which the autoclaves are opened to release the sterile product.

Before placing these products in the finished products store and preparing them for shipment, samples are selected for laboratory analysis for testing sterility and apyrogenity at the local university.

Clean room is necessary in the pre-sterilisation stage, i. e. in the assembling and packaging departments. The air intake is treated in a conditioning system by passing through depyrogenising filters which keep air clean and pyrogen free.

This brief outline of the manufacturing processes serves as an indication, however each specific department will be described in detail hereinafter.



- 5/3 -

5.2 TECHNOLOGY AND EQUIPMENT

5.2.1 MOULDING DEPARTMENT

Department Description

As mentioned previously, the cylinders, pistons and protectors, will be moulded in this department, therefore the size of the machine yard and dies will be selected accordingly.

The raw material (Polypropylene) in granules must conform to the required medical standard and be accompanied by a certificate which guarantees its suitability for this specific use.

The plastic granulate is brought to melting point and then injected into the dies. The machine will be programmed so that opening occurs only after the moulded parts become solidified.

Department Sizing

The sizing of the plant is based on the following parameters:
300 working days/year with 3 daily shifts for a total of 7.200 hours/year

For the sizing of the injection presses, 4,5 cycles per minute have been considered for cylinders and 5.5 cycles for pistons, giving a production of:

2.5 and 5 ml syringes:

- 6,480 cylinders/h for 2.5 and 5 ml (24 digit moulds)
- 7,920 pistons/h for 2.5 and 5 ml (24 digit moulds)



- 5/4 -

1 ml syringes:

- 4,320 cylinders/h x 1 ml (16 digit moulds)
- 5,280 pistons/h x 1 ml (16 digit moulds)
- 7,920 caps/h x 1 ml (24 digit moulds)
- 7,920 needles/caps x 1 ml (24 digit moulds)

The number of machines for the planned production is calculated as follows:

2.5 and 5 ml: 15,000,000 pieces/year

- 15,000,000 + 3% reject = 15,450,000 pieces/year
- 15,450,000 : 6,480 cylinders/h = 2,384 hours/cylinders
- 15,450,000 : 7,920 pistons/h = 1,950 hours/pistons
- 4,334 hours: 7,200 h/year = 0.60 machines

1 ml: 5,000,000 pieces/year

- 5,000,000 + 3% reject = 5,150,000 pieces/year
- 5,150,000 : 4,320 cylinders/h = 1,192 hours/cylinders
- 5,150,000 : 5,280 pistons/h = 975 hours/pistons
- 2,167 hours: 7,200 h/year = 0.30 machines

1 ml: 5,000,000 pieces/year

- 5,000,000 + 3 % reject = 5,150,000 pieces/year
- 5,150,000 : 7,920 caps/h = 650 h/caps
- 5,150,000 : 7,920 needle/caps = 650 h/needle/caps
- 1,300 hours: 7,200 h/year = 0.18 machines

Considering the low production, the presses must be programmed for moulds rotation.

Total of "Injection Presses" : 2



- 5/5 -

To avoid water wastage in moulds cooling, a closed cooling water circuit has been provided.

5.2.2 WELDING DEPARTMENT (for 1 ml syringes only)

The needles are welded with monocomponents resins directly on the cylinder without hub, to avoid any loss of products.

5.2.3 ASSEMBLING DEPARTMENT

The assembling of the syringes is made in a semi-automatic manner, through a belt conveyor.

Parts to be assembled for 1 ml syringe: cylinder with needle, piston, rubber plug, cap, needle-cap

Parts to be assembled for the 2.5 and 5 ml syringes: cylinder, piston, rubber plug, needle with cap and needle/cap.

The semiautomatic assembling and welding line is equipped with 10 feeders, with a production capacity of 2,500 syringes per hour, and includes the conveyor belt, the »Lume« seal testing, the needles siliconizing. The application and welding of the protective caps for 1 ml syringes is also carried out in this department.

5.2.4 PACKING DEPARTMENT

The machines used operate horizontally, packaging the assembled syringes in polyethylene bags with 10 or 12 syringes each.

When the machine is operating, special rollers serve to code with figures or letters. This procedure is essential to enable a specific batch and relative date of production to be traced.



- 5/6 -

The ready packaged syringes are collected on a conveyor belt, which conveys them in cardboard boxes of 100 or 200 pieces. Before closing the boxes, a weight controller verifies that the contents are numerically correct.

The box, each containing 100 or 200 pieces, are then placed in a master carton before undergoing sterilization.

5.2.5 STERILIZATION DEPARTMENT

Department Description

The most widely used sterilization systems for syringes are:

- Ethylene oxide (EO) with freon or CO₂
- Gamma rays with cobalt 60

For this particular plant a ethylene oxide : freon mixture in a proportion of 10-12 % EO and 88-90 % freon, is proposed as sterilising agent, the choice of which is based on the following:

- speed of executing plants
- low cost of plants if compared with gamma rays
- extremely low running cost, amounting to two-thirds less per piece produced than gamma rays sterilization
- employment of not particularly skilled personnel.

Freon is known as ozone-killer. In contrary, the use of CO₂ is ecologically more favourable. However, the sterilisation time with a EO-CO₂ mixture is about 24 h instead of 9 h with the mixture 12 % EO and 88 % freon. That is the reason why freon has been selected instead of CO₂ as component of the sterilisation



- 5/7 -

gas. An after-burning system for the sterilisation gas is not foreseen, only the neutralisation with NH_3 .

For the production of 20 million syringes, sterilization of about 6 m^3 per day of material is necessary in view of the fact that sterilization of ready packaged product in master cartons is suggested.

Department sizing

1 sterilization autoclave with ethylene oxide from mixture, 12-88%, useful capacity 6 m^3 . 2 fully automatic sterilization programmes able to be performed with unexplosive ethylene oxide mixture (10-12 % ethylene oxide + 88-90 % freon).

Automatic Autoclave for Sterilization - Description

Technical Specifications

The PE series autoclaves for sterilization by ethylene oxide have been specially designed for the present tendency towards this type of sterilization. They are fully automatic and do not require skilled personnel, which results in a considerable reduction in operating costs.

Constructional Details

Body

Framework integral with front plate, manufactured in stainless steel AISI 304 (18/8).

Side panel in stainless steel.

Lagged double-panelled inspection door in plastic coated galvanized steel.

Sterilization chamber



- 5/8 -

Rectangular section, in stainless steel AISI 304.

The use of small internal radius bends enable the maximum capacity to be fitted in a given space.

A specially designed frame in stainless steel AISI 304, which makes an integral unit with the sterilization chamber, enable the locking clamps to make exactly and also ensures that the door is fully sealed against the rubber gaskets.

Outer jacket and lattice framework in carbon steel

Covered on the outside with insulating material and enclosed in a galvanized sheet steel casing.

This type of construction greatly reduces heat dissipation, keeps power consumption to a minimum and facilitates the operator's work.

Door in stainless steel AISI 304

Opening and closing by means of stainless steel locking clamps.

Care has been taken in the design and construction of the seat to ensure that a high temperature resistant silicon rubber can be used and the gasket can easily be changed by the operator.

Safety features

Conforming to Italian safety regulations (ANCC) and consisting of:

- an electrical device which prevents gas entering the chamber when the door is open or not fully closed.

5.2.6 AUXILIARY EQUIPMENT

Compressed air system

The compressed air system is designed to supply the compressed air necessary to the whole factory.

A failure of the running compressor or low pressure in the air system starts automatically the spare machinery.



- 5/9 -

The principal compressor is a rotary screw type compressor provided to supply 5 m³/ min and is connected with the air dryer and with a lung tank of 5,000 litres.

Transport of materials

The transportation of various goods inside, for loading and unloading, from warehouse to departments, is undertaken by the following vehicles:

- 3 manual fork-lifts with a capacity of at least 5 tons and 3 mt. elevation

5.2.7 Shelving

The method to be adopted for warehousing goods needs to be known in order to determine the arrangement and installation of the shelving.

The material will be divided into the following sections:

- Moulds for moulding department
- Moulds matrixes and ink for printing department
- Raw material store

Regarding all other materials, these may be stored on pallets.

5.2.8 SPARE PARTS

For all parts normally used and for items largely employed, a quantity of spares to guarantee the operation of all machinery for a period of 2 years will be supplied.



- 5/10 -

5.2.9 ROUGH ESTIMATE OF TECHNOLOGY COSTS

Licence for know-how and Patent

The fee for know-how as requested by PE is US\$ 250,000 + 23 % updating factor (details see chapter 8.1.1 Total Fixed Investment) = US\$ 307,500.- to be paid in a lump sum, upon placing the order of the complete or partial plant

Basic engineering

The basic engineering fee for this project as requested by PE is US\$ 140,000.- + 23 % = US\$ 172,200.- to be paid in one instalment.

