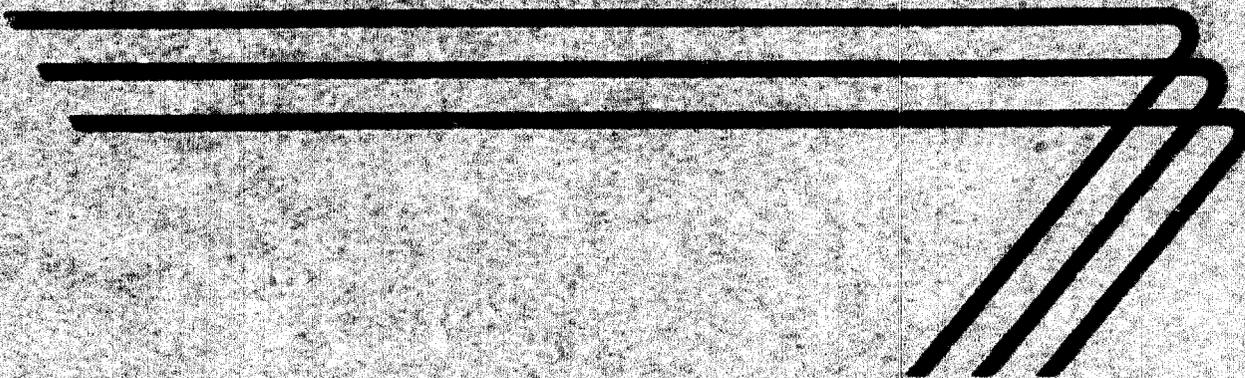
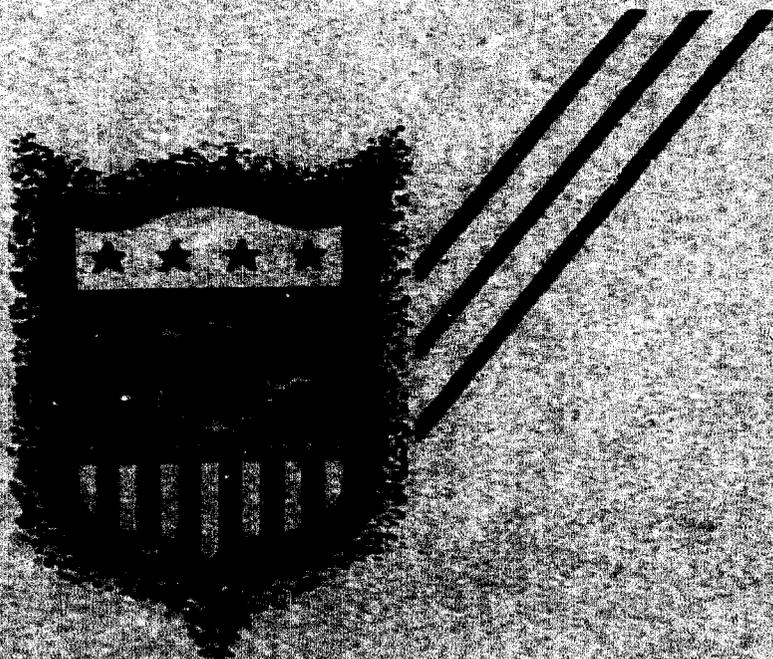


PLANT REQUIREMENTS FOR MANUFACTURE OF VINYL FLOOR TILE



**DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
COMMUNICATIONS RESOURCES DIVISION**

Washington 25, D. C.



**A.I.D.
Reference Center
Room 1456 ES**

FOREWORD

This brochure is one of a series of reports resulting from overseas technical inquiries on factory or commercial establishments, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

Mention of the name of any firm, product, or process in this report is not to be considered a recommendation or an endorsement by the Agency for International Development, but merely a citation that is typical in its field.

* * * * *

The original report was prepared in 1956 by the Gidley Research Institute, Fairhaven, Massachusetts, for the technical aids program through the facilities of the Office of Technical Services, U.S. Department of Commerce.

Technical information, as well as review, was provided by R. Poliakoff, Industrial Consultant, 126 Eleventh Avenue, New York 11, New York.