5.3 **FLOW OF PRODUCTION AND QUALITY CONTROL**

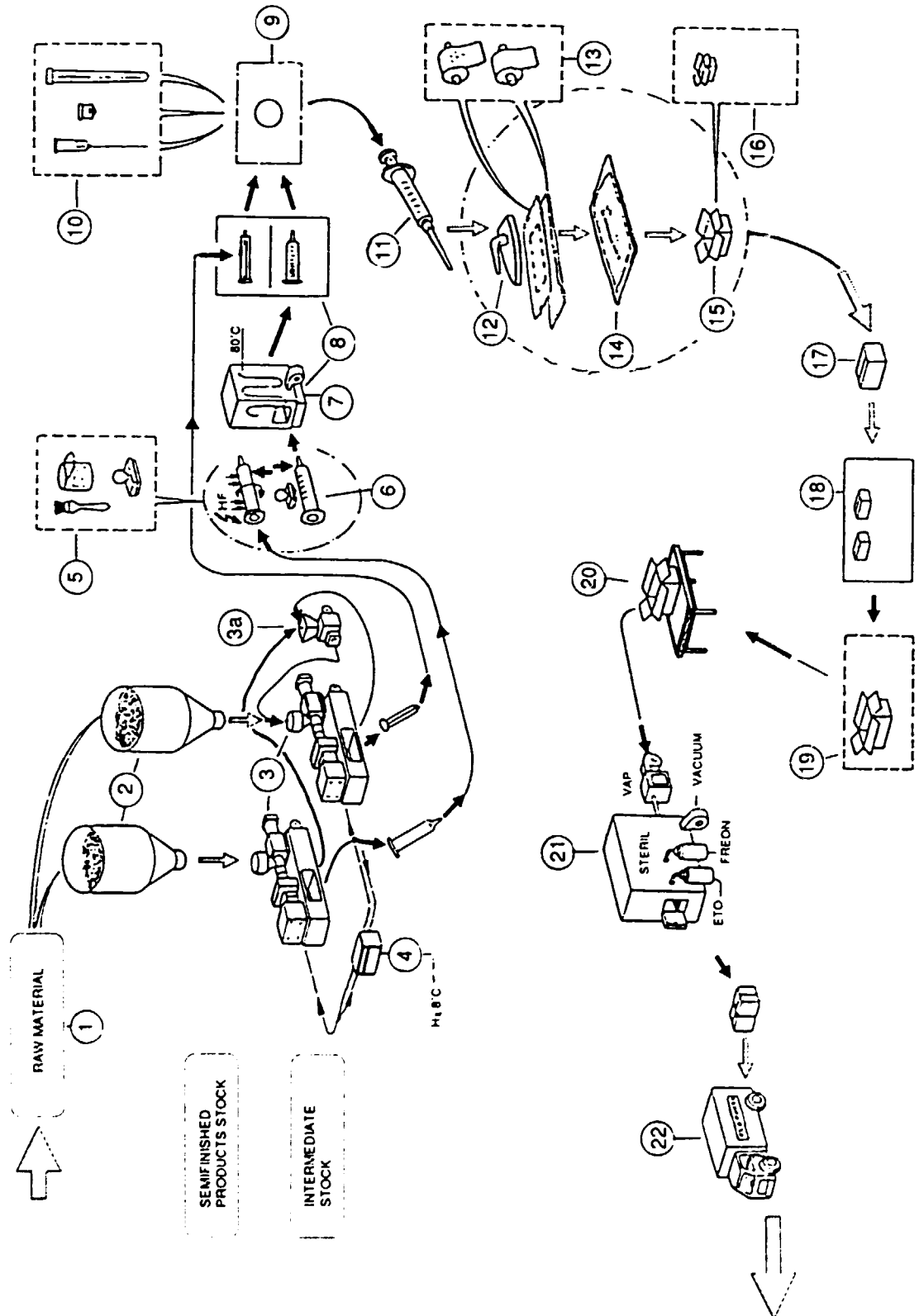
5.3.1 FLOW OF PRODUCTION

In this section the flow of production is considered, indicating also the various control operations which should be carried out to ensure a good quality production. The flow of production is presented in fig. 5.1: Schematic Flowsheet of the syringes production plant.



- 5/11 -

Fig. 5.1: Schematic Flow-sheet of Production Plant



Head office	Phone (internal)	Telex	Cable	Teletax	Bank
Linke Wienzeile 234 A-1153 Vienna, AUSTRIA	+43 1 891 89-0	132997 alaw a	Austroprojekt Wien	+43 1 891 89 299	Österreichische Landesbank Account 235 100 838



- 5/12 -

PLANT FLOW-SHEET DETAILS

- 1) Storage for plastic raw materials
- 2) Fibreglass bin containing the plastic material required for 1 week consumption
- 3) Injection moulding machines for plastic material
- 3a) Automatic mill for the reject and shrinkage recovery coming from (3) automatic transportation to (3)
- 4) Automatic water cooling station in closed circuit for moulds, with deionized water, of 52 KW
- 5) Storage for cliché, cliché holder, inks, solvents, mandrels and baskets interchangeable according to various syringe's sizes
- 6) Automatic serigraphic machine
- 7) Vertical oven for printing drying
- 8) Intermediate warehouse for syringes pistons and cylinders
- 9) Semi-automatic 1 ml syringes assembling line and manually assembling line for 5 ml syringes
- 10) Stock of semifinished products
- 11) Assembled and controlled syringes
- 12) Packaging line for bags of 12 syringes
- 13) Semifinished products store
- 14) Automatic hermetic thermowelding
- 15) Boxing
- 16) Cardboard boxes stock
- 17) Cardboard boxes fastening and sealing
- 18) Intermediate store before sterilisation
- 19) Master cartons
- 20) Manual packing
- 21) Sterilization autoclave with ETO in stainless steel
- 22) Delivery



- 5/13 -

The raw material used is polypropylene in granule form, which will be supplied in bags of 50 kg.

The material is conveyed into the hoppers of the presses used for moulding.

In the first section the following items are produced:

- the cylinders, that will pass directly to the offset processing
- the pistons caps and needles/caps which will be forwarded to the assembly department.

The cylinders are offset processed according to specific requirements, and then forwarded to the assembly and packing department. Naturally particular care should be taken with this product which is warehoused, to ensure that it does not come into contact with any type of impurity. A simple means of ensuring this could be by using cartons with cellophane lining inside which will be used once only.

The items to be used for assembling and packing of the syringes arrive from various rooms:

- cylinders from offset processing
- pistons from moulding
- caps and needle/caps (for 1 ml syringe only) from moulding
- rubber plugs from washing room
- needles from raw & auxiliary materials store
- coupled films for packaging from raw & auxiliary material store
- cardboard boxes and master cartons from raw & auxiliary material store

The products packaged in master cartons are then forwarded to the sterilisation department. After sterilisation (about 10 hours evidence time in the sterilisation autoclave) the products will be stored in the quarantine department for about



- 5/14 -

2 weeks. Then they are transported into the finished products store for dispatch.

5.3.2 QUALITY CONTROL

Production control

A systematic control of production is necessary, in particular at the key points. A fundamental control is to be carried out on moulded cylinders concerning the control of the internal diameter of the cylinder with the aid of a tampon gauge, ensuring that the measure is within the tolerance range.

For the pistons, it is sufficient to test whether the fixing is good and that there are no bars that could cause trouble in the assembly stage. A simple visual control is necessary in the offset processing, to see that the printing is effected satisfactorily, without any trace of butts or ink.

During the assembly stage, the seal of the syringe and the ease with which it slides must be controlled.

The final test is to be carried out on the ready packaged product, to ensure that it is welded and perfectly sealed.

Later on, the laboratory tests which must be effected on each single piece, at random, to determine the apyrogenity and sterility of product will be outlined.

The quality requirements are laid down in the following DIN-standards.

DIN 13 098 Blatt 1: Disposable plastic syringes for medical use; dimensions, requirements, test



- 5/15 -

DIN 13 099:

Disposable plastic syringes for medical use, testing of interaction between syringes and pharmaceutical preparation.

The following relevant ISO-standards have also to be taken into consideration:

ISO/R 594

Conical fittings for syringes, needles and other medical equipment

ISO/R 595

Syringes for medical use

ISO/R 596

Hypodermic needles

Laboratory Analyses

The controls normally set down in the Pharmacopoea are:

- sterility control
- controlling absence of pyrogens

Some countries have more strict standards, which in addition to the above tests also require:

- testing non-toxicity of materials in use
- testing amount of Ethylene Oxide residue
- testing resistance of needle to corrosion
- control of needle diameter, flexibility and perforability
- biocompatibility tests
- microbe Load in working departments

In the plant in question, all necessary tests will be carried out at the local University.



- 5/16 -

5.4 EQUIPMENT LIST

The equipment is designed for the production of 15,000,000 disposable syringes and 5,000,000 of insulin syringes per year, in 300 working days at three working shifts of eight hours.

The plant can produce disposable syringes in three pieces from granular plastic material of polypropylene. In accordance with the findings of the market survey the following quantities will be produced:

- 1 ml syringes: 5,000,000 pcs/year
- 2.5 and 5 ml syringes: 15,000,000 pcs/year

The plant consists of imported equipment as well as of local equipment.



- 5/17 -

Imported Equipment

The following list presents the equipment to be imported.

No.	Item Description	Unit Price	Amount
	<u>MOULDING ROOM</u>		
2	Injection moulding machine for plastic material with microprocessor, video, computer 16BIT for data memory, with fibreglass bin containing the plastic material required for one week's consumption, Type PE 1135	129,200.-	258,400.-
1	Automatic water cooling station in closed circuit for moulds with deionized water, of 52 KW	29,200.-	29,200.-
1	Mould of 1 ml cylinders at 10 cavities	49,000.-	49,000.-
1	Mould of 1 ml piston at 10 cavities	43,000.-	43,000.-
1	Mould of 1 ml caps at 24 cavities	38,000.-	38,000.-
1	Mould of 1 ml needle caps at 24 cavities	44,000.-	44,000.-
1	Mould for syringes of 2.5 ml for the cylinder at 24 cavities	49,000.-	49,000.-
1	Mould for syringes of 2.5 ml for the piston at 24 cavities	43,500.-	43,500.-
1	Mould for syringes of 5 ml for the cylinder at 24 cavities	49,000.-	49,000.-
	Mould for syringes of 5 ml for the piston at 24 cavities	43,500.-	43,500.-
2	Automatic sprue separator	4,950.-	9,900.-
1	Special moving elevator for moulds	12,700.-	12,700.-
1	Automatic mill for the reject and shrinkage recovery, incl. automatic transportation from and to the moulding machines	19,800.-	19,800.-
	Total moulding room		689,000.-
	<u>CLEAN ROOM</u>		
1	Automatic washing and drying machine for plugs	9,500.-	9,500.-



- 5/18 -

No.	Item Description	Unit Price	Amount
1	Serigraphic processing automatic line incl. auto- matic serigraphic machine and vertical oven for print drying	56,000.-	56,000.-
1	Special semi-automatic needle welding/assembly machines for 1 ml size, theoretical production 1,500 pcs/h including packaging machines	187,000.-	187,000.-
1	Rotary welding machine for welding caps and needle/caps to 1 ml syringes	62,000.-	62,000.-
1	Packaging line for bags of 10 or 12 syringes including automatic hermetic thermowelding	38,500.-	38,500.-
100	Moulds for printing machine: 50 for each capacity for 1-5 ml	80.-	8,000.-
2	Benches with continuous belt conveyor for man- ually assembling 2.5 and 5 ml syringes	9,700.-	19,400.-
1	Automatic filling unit RAMP for Ethylene Oxide	38,000.-	38,000.-
20	P.E. containers, capacity 650 lts. with 4 wheels	175.-	3,500.-
30	P.E. containers, capacity 650 lts. without wheels	130.-	3,900.-
1	Compressor Atlas Copco	29,100.-	29,100.-
3	Forklift 1 ton load (manual)	2,500.-	7,500.-
1	Sterilization autoclave in stainless steel	128,000.-	128,000.-
1	Spare parts sufficient for two years of normal operation. The estimated cost of the spare parts will be:	36,000/y	72,000.-
	Total clean room, sterilization and spare parts		657,400.-
	Total moulding room		689,000.-
	Total price free PE factory		1,346,400.-
	Total price F.O.B. Genova		1,381,400.-
	Supervision during assembling and start up		80,000.-
	Estimated cost c & f Manila in 6 sea containers		24,000.-
	Total cost c & f Manila for the complete plant incl. supervision services (Standard Variant)		1,485,400.-



- 5/19 -

No.	Item Description	Unit Price	Amount
	<p>The payment and delivery conditions have been defined by PE as follows: <u>DELIVERY:</u> In Manila in 8-10 months <u>PAYMENT:</u> against irrevocable and confirmed L/C payable: - 30 % at the signature of the contract; - 30 % at working advancement; - 40 % at the shipment against B/L.</p>		

The tables 5.1 and 5.2 present a preliminary characterisation of the machines and equipment with regard to the installed power and the noise levels:

Table 5.1: Preliminary list of machines and equipment, installed power

Unit No.	Installed power in KW	Type of Machinery
2	50 each	Injection moulding machine
1	10	Automatic cooling station in closed circuit for moulds, cooling duty: 35 KW
2	1.2 each	Continuous elevators with shrinkage separator
1	3.5	Automatic washing, drying machine for plugs
1	3	Serigraphic processing automatic line
2	4.5 each	Special semi-automatic needle welding/assembly machine for 1 ml size, theoretical production 1,500 pcs/h
2	6 each	Rotary welding machines
1	1.2	Packaging machine for bags of 12 syringes
1	4.5	Automatic sterilizer 10,000 l with E.T.O. gas
1	2	Automatic plant for neutralising residual Ethylene Oxide
1	3.5	Compressor



- 5/20 -

Table 5.2: Preliminary List of Machines and Equipment, Noise Levels

Unit No.	Decibel	Type of Machines
2	92	Injection moulding machines
1	34	Automatic cooling station in closed circuit for moulds, cooling duty: 35 KW
2	42	Continuous elevators with shrinkage separator
1	46	Automatic washing, drying machine for plugs
1	44	Serigraphic processing automatic line
2	54	Semi-automatic needle welding/assembly machine for 1 ml size, theoretical prod. 1.500 pcs/h
2	68	Rotary welding machines
1	56	Packaging machine for bags of 12 syringes
1	38	Automatic sterilizer 16.000 l with E.T.O. gas
1	36	Automatic plant for neutralising residual Ethylene Oxide
1	88	Compressor

LOCAL EQUIPMENT :

In principle it is assumed that the building which will be rented in the industrial estate will be equipped with the necessary infrastructure. The following equipment has to be provided if the building is not satisfactorily equipped with the following items:

- Steel structure and steel supporting unless specified in the supplies
- High tension (HT), low tension (LT) cables, HT/LT transformers, equipment and lighting distribution system



- Water pumping station and distribution
- Fire fighting system

Customs duty (equipment)

Imports of equipment for use in the project such as injection moulding machines, welding/printing/packaging machines, and conveyors are subject to tariff duties ranging from 10 to 30 percent. If the project proponent is duly registered with the Philippine Board of Investments (BOI), however, such importations will be exempt from the payment of customs duties, provided it exports 50% percent of its production (if it is a Filipino-owned company) or 70 percent of its production (if it is a foreign-owned company) (See Table 5/3).

Table 5.3: Customs duty rates of selected equipment (in percent)

<u>Type of Equipment</u>	<u>Customs Duty Rate</u>
INJECTION MOULDING MACHINES	30
WELDING, PRINTING, PACKAGING MACHINES:	
- Other (gas operated appliances for welding thermoplastics)	20
- Other packing, wrapping machinery	10
- Other printing machinery	10
CONVEYORS:	
- Bucket type, conveyor	20
- Belt type, conveyor	20
- Conveyor loader	20
- Roller conveyor (other)	20

Notes:

- a. Customs duty rate is applied to the CIF value of the product.



- 5/22 -

- b. Importation of these equipment be exempt from customs duties if the manufacturing company registered with the Philippine Board of Investments is qualified for such incentive.

Source: Tariff and Customs Code of the Philippines

Over and above these applicable duty rates, the Philippine government, through Executive Order No. 443 signed December, 1990, decided to impose an additional nine percent tariff on all imports, including those of projects still to be registered with the BOI.

Guarantees

PHARMACHIM ENGINEERING S.R.L. guarantees only the imported machines for 12 (twelve) months, starting from the day of the shipment and engages themselves to replace the parts that, during the guarantee period, should go out of order.

PHARMACHIM ENGINEERING S.R.L. excludes from the guarantees:

1. All the electrical equipment and the installation.
2. The parts purchased from external companies (such as gears, electrical material, etc.) for which the suppliers guarantees are valid.
3. Break down caused by faulty maintenance, by nonobservance of PE's disposition or by overwork, by modification or repairs not made in PE plants or by PE technicians.

The guarantees exclude all and every major responsibilities, including requests of refund for damages, loss of production, etc.



- 5/23 -

The machines are guaranteed only concerning the replacement of damaged parts, the maintenance costs are to be paid by the purchaser.

5.5 CIVIL WORKS

5.5.1 DESCRIPTION OF CIVIL WORKS

Due to the small capacity of the projected plant the joint venture partners intend to rent a suitable production building incl. necessary administration and social facilities. Since the final decision has not been made yet whether to rent or to construct a suitable production building, information for both possibilities is given below.

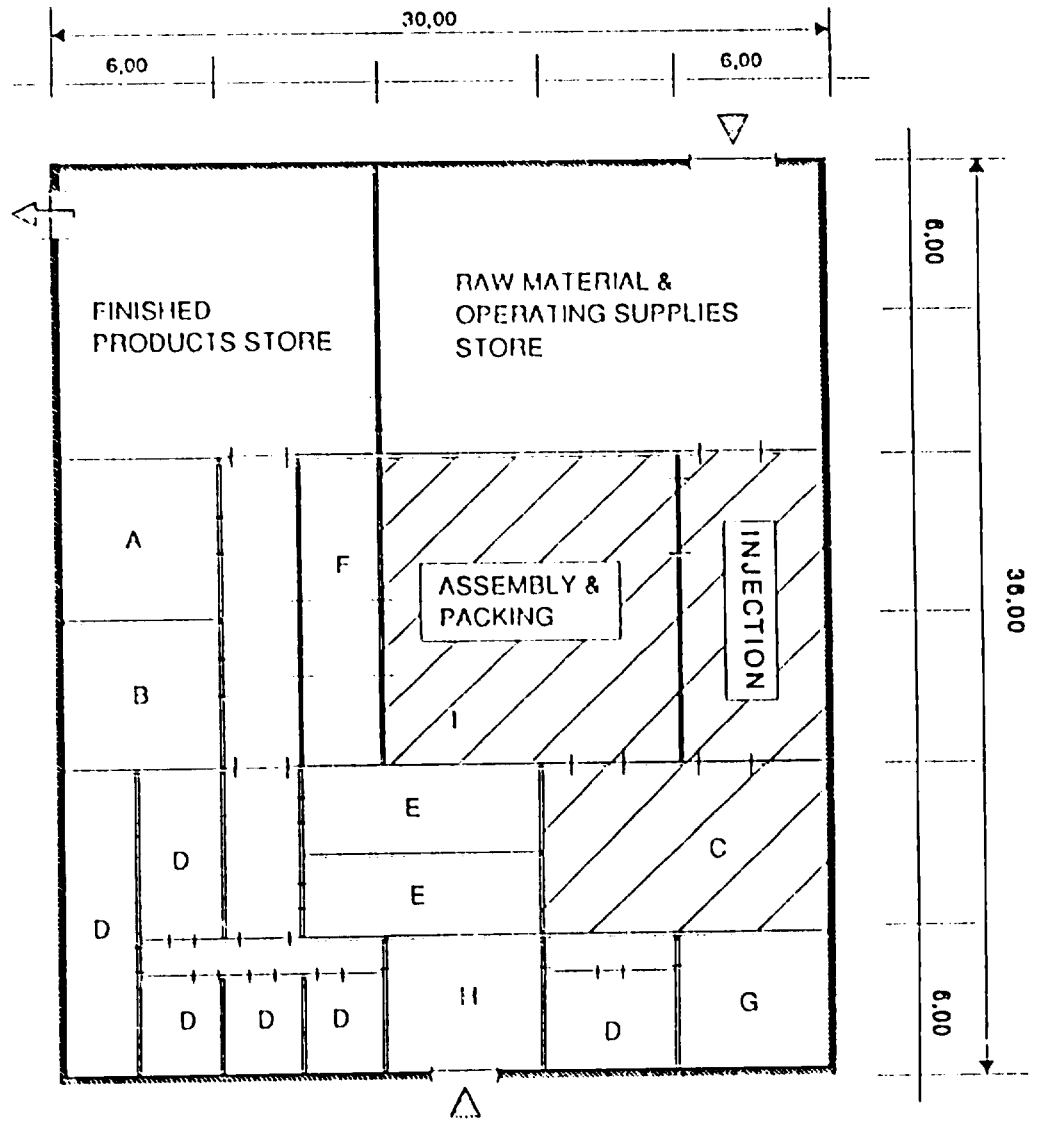
A tentative layout of the production plant, the administration and social facilities is given in fig. 5.2.

The total area sums up to 1,080 m². It has been assumed that clean room technique has to be applied for a total of 288 m².



Fig. 5.2: Layout of the Syringes Production Plant

PRELIMINARY LAYOUT OF THE DISPOSABLE SYRINGES PRODUCTION PLANT



LEGEND

- A QUARANTINE
- B STERILIZATION
- C SERIGRAPHY & OFF-SET & WASHING ROOM
- D OFFICE
- E DRESSING ROOM
- F INTERMEDIATE STORE
- G CANTEEN
- H RECEPTION
- I SEMIFINISHED PRODUCTS AREA

CLEAN ROOM AREA

Head office
 Phone (internal)
 Telex
 Cable
 Teletex
 Bureau



- 5/25 -

5.5.2 CIVIL ENGINEERING WORKS

Rental cost

Based on interviews with real estate brokers, the estimated monthly rental rate of a production building in Canlubang, Laguna ranges from P 50.00 to P 150.00 per square meter. Canlubang is the site of an industrial estate and is approximately 50 kilometres from Metro Manila, about 10 kilometres before Los Banos, Laguna.