* * * * *

This report has been revised and rewritten by George H. Andrews Engineering Associates, Inc., 411 Southern Building, Washington 5, D. C.

For further information and assistance, contact should be made with the local Productivity Center, Industrial Institute, Servicio, or United States Operations Mission.

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V I N Y L F L O O R T I L E

INTRODUCTION

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce vinyl floor tile.

GENERAL ASSUMPTIONS

In order to make realistic estimates in this report, certain assumptions are made. These are:

1. The costs of the building and general facilities are based on United States prices.
2. Material costs are based on sizes and specifications of materials used in the United States.
3. Labor costs are based on the average for the industry as recently published by the United States Bureau of Labor Statistics.
4. Adequate power and water are available at the plant site.
5. Adequate transportation facilities are available at the plant site.
6. The plant operates eight hours a day, five days a week, and fifty weeks a year. However, the plant may be operated any desired number of hours per day.

7. No special provision is made for the training of new personnel. It is assumed that learner's rates are paid in such cases.
8. The following items cannot be estimated realistically:
 - A. Land value;
 - B. Distribution and selling costs;
 - C. In-freight and out-freight;
 - D. Administrative costs;
 - E. Taxes.

While general estimates will be made of each of these items, for the purpose of completing cost estimates, adjustment should be made in accordance with actual local costs.

In fact, all cost estimates contained in this report should be adjusted to conform to local conditions.

9. Columns are provided in the tables included in this report to facilitate the conversion of cost figures to conform with local costs.

PRODUCT SPECIFICATIONS

The plant described in this report is designed to produce standard vinyl floor tile, nine inches by nine inches by one-eighth inch thick. Other sizes and other products may be produced in this plant, but for the purpose of this report only the nine-inch floor tile will be considered.

PRODUCTION CAPACITY

The capacity of this plant is about 1,000,000 vinyl floor tiles per year, which is equivalent to 500 per hour or 4,000 per day.

MANUFACTURING UNIT

The manufacturing unit of this plant is one floor tile, 9" x 9" x 1/8". Other sizes of floor tile can be produced with this equipment.

MANUFACTURING OPERATIONS

1. Raw materials receiving and storing -- None of the raw materials is of a kind that is likely to give rise to problems in connection with receiving and storing. Usual procedures are followed.
2. Weighing and compounding -- Vinyl resin, picco resin, and liquid plasticizer are combined in the proportions called for in the formula used. This and other operations are controlled by laboratory findings. If the number of varieties of mixes is kept to a minimum, the extent of laboratory control will be reduced.
3. Mixing ingredients -- The mixing of the various ingredients is done according to formula, and the process is carried out in a small mixer which may be either open or closed.
4. Fluxing or warm-up milling -- The compound must be thoroughly mixed. To accomplish this the usual mixing of ingredients is followed by a further fluxing and milling process.
5. Calendering -- The calendering process for vinyl flooring can be done at temperatures of 250° Fahrenheit to 320° Fahrenheit, depending

upon the formulation and processing procedure used.

6. Laminating and polishing -- It is desirable to cool the calendered sheets immediately after they leave the calender to prevent the sheets from sticking together in the roll. The next step consists of plying-up a single sheet of calendered face stock with two sheets of backing stock and laminating this assembly in a polished steel mold 36" x 36" x 1/8" in internal dimensions. The laminating operation is carried out in a multideck press equipped to supply sufficient heat to fuse the individual sheets into an integral unit and equipped to cool the resulting assembly under pressure.

7. Cutting to size -- The sheets assembled and formed in this manner are sanded on the back to assure satisfactory adhesion when the tile is laid. The sheets are then sheared to the required dimensions and then cut to make standard tiles (9" x 9"). Other sizes can be made, but for the purposes of this report all the tiles are nine inches square.

8. Packing and shipping -- The finished tiles are packed in cartons of 48 tiles each, ready for shipping.

DIRECT MATERIALS

<u>Item</u>	<u>Annual</u>	<u>Unit Cost</u>	<u>Annual Cost</u>	
	<u>Requirements</u>		<u>Estimated</u>	<u>Actual</u>
	Tons			
Vinyl resin	72	\$ 400	\$ 28,800	_____
Picco 100 resin	21	600	12,600	_____
Liquid plasticizer	18	400	7,200	_____
Litharge	1	400	400	_____
Lead stearate	2	320	640	_____
Whiting	72	30	2,160	_____
Clay	38	38	1,440	_____
Asbestine	72	500	36,000	_____
Color	4	1,500	6,000	_____
Cartons	12,500 (cartons)		<u>2,130</u>	_____
TOTAL			\$ 97,370	_____

PLANT LAYOUT

A plant layout indicating the location of the equipment is shown on the last page of this report.

PLANT SITE

To provide for eventual expansion the plant site should have an area of one-half acre.

The cost of the land is estimated at \$500.

BUILDINGS

A one-story building will be required, about fifty feet wide by eighty feet long or about 4,000 square feet of floor space. The building may be constructed of any suitable local fireproof material.

The cost of the building is estimated at about \$3.75 per square foot, or \$15,000.

POWER

It is assumed that a dependable supply of electric power will be available from public power service lines. The total connected load is about 150 horsepower.

On this basis the annual cost of power is estimated at \$2,250.

WATER

The water requirement is estimated at one million gallons annually for production, sanitation, and fire protection.

The annual cost of water is estimated at \$300.

FUEL

The fuel requirements for this plant are estimated at approximately 3,000 gallons of oil for heating and process rollers.

The estimated annual cost of fuel oil is \$300.

TRUCK

No truck, owned and operated by the company is considered necessary for this plant. Local builders will pick up any tiles they buy at the factory. Deliveries to dealers and out-of-town purchasers will be made by public transportation systems. Good highway facilities will be necessary because the combined shipments in and out are estimated at 60 tons per month.

PRODUCTION TOOLS AND EQUIPMENT

<u>Description</u>	<u>Cost</u>	
	<u>Estimated</u>	<u>Actual</u>
Internal mixer or open mill	\$ 12,000	_____
Flux mill	9,000	_____
Calender	20,000	_____
Laminating press	6,000	_____
Cutter	2,500	_____
Compounding equipment	<u>600</u>	_____
TOTAL	\$ 50,100	_____

NOTES:

Equipment list explanation

1. The internal mixer in a U.S.A. factory would be preferably a large Banbury, but the cost and productivity would not be economically sound overseas in most areas. Therefore, the above mixer is best a small, sturdily-built two-roll mixer. This is the same as would be used for rubber tiles.

2. Flux mill

This is a standard two-roll rubber or plastic mill with cast iron chilled rolls or steel rolls (hardened); the steel rolls are to be preferred. The size of these rolls will be from 14" to 20" in diameter and from 40" to about

30" long. The rolls rotate at the same speed--even friction ratio. This mill will require about a 50 hp. motor. Mill rolls should be cored for steam or cold water, as required.

3. Calender

The calender recommended here is a standard steel or cast iron three-roll (or three-bowl) calender. A four-roll calender is better, but too expensive for overseas operation, in most cases. The calender should have rolls approximately 40" long. The motor should be cored for application of steam and cold water, as the occasion demands. Roll surfaces should be ground and polished and free of imperfections. Price quoted is for a new calender with rebuilt motor. For a new motor, add \$2,000.

4. Laminating press

This is similar to the hydraulic press specified for rubber tile (to which the reader is referred). The function is not to vulcanize but, rather, to fuse together the backing stock and the face stock. Highly polished steel molds (about 36" x 36") are required. The press may be multi-decked (to contain two or more molds at once).

5. Cutting press

The cutting press is a small model 42" automatic tile

cutter and will produce 500 tiles per hour with an experienced operator. An excellent machine is the Campbell tile cutter. This unit will accurately cut tiles from 4" to 24" square on inch intervals.

6. Compounding equipment

This will consist of one heavy weighing scale (floor type) of up to 200 pounds capacity and a smaller, more accurate, scale for weighing colors, which will be about 10 pounds capacity. Various metal containers, benches and bins are included. Price is for all new equipment.