As shown in Table 5.4, the monthly rental cost for a 1,080 square meter building will therefore range from P 54,000 to P 162,000.

Table 5.4: **Rental Cost of Production Buildings in Canlubang, Laguna as of January 1991 (In Pesos)**

	<u>Low End</u>	<u>High End</u>
Cost per square meter	50.00	150.00
Number of square meters	1,080	1,080
<hr/>		
Total	54,000	162,000

Source: SGV

Interviews indicated, however, that there are hardly any production buildings left which are available on a rental basis.



- 5/26 -

Construction cost

The current construction costs are estimated as follows:

Item	Cost Estimate (in pesos/m ²)
Civil works	
Administration building <u>without</u> airconditioning	12,500.-
Production building <u>without</u> airconditioning and clean room technique	10,000.-
Road, parking area and site preparation	700.-

Source: SGV

Land cost

Land lease rental rates range from ₱ 12 to ₱ 15 per square meter per month. Land acquisition costs, on the other hand, range from ₱ 950 to ₱ 1,000 per square meter.



6. PLANT ORGANISATION AND MANPOWER

6.1 PERSONNEL REQUIREMENTS

The total number of personnel (overhead plus operating personnel) amounts to 95 persons.

Commercial and technical overheads

The number of (commercial and technical) overhead personnel is estimated to be 9 persons. The personnel is presented in Table 6.1.

Table 6.1: Commercial and technical overhead personnel

Position	Total
General Manager	1
Technical Manager	1
Executives	3
Office staff	4
TOTAL	9

Operating personnel requirements

The manpower requirements are presented in Table 6.2. The total necessary manpower requirements for three shifts are 86 workers.



- 6/2 -

Table 6.2: Operating personnel required for the production at nominal capacity

- Moulding:				
2 persons + 1 foreman for each shift	Total	9	persons	
- Printing processing:				
1 person for each shift	Total	3	persons	
- Assembly:				
16 persons for each shift	Total	48	persons	
- Packing:				
2 persons for each shift	Total	6	persons	
- Outer packaging:				
2 persons for each shift	Total	6	persons	
- Sterilization:				
1 person for each shift	Total	3	persons	
- Maintenance:				
2 engineers for each shift	Total	6	persons	
- Storekeeper:				
1 person for each shift	Total	3	persons	
- Supervision:				
1 supervisory staff for each shift	Total	3	persons	
TOTAL		86	persons	



6.2 SALARIES AND SOCIAL CHARGES

Table 6.3 presents a range of annual salaries for personnel of manufacturing firms in Metro Manila. Social charges equivalent to 30 per cent of the annual basic salary must be added in computing the total annual compensation.

Table 6.3: Annual Salary Structure for Manufacturing Enterprises (In Thousand Pesos)

Position	Annual Basic Salary	
	Low End	High End
GENERAL MANAGER	1,000	2,000
SENIOR EXECUTIVE		
VP - Finance/Accounting	210	500
VP - Human Resources/Personnel	270	-
VP - Marketing/Sales	300	540
VP - Operations/Manufacturing	180	480
VP - Supply/Distribution	300	-
EXECUTIVE OFFICER		
Accounting Manager/Chief Accountant	150	220
Audit Manager	150	-
Brand Manager	120	260
Credit/Collection Manager	210	-
EDP/Systems Manager	190	-
Engineering/Maintenance Manager	230	-
Finance/Treasury Manager	170	200
Marketing Manager	250	-
Materials/Inventory Control Manager	130	210



- 6/4 -

Office Personnel Manager	120	190
Office/Administrative Manager	140	240
Plant Personnel Manager	140	-
Production Manager	190	260
Purchasing Manager	150	340
Regional Area Sales Manager	160	180
OFFICE STAFF	80	-
FOREMAN	110	160
PRODUCTION SKILLED WORKER	70	-
PRODUCTION UNSKILLED WORKER	40	60

Note: Social charges are equivalent to 30 percent of basic salary

Source: Compensation Survey, 1990

Table 6.4 presents the selected salaries for the projected plant on the base of the actual salaries structure in the manufacturing industry sector in the Philippines.

Table 6.4: Annual salaries and social charges for selected levels of salaries of projected plant

Position	Annual basic salaries (P/y)	Annual salaries incl. social charges		
		(P/y)	(US\$/y)	rounded to (US\$/y)
General Manager	1,000,000.-	1,300,000.-	46,429.-	46,000.-
Production Manager	200,000.-	260,000.-	9,286.-	9,300.-
Executives	150,000.-	195,000.-	6,964.-	7,000.-
Office staff	80,000.-	104,000.-	3,714.-	3,700.-



- 6/5 -

Position	Annual basic salaries (P/y)	Annual salaries incl. social charges		
		(P/y)	(US\$/y)	rounded to (US\$/y)
Supervisory staff, shift engineers and foreman for moulding	110,000.-	143,000.-	5,107.-	5,100.-
Skilled workers	70,000.-	91,000.-	3,250.-	3,250.-

6.3 TRAINING

6.3.1 TRAINING PROGRAMME

General remark

The staff of workers of the factory object of this contract will be trained in different groups. Pharmachim wishes to stress that the envisaged training programme is the effective way of transferring both technology and know-how. An experienced manager of PE will be nominated to take overall charge of the training programme and trainees.

Training scope

Selection of staff for training will call for considerable care since trainees will be required:

- to learn a language
- to master technical and practical tasks
- to pass this knowledge on to others

Selection recommendations



- 6/6 -

Special care will be needed since trainees will have to master both language and -technical training. Therefore, all trainees should have a good working knowledge of their own spoken and written language. They should also be tested for their capacity in speaking at least English.

In more general terms we recommend the following which would be applied in normal selection:

- Intelligence and attitude for learning
- Health and hygiene - good average physique, not allergic to dust
- Full use of all senses - sight, smell, hearing, etc.
- Motivation to learn and get things done
- Piratical/mechanical abilities
- Ability to lead and handle people
- Any specific knowledge helpful to a factory e.g. machinery, instruments, goods drying planning, organising.

Number to be trained

In accordance to our experience, the following personnel should be trained:

- | | |
|---|---|
| - Production technical manager | 1 |
| - Moulding operator | 2 |
| - Printing operator | 1 |
| - Assembling and packing machine | 1 |
| - Sterilisation | 1 |
| - Process maintenance | 1 |
| - Moulds maintenance | 1 |
| - Air-conditioning and utilities operator | 1 |
| - Electrician | 1 |



- 6/7 -

Training abroad

The duration of training of Philippines technicians in Italy shall be 1 month for selected trainees with exception of the production manager whose duration of training in Italy shall be 2 months. This will be arranged in two phases:

- Basic training:

The basic training consists of a review of all aspects of factory operation and provides a general knowledge of all machinery and equipment.

- Specialist training:

This is a detailed training for specific tasks. Not everyone will do everything. Parts of the training will be carried out by the equipment suppliers.

6.3.2 TRAINING COSTS

The training cost of Philippino technicians in Italy will be borne by the customer.

The cost of the training of technicians in Manila and of assistance for the start-up plant will also be borne by customer. This includes trips of three experts from Italy to Manila and return, boarding and lodging expenses in Manila, etc. for 15 days per expert.



- 7/1 -

7. **PROJECT IMPLEMENTATION SCHEDULE**

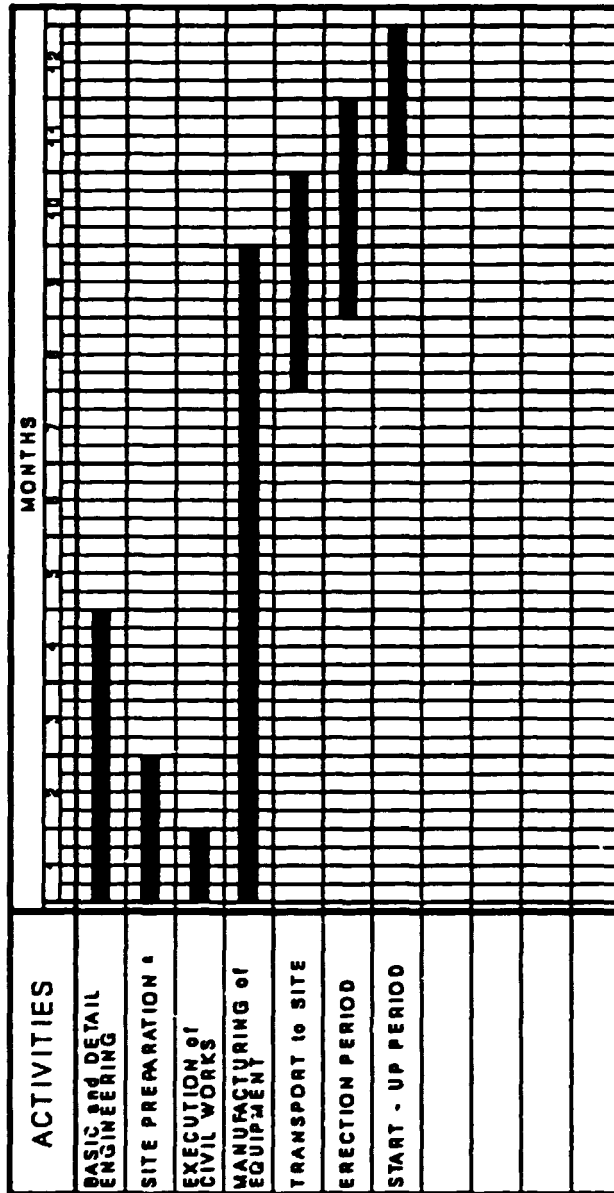
The total project implementation period is estimated at 12 months after the Letter of Credit has been established.

The project implementation schedule is presented in Fig. 7.1 on the next page.



Fig.7.1: Project Implementation Schedule

TIME SCHEDULE CONCERNING THE IMPLEMENTATION OF
 A DISPOSABLE SYRINGES PRODUCTION PLANT IN THE PHILIPPINES



* EXISTING: BUILDING TO BE RENTED.



8. COST AND REVENUE ESTIMATES

Remarks:

The terminology used in this chapter corresponds to COMFAR («Computerized Model for Feasibility Analysis and Reporting») COMFAR was developed by the Feasibility Studies Branch of the Department of Industrial Operations of UNIDO and is based on the UNIDO Manual for the Preparation of Industrial Feasibility Studies, published by the United Nations in New York in 1978 (ref. ID/206).

8.1 TOTAL INITIAL INVESTMENT

The initial fixed assets comprise the total fixed investment and the pre-production capital expenditures. For cost accounting purposes, besides the depreciation of initial fixed investments, pre-production capital expenditures have been capitalized and amortized during the first six years of operation.

8.1.1 TOTAL FIXED INVESTMENT

The total fixed investment for the envisaged disposable syringes production plant includes the equipment and machinery (incl. allocated engineering, freight and erection).

The amount of the estimated total fixed investment is

US\$ 3,224,196.-

The breakdown of these initial fixed investment cost is shown in Table 8.1 and described in more detail in the following text.



Table 8 1: Total Initial Investment in US\$

Year	1991.1	1991.2
Fixed investment costs		
Land, site preparation, development	0.00	0.00
Buildings and civil works	0.00	0.00
Auxiliary and service facilities	0.00	0.00
Incorporated fixed assets	479700.00	246792.00
Plant machinery and equipment	623218.00	1600811.00
Total fixed investment costs	1102918.00	1847603.00
Pre-production capital expenditures.	92000.00	181675.00
Net working capital	0.00	0.00
Total initial investment costs	1194918.00	2029278.00
Of it foreign, in %	92.30	95.49

Details to the total fixed investment items are as follows:

(a) Land acquisition

Since a suitable building is supposed to be rented no provision is made for land acquisition. The land rental costs are supposed to be included in the building rental cost.

(b) Air conditioning and clean room systems

It is assumed that the use of ceiling fans will be sufficient to bring the temperature in the working rooms to an acceptable standard for these workers and for the requirements of a clean room environment. Furthermore Pharmachim will supply free of charge air filters which work with slight overpressure for the clean room.



- 8/3 -

Therefore, besides small air conditioners for the offices of the management, no air conditioning system for the plant will be foreseen.

(c) Equipment, Machinery and Spare Parts

This item of initial fixed investment will be composed of

(c1) Foreign supplies as major part and

(c2) Local supplies as minor part

(c1) Foreign Supplies of Equipment and Machinery

The determination of foreign equipment expenditure requirements is based on the list of plant machinery and equipment, including related facilities for the production, processing and operational control as presented by PHARMACHIM ENGINEERING SRL, 9 Via Appiani, 21 121 Milan, Italy to ST. MARTIN PHARMACEUTICAL LAB. 55, Lakandula Street, Parang Marikina, Metro Manila, September 11 th, 1989. This offer has been used to elaborate the equipment list.

The following updating factors from September 1989 to June 1991 have been used:

Inflation:	9 %
US\$ devaluation:	14 %
Total:	23 %

The total updated price for foreign supplies of machinery and equipment, f.o.b. Genova (standard export packing) is US\$ 1,699,122.-. Spare parts and tools, obtained with the original equipment, are included in this amount.



- 8/4 -

The delivery will be 8-10 months after coming into force of the contract. The destination is Manila, Philippines. The estimated cost of C & F Manila in 6 sea containers is US\$ 29,520.-.

The transport insurance costs are estimated at 1.45 % of 110 % invoice value, i.e. US\$ 27,100.-. Therefore the cost of imported equipment CIF Manila amounts to US\$ 1,755,742.-

On the basis of the assumption of an average customs duty of 30 %, the combined CIF value and the custom duties amounts to a total of US\$ 2,282,465.-

The local transport to Canlubang industrial estate is estimated at US\$ 5,000.-.

The cost for supervision of assembling and start up of the plant amounts to US\$ 98,400.

The requested (updated) fee for know how and patent is US\$ 307,500.- to be paid as a lump sum, upon placing the order of the complete or partial plant.

The basic engineering for this project has been fixed at US\$ 172,200.- to be paid in one instalment.

The total cost of foreign equipment, machinery and spare parts transported to site incl. know how and patent fee, as well as basic engineering, supervision services and erection (5% of fob value) amounts therefore to

US\$ 2,950,521.-



- 8/5 -

(c2) Local equipment

Since a suitable production building is envisaged to be rented, no provisions are made for:

- Electric power initial connecting charge
- Transformer station
- Lighting distribution system
- Fire fighting system
- Water pumping , storage and distribution

8.2 PRE-PRODUCTION CAPITAL EXPENDITURES

As a part of the initial fixed assets, there are certain expenditures prior to commercial production, which are due to a number of items originating from project formulation and implementation, i.e.

US\$ 273,675.-

A break-down of the most significant preproduction capital expenditures is shown in Table 8.2.

Table 8.2: Preproduction capital expenditures

ITEM	US\$			
	1. Period		2. Period	
	local	foreign	local	foreign
Preliminary and capital issue expenditure	10,000	.	.	.
Building rental	23,000	.	23,000	.
Consulting, monitoring services	36,000	.	36,000	.



- 8/6 -

Personnel	23,000	-	32,575	-
Flights & accommodation for training	-	-	-	90,100
TOTAL	92,000		181,675	

Two half year periods, i.e. 12 months, have been assumed for project implementation according to the schedule which has been presented in chapter 7.

The items which occur prior to the production period have been capitalized as non-physical assets and will be amortized during the first six years of operation:

(a) Preliminary and Capital Issue Expenditures

These include expenditures incurred during the registration and the formation of the company, the legal fees for loan applications, rental agreements, etc. They are estimated at US\$ 10,000.

(b) Project, Monitoring and Consultancy Services

The estimated cost for Consulting and Project Monitoring Services is based on the assumption that the investor will appoint an local Consulting Engineer during the projects' implementation schedule. On the basis of 12 manmonths at US\$ 6,000, the Consulting and Monitoring Services would amount to US\$ 72,000.

(c) Personnel Recruitment and Preoperational Training

These cost will be allocated in the second period (= second half-year) of project implementation. The following personnel cost have been taken into consideration to cover the personnel costs for management of project



- 8/7 -

implementation, preoperational training, and installation, start-up and commissioning of the plant:

Function	1. Period (first half-year)	2. Period (second half-year)
1 Project Manager (future General Manager) for 46,000 US\$/man-y. during 12 months: 46,000 US\$	23,000	23,000
2 Executives for 7,000 US\$/man-y. during 4 months: 4,700 US\$		4,700
9 Skilled workers for 3,250 US\$/man-y. during 2 months: 4,875 US\$		4,875
Total	23,000	32,575

Furthermore a training in Italy during 1 month for selected trainees (4 persons) and during 2 months for the production manager has been foreseen :

183 man days à US\$ 200	US\$ 36,600
5 flights à US\$ 5,000	<u>US\$ 25,000</u>

Total training cost abroad (without salaries & soc. charges) US\$ 61,600

Finally the training on site during erection, start-up and initial operation will be carried out by Pharmachim-supervisors.

The cost of Pharmachim-supervisors (3 Senior Engineers) are included in Pharmachim's offer. Therefore, only flight cost and accommodation have been taken into consideration:

3 flights à US\$ 5,000	US\$ 15,000
------------------------	-------------

Accommodation and daily allowances for 45 mandays



- 8/8 -

(3 persons x 15 days): 45 mandays x US\$ 300	<u>US\$ 13,500</u>
Total cost (flights+accommodation) for PE supervisors	US\$ 28,500

The training cost of Philippino personnel in Italy and the cost of Italian engineers in the Philippines sums up to

US\$ 90,100.-

8.3 WORKING CAPITAL REQUIREMENTS

The working capital (defined as balance of current assets minus current liabilities), indicates the financial means required to operate the project under normal circumstances. For the operation of the disposable syringes production plant the minimum requirements have been defined as follows:

Current assets	Minimum days of coverage
Accounts receivable	30
Inventory and materials	90
Energy	0
Spares	30
Work in progress	30
Finished products	30
Cash in hand	10
Current liabilities	
Accounts Payable	30

In accordance with the above definitions, the working capital amounts to

US\$ 429,117.-



- 8/9 -

and is detailed in Table 8.3. The indicated working capital refers to the full capacity and gives a rough indication, which is however considered to be sufficient for this assessment. The successive build-up of working capital from start-up to full capacity is considered to take place during the first year of plant operation .



- 8/10 -

Table 8.3: Net Working Capital in US\$

Year			1992	1993
Coverage	mdc	coto		
Current assets \$				
Accounts receivable	30	12.0	71739.05	80682.34
Inventory and materials	90	4.0	98225.33	118081.60
Energy	0	---	0.00	0.00
Spares	275	1.3	-6583.50	-7926.00
Work in progress	30	12.0	57422.38	66365.68
Finished products	30	12.0	70072.38	79015.69
Cash in hand	30	12.0	33092.81	34687.50
Total current assets			323968.40	370912.80
Current liabilities and				
Accounts payable	30	12.0	57422.38	66365.68
Net working capital			266546.10	304547.10
Increase in working capital			266546.10	38001.06
Net working capital, local			110984.80	117647.10
Net working capital, foreign			155561.30	186900.00
<hr/>				
Year			1994	1995-2006
Coverage	mdc	coto		
Current assets \$				
Accounts receivable	30	12.0	97866.08	97866.08
Inventory and materials	90	4.0	147601.60	147601.60
Energy	0	---	0.00	0.00
Spares	275	1.3	36900.00	36900.00
Work in progress	30	12.0	83549.41	83549.41
Finished products	30	12.0	96199.41	96199.41
Cash in hand	30	12.0	40950.00	40950.00
Total current assets			503066.50	503066.50
Current liabilities and				
Accounts payable	30	12.0	83549.41	83549.41
Net working capital			419517.10	419517.10
Increase in working capital			114970.00	0.00
Net working capital, local			127517.10	127517.10
Net working capital, foreign			292000.00	292000.00

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .



8.4 DEPRECIATION AND AMORTIZATION

(a) Depreciation Charges

The depreciation charges have been calculated based on the original value of the initial fixed investment according to the straight line method.

Since numerous elements with different periods of life expectancy exist, an average of these investment lifetime rates has been formulated.

- 8 years (12.5 %) for production equipment (incl. erection)

For the purpose of the discounted cash-flow analysis the economic life time of the whole project has been assumed to be 15 years.

Salvage values of fully depreciated assets have not been considered.