OTHER TOOLS AND EQUIPMENT

<u>Description</u>	<u>Cost</u>	
	<u>Estimated</u>	<u>Actual</u>
Laboratory equipment	\$ 2,500	_____
TOTAL	\$ 2,500	_____

Laboratory equipment - explanation

1. 3" x 8" or 4" x 9" two-roll mill with motor. This is very desirable for control tests, new test formulations, and matching colors.
2. Accessory equipment and hand tools. A dead weight plastometer (du Pont type), ring and ball apparatus, glassware, thermometers, indentation tester, flex tester.

FURNITURE AND FIXTURES

<u>Item</u>	<u>Number Required</u>	<u>Unit Cost</u>	<u>Cost</u>	
			<u>Estimated</u>	<u>Actual</u>
Desk and chair	1	\$150	\$ 150	_____
File cabinets	2	75	150	_____
Typewriter	1	150	150	_____
Adding machine	1	150	<u>150</u>	_____
TOTAL			\$ 600	_____

SUPPLIES

<u>Item</u>	<u>Annual Cost</u>	
	<u>Estimated</u>	<u>Actual</u>
Lubricants and hand tools	\$ 100	_____
Maintenance materials and repair parts	1,400	_____
Office supplies	<u>100</u>	_____
TOTAL	\$ 1,600	_____

DIRECT LABOR

<u>Occupation</u>	<u>Number Required</u>	<u>Hourly Rate</u>	<u>Annual Cost</u>	
			<u>Estimated</u>	<u>Actual</u>
Mixer	1	\$1.50	\$ 3,000	_____
Compounder and storesman	1	1.50	3,000	_____
Flux mill	1	1.50	3,000	_____
Calender operator	1	1.50	3,000	_____
Laminating press operator	1	1.50	3,000	_____
Cutter operator	1	1.50	3,000	_____
General operators	<u>2</u>	1.50	<u>6,000</u>	_____
TOTAL	8		\$ 24,000	_____

Each of the direct laborers is qualified to operate any of the steps in the process and is sent from one spot to another.

INDIRECT LABOR

<u>Occupation</u>	<u>Number Required</u>	<u>Hourly Rate</u>	<u>Annual Cost</u>	
			<u>Estimated</u>	<u>Actual</u>
Manager	<u>1</u>	\$3.00	<u>\$ 6,000</u>	_____
TOTAL	1		\$ 6,000	_____

The manager buys, sells, keeps books and supervises the eight operators.

DEPRECIATION

<u>Description</u>	<u>Estimated Cost</u>	<u>Years Life</u>	<u>Annual Cost</u>	
			<u>Estimated</u>	<u>Actual</u>
Building	\$ 15,000	20	\$ 750	_____
Production tools and equipment	50,100	10	5,010	_____
Other tools and equipment	2,500	10	250	_____
Furniture and fixtures	600	10	<u>60</u>	_____
TOTAL			\$ 6,070	_____

MANUFACTURING OVERHEAD

<u>Item</u>	<u>Annual Cost</u>	
	<u>Estimated</u>	<u>Actual</u>
Depreciation	\$ 6,070	_____
Indirect labor	6,000	_____
Supplies	1,600	_____
Power	2,250	_____
Water	300	_____
Fuel	<u>300</u>	_____
TOTAL	\$ 16,520	_____

MANUFACTURING COSTS

<u>Item</u>	Annual Cost	
	<u>Estimated</u>	<u>Actual</u>
Direct materials	\$ 97,370	_____
Direct labor	24,000	_____
Manufacturing overhead	<u>16,520</u>	_____
TOTAL	\$ 137,890	_____

FIXED ASSETS

<u>Item</u>	Cost	
	<u>Estimated</u>	<u>Actual</u>
Land	\$ 500	_____
Buildings	15,000	_____
Production tools and equipment	50,100	_____
Other tools and equipment	2,500	_____
Furniture and fixtures	<u>600</u>	_____
TOTAL	\$ 68,700	_____