(b) Amortization charges

The amortization charges have been calculated for allocating the preproduction capital expenditures which have been capitalized as non-physical assets, written off in the first 6 years of operation.



- 8/12 -

8.5 COMPILATION OF OPERATIONAL IN-PUT COSTS

The compilation of operational in-put costs is based on the following information sources:

Type of input	Source of information	designation in COMFAR
Raw material and operating supplies	PE	raw material 1
Water	SGV	utilities
Electric power	SGV	energy
Factory and administrative overheads	SGV	factory and administrative overheads
Direct labour	SGV	direct labour
Building rental rate	SGV	administration, non-labour
Communication, office supplies	AP	non-labour
Spares	SGV	spares
Maintenance	AP	maintenance
Distribution	AP	marketing, non-labour

8.5.1 RAW MATERIALS, OPERATING AND UTILITIES SUPPLIES

Raw material and operating supplies costs

The estimates of annual raw material and operating supplies costs are presented in tables 8.4 and 8.5.



- 8/13 -

Table 8.4: Raw material and operating supplies costs per 1000 pieces 5 ml or 2,5 + 3 + 5 ml syringes in US\$ and corresponding annual costs.

Description	US\$/1000 p.
Cylinder, plunger and cap (polypropylene)	5.24
Needle (complete with caps)	14.00
Rubber plug	8.65
Polyethylene film	2.98
Cardboard box	0.42
Ethylene oxide	0.49
Other materials (ink, silicone, adhesive analyses material etc.)	0.53
Total	32.31
Planned production at a normal year of production: 15,000,000 p.	
Corresponding raw materials and operating supplies costs: 484,650.- US\$/y	

Remark: Costs for master cartons are supposed to be included in other materials costs



- 8/14 -

Table 8.5: Raw materials and operating supplies costs per 1000 pieces 1 ml syringes in US\$ and corresponding annual costs.

Description	US\$/1000 p.
Cylinder, plunger and cap (polypropylene)	3.36
Needle (only canula)	7.50
Rubber plug	6.20
Polyethylene film	2.73
Cardboard box	0.42
Ethylene oxide	0.44
Other materials (ink, silicone, adhesive analyses material etc.)	0.50
Total	21.15
Planned production at a normal year of production: 5,000,000	
Corresponding raw materials and operating supplies costs: 105,750.- US\$/y	

Remark: Costs for master cartons are supposed to be included in other materials costs

Water cost

$6 \text{ m}^3/\text{d} \times 300 \text{ d/y} = 1,800 \text{ m}^3/\text{y}$ corr. to a

Total monthly water consumption: 150 m^3 (25 operating days/m, $6 \text{ m}^3/\text{d}$)

Monthly cost:

Fixed charge: 134.40 (incl. 1st 10 m^3)

Variable charge: $1.249 \text{ E}/\text{m}^3$

Total monthly cost: $1,383.40 \text{ E}/\text{m}^3$



- 8/15 -

Total annual water cost: 16,600 P corr. to approx US\$ 593.- .

Therefrom US\$ 148.- are allocated to 1 ml syringes production and

US\$ 445.- are allocated to 2,5 + 3 + 5 ml syringes production;

Electric power cost:

Maximum consumption (installed capacity): 180 KWh/h

Annual consumption based on 7,200 working hours and average 100 KWh/h:
720,000 KWh/y.

Annual electric power cost: 720,000 KWh/y x 2.8 P/KWh = 2,016,000.- /P/y

Corr. to approx. US\$ 72,000.-.

Therefrom US\$ 32,400.- are allocated to 1 ml syringes production and

US\$ 97,200.- are allocated to 2,5 + 3 + 5 ml syringes production;

8.5.2 PERSONNEL REQUIREMENTS

The personnel cost per function of personnel as used in the following personnel cost determination was presented in chapter 6.

The total personnel cost of

US\$ 370,600.- per year

is split-up into:

- administrative and factory overheads
- direct labour



- 8/16 -

Administrative and factory overheads

Function	No. of personnel	Salary incl. soc. charges (US\$/y and person)	Total Salaries (US\$/y)
General Manager	1	46,000.-	46,000.-
Executives	3	7,000	21,000.-
Office staff	4	3,700.-	14,800.-
Total	8		81,800.-

Total cost of 8 persons administrative overheads: US\$ 81,800.-

Therefrom US\$ 20,450.- are allocated to 1 ml syringe production and approx.

US\$ 61,350.- are allocated to 2,5 + 3 + 5 ml syringe production

Factory overheads

Function	No. of personnel	Salary incl. soc. charges (US\$/y and person)	Total Salaries (US\$/y)
Responsible Technical Manager	1	9,300.-	9,300.-

Total cost of factory overhead: 9,300.- US\$/y

Therefrom US\$ 2,325.- are allocated to 1 ml syringe production and US\$

6,975.- are allocated to 2,5 + 3 + 5 ml syringe production.

Direct Labour

Total direct labour: 86 skilled workers

86 skilled workers x 3,250 US\$/y = US\$ 279,500.-- per year



- 8/17 -

Therefrom US\$ 69,875.- are allocated to 1 ml syringe production and US\$ 209,625.- are allocated to 2,5 + 3 + 5 ml syringe production.

8.5.3 NON-LABOUR MAINTENANCE AND SPARES, ADMINISTRATIVE OVERHEADS AND DISTRIBUTION

(a) **Maintenance and spares**

The cost of wear and spare parts required for preventive maintenance and operational wear and tear will be according to PE:

US\$ 36,000.- per year, therefrom

US\$ 9,000.- per year will be allocated to 1 ml syringes production and

US\$ 27,000.- per year will be allocated to 2,5 + 3 + 5 ml syringes production.

For financial analysis these costs have been increased by thirty percent (30 %) to take into consideration custom duties.

Materials for the first two years of operation are included in the initial investment, thus spare parts requirements have assumed to begin with the 3rd year of operation.

The maintenance material costs are estimated at

US\$ 4,000.- per year, therefrom

US\$ 1,000.- per year will be allocated to 1 ml syringes production and

US\$ 3,000.- per year will be allocated to 2,5 + 5 ml syringes production.

(b) **Non-labour administrative overheads**

The administrative overheads are broken down into:

(b1) Communication, office supplies, building rental

2,000 US\$/m x 12 m/y = US\$/y 24,000.-, therefrom



- 8/18 -

US\$/y 6,000.- will be allocated to 1 ml syringe production and
US\$/y 18,000.- will be allocated to 2,5 + 5 ml syringe production.

The amount of 24,000 US\$/y takes into account costs for communication,
materials, etc.

(b2) Building rental

Based on a monthly average rental rate for a 1,080 m² building of
100 ₱/m² the monthly rental cost will be ₱ 108,000.- or US\$ 3,857.- per
month corresponding to approx. US\$ 46,000.- per year, therefrom US\$
11,500.- will be allocated to 1 ml syringes production and US\$ 34,500.- will
be allocated to 2,5 + 5 ml syringes production.

(c) Distribution costs (Marketing, non-labour costs)

A lumpsum of US\$ 20,000.- has been provided to be taken into consider-
ation distribution costs for sales promotion, marketing expenses, travel
expenses etc.

Therefrom US\$/y 5,000.- will be allocated to 1 ml syringe production and
US\$/y 15,000.- will be allocated to 2,5 + 5 ml syringe production.

Break-Down of Total Costs Covering a Normal Production Year

The total production costs have been calculated on the basis of the annual
consumption figures, personnel requirements, maintenance costs, etc. given in
the previous subchapters, and include also financial costs.



- 8/10 -

Table 8.6: Total Production Costs in US\$

Year	1992	1993	1994-96	1997
% of nom. capacity (single product)	0.00	0.00	0.00	0.00
Raw material 1	392895.00	472320.00	590400.00	590400.00
Other raw materials	0.00	0.00	0.00	0.00
Utilities	567.84	578.20	593.00	593.00
Energy	50292.00	59040.00	72000.00	72000.00
Labour, direct	232683.80	251550.00	279500.00	279500.00
Repair, maintenance	3330.00	3600.00	4000.00	4000.00
Spare parts	0.00	0.00	46800.00	46800.00
Factory overheads	9300.00	9300.00	9300.00	9300.00
Factory costs	689068.60	796388.20	1002593.00	1002593.00
Administrative overheads	151800.00	151800.00	151800.00	151800.00
Indir. costs, sales and distribution	20000.00	20000.00	20000.00	20000.00
Direct costs, sales and distribution	0.00	0.00	0.00	0.00
Depreciation	414488.80	414488.80	414488.80	414121.70
Financial costs	0.00	0.00	0.00	0.00
Total production costs	1275358.00	1382677.00	1588882.00	1588515.00
Costs per unit (single product)	0.00	0.00	0.00	0.00
Of it foreign, \$	60.60	61.56	63.83	63.85
Of it variable, \$	44.02	48.82	53.11	53.12
Total labour	314483.80	333350.00	361300.00	361300.00



- 8/20 -

Table 8.6: Total Production Costs in US\$ (continued)

Year	1998-99	2000	2001- 6
% of nom. capacity (single product).	0.00	0.00	0.00
Raw material 1	590400.00	590400.00	590400.00
Other raw materials	0.00	0.00	0.00
Utilities	593.00	593.00	593.00
Energy	72000.00	72000.00	72000.00
Labour, direct	279500.00	279500.00	279500.00
Repair, maintenance	4000.00	4000.00	4000.00
Spares	46800.00	46800.00	46800.00
Factory overheads	9300.00	9300.00	9300.00
Factory costs	1002593.00	1002593.00	1002593.00
Administrative overheads	151800.00	151800.00	151800.00
Indir. costs, sales and distribution	20000.00	20000.00	20000.00
Direct costs, sales and distribution	0.00	0.00	0.00
Depreciation	368815.10	0.00	282406.80
Financial costs	0.00	0.00	0.00
Total production costs	1543208.00	1174393.00	1456800.00
Costs per unit (single product) .	0.00	0.00	0.00
Of it foreign, %	64.75	53.68	61.95
Of it variable,%	54.68	71.85	57.92
Total labour	361300.00	361300.00	361300.00

8.6 SALES PRICES AND ANNUAL REVENUE PROJECTION

For the calculation of the yearly sales revenues the following ex-factory sales prices were assumed per 1000 pieces for the various sizes of syringes:

Product	(US\$/1,000 p.)
1 ml syringe (domestic sales)	117
2.5 and 5 ml syringe (domestic sales)	127



- 8/21 -

The estimated prices for domestic sales correspond to 90 % of the actual wholesale prices. The ex factory sales price of 2,5 ml syringes is assumed to be the same as of 5 ml syringes.

The sales revenues estimates are based on the assumption that the whole production of syringes can be sold on the local market.

The expected annual sales revenues are presented in the Table 8.7.



- 8/22 -

Table 8.7: Sales revenues 1993 - 2007 (in US\$ per year)

Year	Sales (mio p./y)		Sales revenues		Total sales revenues
	1 ml syr.	2.5 + 5 ml syr.	1 ml syr. US\$/y	2.5 + 5 ml syr. US\$/y	US\$/y
1993	3.3	10	386,100.00	1,270,000.00	1,656,100.00
1994	4.0	12	468,000.00	1,524,000.00	1,992,000.00
1995	5	15	585,000.00	1,905,000.00	2,490,000.00
1996	5	15	585,000.00	1,905,000.00	2,490,000.00
1997	5	15	585,000.00	1,905,000.00	2,490,000.00
1998	5	15	585,000.00	1,905,000.00	2,490,000.00
1999	5	15	585,000.00	1,905,000.00	2,490,000.00
2000	5	15	585,000.00	1,905,000.00	2,490,000.00
2001	5	15	585,000.00	1,905,000.00	2,490,000.00
2002	5	15	585,000.00	1,905,000.00	2,490,000.00
2003	5	15	585,000.00	1,905,000.00	2,490,000.00
2004	5	15	585,000.00	1,905,000.00	2,490,000.00
2005	5	15	585,000.00	1,905,000.00	2,490,000.00
2006	5	15	585,000.00	1,905,000.00	2,490,000.00
2007	5	15	585,000.00	1,905,000.00	2,490,000.00



9. FINANCIAL ANALYSIS

General Remark

The financial project analysis has been carried out in accordance with the methodology as laid down in the

MANUAL FOR THE PREPARATION OF INDUSTRIAL FEASIBILITY STUDIES

published by UNIDO (Vienna, Sales N° E.78.II.B.5, 1978).

UNIDO's software package COMFAR © (Computerized Model for Financial Analysis and Reporting), which corresponds to this methodology, has been applied on a personal computer for the processing of the techno-economic input data which were presented in Chapter 9 and editing of the tables.

Project financing

For the calculation of the financial key indicators of this project, it has been assumed that the total initial investment will be paid in as equity and therefore no outside financing has been considered.

Income tax rate

Under the National Internal Revenue Code, a tax rate of 35 per cent of the taxable income derived from all sources within the Philippines is imposed on all corporations organized, authorized, or existing under the laws of any foreign country and engaged in trade or business within the Philippines.



- 9/2 -

Income tax holiday

Under the Omnibus Investment Code of 1987, a compilation of the foreign investment laws and various incentive schemes administered by the Department of Trade and Industry (DTI) through either the Board of Investments (BOI) or the Export Processing Zone Authority (EPZA), BOI-registered enterprises will be fully exempt from income taxes for six years from commercial operation for pioneer firms and four years for non-pioneer firms. As of January, 1991, the BOI cannot definitely determine whether this project will qualify for pioneer status as two companies with similar projects (as mentioned earlier) have already been granted pioneer status.

The tax holiday incentive, however, can still be availed of by the project provided it exports 50 per cent of its production (if it is a Filipino-owned company) or 70 per cent of its production (if it is a foreign-owned company).

For the envisaged plant tax holidays for the first four (4) years of operation have been assumed.

Foreign exchange rate

The peso-dollar exchange rate as of January 29, 1991 is P 28 to US\$ 1.

Summary Sheet

In the following sheet all relevant project data of the COMFAR calculation are summarized.



- 9/3 -

----- COMFAR 2.1 - AUSTROPLAN, VIENNA, AUSTRIA -----

Production of Disposable Syringes

September 1991

3 Products viz 1, 2.5 and 5ml syr.

1 year(s) of construction, 15 years of production

currency conversion rates:

foreign currency 1 unit = 1.0000 units accounting currency

local currency 1 unit = 1.0000 units accounting currency

accounting currency: US \$

Total initial investment during construction phase

fixed assets: 3224196.00 94.306 % foreign

current assets: 0.00 0.000 % foreign

total assets: 3224196.00 94.306 % foreign

Source of funds during construction phase

equity & grants: 3224196.00 0.000 % foreign

foreign loans : 0.00

local loans : 0.00

total funds : 3224196.00 0.000 % foreign

Cashflow from operations

Year:	1	2	3
operating costs:	860868.60	968188.20	1174393.00
depreciation :	414488.80	414488.80	414488.80
interest :	0.00	0.00	0.00
production costs	1275357.00	1382677.00	1588882.00
thereof foreign	60.60 %	61.56 %	63.83 %
total sales :	1656100.00	1992000.00	2490000.00
gross income :	380742.60	609323.00	901118.30
net income :	380742.60	609323.00	901118.30
cash balance :	528685.50	985810.70	1200637.00
net cashflow :	528685.50	985810.70	1200637.00

Net Present Value at: 10.00 % = 3378372.00

internal Rate of Return: 28.68 %

Return on equity 1: 19.89 %

Return on equity 2: 28.56 %

List of all COMFAR © schedules

All schedules which are available by the reporting module of COMFAR for financial analysis are presented as Annex on the following pages.

- Total initial investment cost
- Investment during production
- Total production costs
- Production costs for each product
- Working capital required
- Sources of finance
- Cashflow tables
- Net income statement
- Balance sheet.



Production of Disposable Syringes
September 1991
3 Products viz 1, 2.5 and 5ml syr.

1 year(s) of construction, 15 years of production

currency conversion rates:

foreign currency 1 unit = 1.0000 units accounting currency
local currency 1 unit = 1.0000 units accounting currency
accounting currency: US \$

Total initial investment during construction phase

fixed assets:	3224196.00	94.306 % foreign
current assets:	0.00	0.000 % foreign
total assets:	3224196.00	94.306 % foreign

Source of funds during construction phase

equity & grants:	3224196.00	0.000 % foreign
foreign loans :	0.00	
local loans :	0.00	
total funds :	3224196.00	0.000 % foreign

Cashflow from operations

Year:	1	2	3
operating costs:	860868.60	968188.20	1174393.00
depreciation :	414488.80	414488.80	414488.80
interest :	0.00	0.00	0.00
production costs	1275357.00	1382677.00	1588882.00
thereof foreign	60.60 %	61.56 %	63.83 %
total sales :	1656100.00	1992000.00	2490000.00
gross income :	380742.60	609323.00	901118.30
net income :	380742.60	609323.00	901118.30
cash balance :	528685.50	985810.70	1200637.00
net cashflow :	528685.50	985810.70	1200637.00

Net Present Value at: 10.00 % = 3378372.00
Internal Rate of Return: 28.68 %
Return on equity1: 19.89 %
Return on equity2: 28.56 %

Index of Schedules produced by COMFAR

Total initial investment	Cashflow Tables
Total investment during production	Projected Balance
Total production costs	Net income statement
Working Capital requirements	Source of finance



Total Initial Investment in US \$

Year	1991.1	1991.2
Fixed investment costs		
Land site preparation, development	0.000	0.000
Buildings and civil works	0.000	0.000
Auxiliary and service facilities	0.000	0.000
Incorporated fixed assets	479700.000	246792.000
Plant machinery and equipment	623218.000	1600811.000
	-----	-----
Total fixed investment costs	1102918.000	1847603.000
Pre-production capital expenditures.	92000.000	181675.000
Net working capital	0.000	0.000
	-----	-----
Total initial investment costs	1194918.000	2029278.000
Of it foreign, in \$	92.301	95.487

Production of Disposable Syringes --- September 1991



Total Current Investment in US \$

Year	1992	1993	1994	1995-99	2000
Fixed investment costs					
Land, site preparation, development	0.000	0.000	0.000	0.000	0.000
Buildings and civil works	0.000	0.000	0.000	0.000	0.000
Auxiliary and service facilities	0.000	0.000	0.000	0.000	0.000
Incorporated fixed assets	0.000	0.000	0.000	0.000	714497.000
Plant, machinery and equipment	0.000	0.000	0.000	0.000	1544757.000
Total fixed investment costs	0.000	0.000	0.000	0.000	2259254.000
Preproduction capitals expenditures.	0.000	0.000	0.000	0.000	0.000
Working capital	266546.100	30001.060	114970.000	0.000	0.000
Total current investment costs	266546.100	30001.060	114970.000	0.000	2259254.000
Of it foreign, \$	58.362	82.468	91.415	0.000	96.360

Production of Disposable Syringes --- September 1991

**Total Production Costs in US \$**

Year	1992	1993	1994-96	1997	1998-99
% of nom. capacity (single product).	0.000	0.000	0.000	0.000	0.000
Raw material 1	392895.000	472320.000	590400.000	590400.000	590400.000
Other raw materials	0.000	0.000	0.000	0.000	0.000
Utilities	567.840	578.200	593.000	593.000	593.000
Energy	50292.000	59040.000	72000.000	72000.000	72000.000
Labour, direct	232683.800	251550.000	279500.000	279500.000	279500.000
Repair, maintenance	3330.000	3600.000	4000.000	4000.000	4000.000
Spares	0.000	0.000	46800.000	46800.000	46800.000
Factory overheads	9300.000	9300.000	9300.000	9300.000	9300.000
Factory costs	689068.600	796388.200	1002593.000	1002593.000	1002593.000
Administrative overheads	151800.000	151800.000	151800.000	151800.000	151800.000
Indir. costs, sales and distribution	20000.000	20000.000	20000.000	20000.000	20000.000
Direct costs, sales and distribution	0.000	0.000	0.000	0.000	0.000
Depreciation	414488.800	414488.800	414488.800	414121.700	368815.100
Financial costs	0.000	0.000	0.000	0.000	0.000
Total production costs	1275358.000	1382677.000	1588882.000	1588515.000	1543208.000
Costs per unit (single product) .	0.000	0.000	0.000	0.000	0.000
Of it foreign, %	60.601	61.555	63.833	63.848	64.749
Of it variable,%	44.021	48.823	53.108	53.120	54.680
Total labour	314483.800	333350.000	361300.000	361300.000	361300.000