WORKING CAPITAL

<u>Item</u>		Cost	
		<u>Estimated</u>	<u>Actual</u>
Direct materials	30 days	\$ 8,100	_____
Direct labor	30 days	2,000	_____
Manufacturing overhead	30 days	1,400	_____
Reserve for sales collections	30 days	<u>15,400</u>	_____
TOTAL		\$ 26,900	_____

CAPITAL REQUIREMENTS

<u>Item</u>	Cost	
	<u>Estimated</u>	<u>Actual</u>
Fixed assets	\$ 68,700	_____
Working capital	<u>26,900</u>	_____
TOTAL	\$ 95,600	_____

SALES REVENUE

The current selling price, f.o.b. plant, for vinyl tiles, 9 inches by 9 inches, is \$0.185 per piece. The annual production is 1,000,000 tiles.

Based on these figures, the gross annual sales would amount to 1,000,000 x \$0.185, or \$185,000.

RECAPITULATION OF COSTS, SALES AND PROFITS

<u>Item</u>	<u>Estimated Cost</u>	<u>Actual Cost</u>
Direct materials	\$ 97,370	_____
Direct labor	24,000	_____
Manufacturing overhead	<u>16,520</u>	_____
Total manufacturing costs		_____
		\$137,890
Interest on loans	2,900	_____
Insurance	300	_____
Legal	500	_____
Auditing	900	_____
Unforeseen expense	<u>1,610</u>	_____
Total administrative costs		_____
		6,210
Sales commissions		_____
		1,900
Travel, bad debts, discounts and allowances, freight-out		_____
		2,000
Profit before taxes		_____
		<u>37,000</u>
Total annual gross sales		_____
		\$185,000

BUDGET CONTROL:

A requisition form designed to provide accurate records of procurement and indicate the purpose of procurement with the least amount of time and effort is shown on the following page.

This form has an account number for each type of the various expenditures which the manager will review in detail, monthly or oftener, in order to control his expenses. Some items, such as power and water, are usually under contract and are easily checked by reference to monthly bills. For simplification, items (marked with an asterisk below) are omitted from the purchase requisition. Variations in the labor costs are easily reviewed by examination of the payroll vouchers. The simplified type of control thus provided makes certain that the manager can control expenditures promptly.

Following the requisition form, a sample voucher check is shown. Voucher checks should be used for the payment of all expenditures and the appropriate book account number placed on each voucher.

At the end of each month the manager will receive a statement of all expenditures broken down by budget accounts. If the expenditures exceed the budgeted monthly allowances of any of the accounts, the bookkeeper will furnish the manager with a break-down of all expenditures relative to the budgeted accounts exceeded. All these supporting data can be secured by reference to the purchase requisitions and the check vouchers. This reference will enable the manager to determine what caused the over-expenditure and take corrective action.

If at any time during each month it becomes apparent that expenditures will exceed any of the budget accounts, the bookkeeper will bring this to the attention of the manager for his information and action.

BUDGET CONTROL ACCOUNTS:

Account Number	Monthly Expense	Monthly Budget	Annual Budget	Actual
10 Administrative	\$ _____	\$ 383	\$ 4,600	\$ _____
20 Sales	_____	325	3,900	_____
30 Direct Materials	_____	8,114	97,370	_____
40 Supplies	_____	133	1,600	_____
51 Power*	_____	187	2,250	_____
52 Water*	_____	25	300	_____
53 Fuel	_____	25	300	_____
60 Unforeseen Expense (Reserve Account)	_____	134	1,610	_____
71 Direct Labor*	_____	2,000	24,000	_____
72 Indirect Labor*	_____	500	6,000	_____
80 Depreciation (Reserve Account)	_____	505	6,070	_____

Note: Administrative includes interest on loans,
insurance, legal and auditing.

R. W. MITCHELL MANUFACTURING COMPANY

1422 BOSWORTH STREET, S. E.

65-22
514

ANYWHERE, U. S. A. _____ 19 ____ No. **10000**

PAY _____ DOLLARS \$ _____

TO THE ORDER OF

R. W. MITCHELL MANUFACTURING COMPANY

TO FIRST NATIONAL BANK
ANYWHERE, U. S. A.