Production of Disposable Syringes --- September 1991



Total Production Costs in US \$

Year	2000	2001- 6
% of nom. capacity (single product).	0.000	0.000
Raw material 1	590400.000	590400.000
Other raw materials	0.000	0.000
Utilities	593.000	593.000
Energy	72000.000	72000.000
Labour, direct	279500.000	279500.000
Repair, maintenance	4000.000	4000.000
Spares	46800.000	46800.000
Factory overheads	9300.000	9300.000
Factory costs	1002593.000	1002593.000
Administrative overheads	151800.000	151800.000
Indir. costs, sales and distribution	20000.000	20000.000
Direct costs, sales and distribution	0.000	0.000
Depreciation	0.000	282406.800
Financial costs	0.000	0.000
Total production costs	1174393.000	1456800.000
Costs per unit (single product) .	0.000	0.000
Of it foreign, %	53.679	61.953
Of it variable, %	71.852	57.923
Total labour	361300.000	361300.000

Production of Disposable Syringes --- September 1991



Net Working Capital in US \$

Year		1992	1993	1994	1995-2006
Coverage	mdc coto				
Current assets &					
Accounts receivable	30 12.0	71739.050	80682.340	97866.080	97866.080
Inventory and materials	90 4.0	98225.330	118081.600	147601.600	147601.600
Energy	0 ---	0.000	0.000	0.000	0.000
Spares	275 1.3	-6583.500	-7920.000	36900.000	36500.000
Work in progress	30 12.0	57422.380	66365.680	83549.410	83549.410
Finished products	30 12.0	70072.380	79015.690	96199.410	96199.410
Cash in hand	30 12.0	33092.810	34687.500	40950.000	40950.000
Total current assets		323968.400	370912.800	503066.500	503066.500
Current liabilities and					
Accounts payable	30 12.0	57422.380	66365.680	83549.410	83549.410
Net working capital		266546.100	304547.100	419517.100	419517.100
Increase in working capital		266546.100	38001.060	114970.000	0.000
Net working capital, local		110984.800	117647.100	127517.100	127517.100
Net working capital, foreign		155561.300	186900.000	292000.000	292000.000

Note: mdc = minimum days of coverage ; coto = coefficient of turnover .



Source of Finance, construction in US \$

Year	1991.1	1991.2
Equity, ordinary ..	1283989.000	1940207.000
Equity, preference.	0.000	0.000
Subsidies, grants .	0.000	0.000
Loan A, foreign .	0.000	0.000
Loan B, foreign..	0.000	0.000
Loan C, foreign .	0.000	0.000
Loan A, local....	0.000	0.000
Loan B, local....	0.000	0.000
Loan C, local....	0.000	0.000
	-----	-----
Total loan	0.000	0.000
Current liabilities	0.000	0.000
Bank overdraft	0.000	0.000
	-----	-----
Total funds	1283989.000	1940207.000

Production of Disposable Syringes --- September 1991



Source of Finance, production in US \$

Year	1992	1993	1994
Equity, ordinary ..	0.000	0.000	0.000
Equity, preference.	0.000	0.000	0.000
Subsidies, grants .	0.000	0.000	0.000
Loan A, foreign .	0.000	0.000	0.000
Loan B, foreign..	0.000	0.000	0.000
Loan C, foreign .	0.000	0.000	0.000
Loan A, local....	0.000	0.000	0.000
Loan B, local....	0.000	0.000	0.000
Loan C, local....	0.000	0.000	0.000
Total loan	0.000	0.000	0.000
Current liabilities	57422.380	8943.299	17183.730
Bank overdraft	0.000	0.000	0.000
Total funds	57422.380	8943.299	17183.730

Production of Disposable Syringes --- September 1991



Cashflow Tables, construction in US \$

Year	1991.1	1991.2
Total cash inflow . .	1283989.000	1940207.000
Financial resources .	1283989.000	1940207.000
Sales, net of tax . .	0.000	0.000
Total cash outflow . .	1194918.000	2029278.000
Total assets	1194918.000	2029278.000
Operating costs . . .	0.000	0.000
Cost of finance . . .	0.000	0.000
Repayment	0.000	0.000
Corporate tax	0.000	0.000
Dividends paid	0.000	0.000
Surplus (deficit) .	89071.000	-89071.000
Cumulated cash balance	89071.000	0.000
Inflow, local	1283989.000	1940207.000
Outflow, local	92000.000	91575.000
Surplus (deficit) .	1191989.000	1848632.000
Inflow, foreign	0.000	0.000
Outflow, foreign . . .	1102918.000	1937703.000
Surplus (deficit) .	-1102918.000	-1937703.000
Net cashflow	-1194918.000	-2029278.000
Cumulated net cashflow	-1194918.000	-3224196.000

Cashflow tables, production in US \$

Year	1992	1993	1994	1995	1996	1997
Total cash inflow . .	1713522.000	2000943.000	2507184.000	2490000.000	2490000.000	2490000.000
Financial resources .	57422.380	8943.299	17183.730	0.000	0.000	0.000
Sales, net of tax . .	1656100.000	1992000.000	2490000.000	2490000.000	2490000.000	2490000.000
Total cash outflow . .	1184837.000	1015133.000	1306547.000	1174393.000	1489784.000	1489913.000
Total assets	323968.400	46944.360	132153.700	0.000	0.000	0.000
Operating costs . . .	860868.500	968188.300	1174393.000	1174393.000	1174393.000	1174393.000
Cost of finance . . .	0.000	0.000	0.000	0.000	0.000	0.000
Repayment	0.000	0.000	0.000	0.000	0.000	0.000
Corporate tax	0.000	0.000	0.000	0.000	315391.400	315519.800
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit) .	528685.400	985810.600	1200637.000	1315607.000	1000216.000	1000087.000
Cumulated cash balance	528685.400	1514496.000	2715133.000	4030740.000	5030956.000	6031043.000
Inflow, local	1681102.000	1994424.000	2493591.000	2490000.000	2490000.000	2490000.000
Outflow, local	607812.400	509994.100	557453.400	543993.000	859384.400	859512.900
Surplus (deficit) .	1073290.000	1484429.000	1936137.000	1946007.000	1630616.000	1630487.000
Inflow, foreign . . .	32420.250	6519.750	13593.330	0.000	0.000	0.000
Outflow, foreign . . .	577024.500	505138.500	749093.300	630400.000	630400.000	630400.000
Surplus (deficit) .	-544604.300	-498618.800	-735500.000	-630400.000	-630400.000	-630400.000
Net cashflow	528685.400	985810.700	1200637.000	1315607.000	1000216.000	1000087.000
Cumulated net cashflow	-2695511.000	-1709700.000	-509062.800	806544.300	1806760.000	2806847.000

 Production of Disposable Syringes --- September 1991



COMFAR[®]
2.1 UNIDO

----- COMFAR 2.1 - AUSTRORPLAN, VIENNA, AUSTRIA -----

Cashflow tables, production in US \$

Year	1998	1999	2000	2001	2002	2003
Total cash inflow . .	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000
Financial resources .	0.000	0.000	0.000	0.000	0.000	0.000
Sales, net of tax . .	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000
Total cash outflow . .	1505770.000	1505770.000	3894110.000	1536013.000	1536013.000	1536013.000
Total assets	0.000	0.000	2259254.000	0.000	0.000	0.000
Operating costs . . .	1174393.000	1174393.000	1174393.000	1174393.000	1174393.000	1174393.000
Cost of finance . . .	0.000	0.000	0.000	0.000	0.000	0.000
Repayment	0.000	0.000	0.000	0.000	0.000	0.000
Corporate tax	331377.200	331377.200	460462.400	361620.100	361620.100	361620.100
Dividends paid	0.000	0.000	0.000	0.000	0.000	0.000
Surplus (deficit) .	984229.900	984229.900	-1404110.000	953986.900	953986.900	953986.900
Cumulated cash balance	7015273.000	7999503.000	6595393.000	7549380.000	8503367.000	9457354.000
Inflow, local	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000	2490000.000
Outflow, local	875370.100	875370.100	1086694.000	905613.100	905613.100	905613.100
Surplus (deficit) .	1614630.000	1614630.000	1403307.000	1584387.000	1584387.000	1584387.000
Inflow, foreign . . .	0.000	0.000	0.000	0.000	0.000	0.000
Outflow, foreign . . .	630400.000	630400.000	2807416.000	630400.000	630400.000	630400.000
Surplus (deficit) .	-630400.000	-630400.000	-2807416.000	-630400.000	-630400.000	-630400.000
Net cashflow	984229.900	984229.900	-1404110.000	953986.900	953986.900	953986.900
Cumulated net cashflow	3791077.000	4775307.000	3371198.000	4325185.000	5279172.000	6233159.000

Production of Disposable Syringes --- September 1991



Cashflow tables, production in US \$

Year	2004	2005	2006
Total cash inflow . .	2490000.000	2490000.000	2490000.000
Financial resources .	0.000	0.000	0.000
Sales, net of tax . .	2490000.000	2490000.000	2490000.000
Total cash outflow . .	1536013.000	1536013.000	1536013.000
Total assets	0.000	0.000	0.000
Operating costs . . .	1174393.000	1174393.000	1174393.000
Cost of finance . . .	0.000	0.000	0.000
Repayment	0.000	0.000	0.000
Corporate tax	361620.100	361620.100	361620.100
Dividends paid	0.000	0.000	0.000
Surplus (deficit) .	953986.900	953986.900	953986.900
Cumulated cash balance	10411340.000	11365330.000	12319320.000
Inflow, local	2490000.000	2490000.000	2490000.000
Outflow, local	905613.100	905613.100	905613.100
Surplus (deficit) .	1584387.000	1584387.000	1584387.000
Inflow, foreign	0.000	0.000	0.000
Outflow, foreign . . .	630400.000	630400.000	630400.000
Surplus (deficit) .	-630400.000	-630400.000	-630400.000
Net cashflow	953986.900	953986.900	953986.900
Cumulated net cashflow	7187146.000	8141133.000	9095119.000

Production of Disposable Syringes --- September 1991

"AUSTROPLAN"
ÖSTERREICHISCHE PLANUNGSGESELLSCHAFT M.B.H.
AUSTRIAN ENGINEERING CO. LTD.
LINKE WIENZEILE 234, A-1153 VIENNA

Phone (Internat.): + 43 • 1 • 89 1 89 - 0
Fax (Internat.): + 43 • 1 • 89 1 89 - 279
Telex: 132997 alaw a