BY **SAMPLE CHECK**

VICE PRESIDENT

ACCOUNT NUMBER

Sample voucher check to be used for the payment of
all expenditures in connection with Budget Control.

R. W. MITCHELL MANUFACTURING COMPANY

ENGINEERS:

The services of professional engineers are desirable in the design of this plant, even though the proposed plant is small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in industrial design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines. They may also be reached through their national organizations, one of which is the

National Society of Professional Engineers
2029 K Street, Northwest,
Washington 6, D. C.

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project.

The equipment manufacturers also know, and can recommend, professional engineers in private practice, who are willing and able to provide appropriate consulting services.

TRAINING:

Manufacturing an inferior quality of product during the training period could create sales resistance that might be difficult to cope with later. To avoid such possibilities, the quality of the product should be maintained at all times, including the training period.

In some areas skilled operators may be available locally. In other areas all the operators may have to be trained.

If skilled operators are not available, adequate training would be assured by using one or more of the following methods:

- A. If the plant is designed and installed by a competent engineering firm, the contract should be negotiated, if possible, on a turn-key basis. On this basis the contractor agrees to operate the plant and produce the quality and quantity of the product stated in the contract for an agreed period of time. Such a contract would assure adequate personnel training, since full quantity and quality could not be produced with an untrained organization.
- B. The engineering firm that designs and installs the plant can usually make training arrangements to have key personnel placed, for training purposes, in a foreign industry that produces the same type of product. This would provide training for the key personnel while the plant is being installed.
- C. If neither of the above methods is possible, then qualified and experienced individuals should be employed for the key positions, either permanently or temporarily, to perform the key operations and assist in training the organization, even if they must be secured outside the country.
- D. The manager should have years of successful experience in this type of business and be fully qualified in all phases of management, including the training of employees.

SAFETY:

There is always danger of accident and injury in any industrial plant. Because of this, the manager should take specific action to bring to the attention of each employee the importance of safety precautions and intelligent first aid.

Practically all machines have safety appliances, and the manager should see that these are in good working condition and that the operators are making full use of them.

In addition to constant watchfulness to make sure that all practicable safety precautions are taken, first aid supplies should be readily available. One complete first aid kit should be maintained near the manager's office, and others at appropriate places throughout the plant. Some of the employees should be trained to provide first aid service.

The use of accident posters in the plant have proved to be of value in reducing accidents. It is recommended that such posters be used, and that some direct special action be taken by the manager, at least once each month, to bring to the attention of all personnel the importance of safety precautions.

A fire brigade should be established and each member trained as to his responsibility in case of fire. Fire drills should be conducted periodically.

It is recommended that the employees be encouraged to offer suggestions or recommendations relative to prevention of accidents, removal of fire hazards and maintaining general interest in all safety factors.

OTHER CONSIDERATIONS

There are other important subjects, shown below, that should be fully investigated and considered. Information on these subjects is usually available from such sources as banks, government agencies, exporters and importers, wholesalers, retailers, transportation companies and manufacturers.

MATERIALS AND SUPPLIES

1. Are all materials and supplies available locally?
2. Is the local material market competitive?
3. Is satisfactory delivery of local materials assured at reasonable prices?
4. What materials and supplies must be imported?
5. Are they available in world markets at competitive prices?
6. Would prompt delivery of imported materials and supplies be assured so that large inventories would not be required?

MARKET FACTORS

1. Is there already a demand for the product?
 - A. Who are the principal consumers?
 - B. Who are possible new consumers?
2. How is demand for the product now satisfied?
 - A. By local production? If so, what is the volume of annual production?
 - B. What percentage of consumption is filled by local production?
 - C. By imports? If so, what is the volume of annual imports?
 - D. What percentage of consumption is met by imports?
 - E. From what areas are imports derived?
3. What is the estimated annual increase in local consumption over the next five years?
 - A. How were such estimates made?
 - B. By reference to official figures on population growth, family budgets, imports, etc.?
 - C. By consultation with trade or industry, ministries, associations, bankers, commercial houses, wholesalers, retailers, industrial consumers, etc.?

4. If the product is already being manufactured, can the existing and estimated future local market absorb production of the new plant without price-cutting or other dislocations?
5. Would the estimated sales price and quality of the new product make it competitive with an imported equivalent?
 - A. After adjusting cost to local conditions, is the estimated sales price of the product so high that tariff protection is necessary to protect it from imports?

EXPORT MARKETS:

1. Could the product compete in export markets on the basis of price, quality and dependability of supply?
2. Can export markets for the product be developed?
3. If so, in what areas and in what annual volume?
4. What procedures would be necessary to develop export markets?
5. What would it cost?

MARKETING PROBLEMS:

1. In calculating costs of the product, has adequate allowance been made for the expense of a sales department, advertising and promotion that might be required?
2. Do consumer prejudices against locally manufactured products exist?
 - A. If so, why?
 - B. Would they apply to the new product?
 - C. If so, how could they be overcome and what would it cost to do so?
3. Do marketing and distribution facilities for the product exist?
 - A. If not, can they be set up?
 - B. What would it cost to do so?
4. Will the product be sold to:
 - A. Wholesalers?
 - B. Retailers?
 - C. Direct to consumer?
 - D. Other industries?
 - E. Government?

ECONOMIC FACTORS:

1. How much foreign exchange (and in what currency) is required to import machinery, equipment and supplies:
 - A. How much foreign exchange (and in what currency) is required for annual interest payments and amortization of any loans contracted to import machinery and equipment, or for payment of royalties and technical services?
 - B. How much foreign exchange (and in what currency) is required for annual import of raw materials and supplies?
 - C. What are estimated annual foreign exchange earnings and in what currencies?
 - D. Has careful consideration been given to the possibility of depreciation in the foreign exchange value of the local currency?
 - E. Has careful consideration been given to the possibility of import controls, or restrictions on availabilities of foreign exchange necessary to operate the business?
 - F. What benefits would the new business bring to the economy in the use of local raw materials: in employment and in technology?
 - G. Do dependable facilities exist for transportation, power, fuel, water and sewage?
 - (1) If not, can existing deficiencies be eliminated satisfactorily?
 - (2) What would be the cost to do so?

PERSONNEL:

1. Is there an adequate labor supply near the plant location?
 - A. If not, how can the problem be solved?
2. Can the problem of training competent management and supervisory personnel be solved?
 - A. Also, the training of skilled labor?
 - B. Is technical advice available in the locality?
 - C. If not, where can it be obtained and what will it cost?

LAWS AND REGULATIONS:

1. Do existing labor laws, government regulations, laws and taxes favor establishment of new business?
 - A. If not, can existing obstacles be removed?
 - B. If so, how and when?

FINANCIAL FACTORS:

1. Technical advice on selection of machinery and equipment.
 - A. In selecting the machinery and equipment for the new plant, have reputable and competent engineers and technicians been consulted?
 - B. Have they been asked for advice on the most suitable types of machinery and equipment for the process and locality?
 - C. Have they carefully compared costs of various suppliers?
 - D. Credit terms offered purchasers?

FINANCIAL REQUIREMENTS OF THE PROJECT:

1. In estimating the cost of the project, has careful consideration been given to:
 - A. The effect on costs of delays in construction schedules?
 - B. In delivery and installation of machinery and equipment?
 - C. In import of essential raw materials and supplies?
2. In calculating cash flow and working capital requirements, has careful consideration been given to:
 - A. Maintaining adequate inventories of raw materials?
 - B. Supplies and spare parts?
 - C. Seasonal fluctuations in the business?
 - D. The time required to liquidate credit sales to customers and bad debts?
 - E. The period necessary to get the plant into production?
 - F. Cash required to amortize its principle loans?
3. If the economy is in a period of inflation, has full allowance been made for the influence of rising prices and wages on the cost of the project and on working capital requirements?

SHORT TERM BANK CREDITS:

1. Has it been possible to make arrangements with local banks to finance short-time working capital requirements of the business?

FINANCIAL PLAN:

1. Has a definite plan to finance the project been worked out?
 - A. Is sufficient capital available locally?
 - B. If not, what is the plan to obtain the required capital?

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Describes the characteristics of a variety of plastics,
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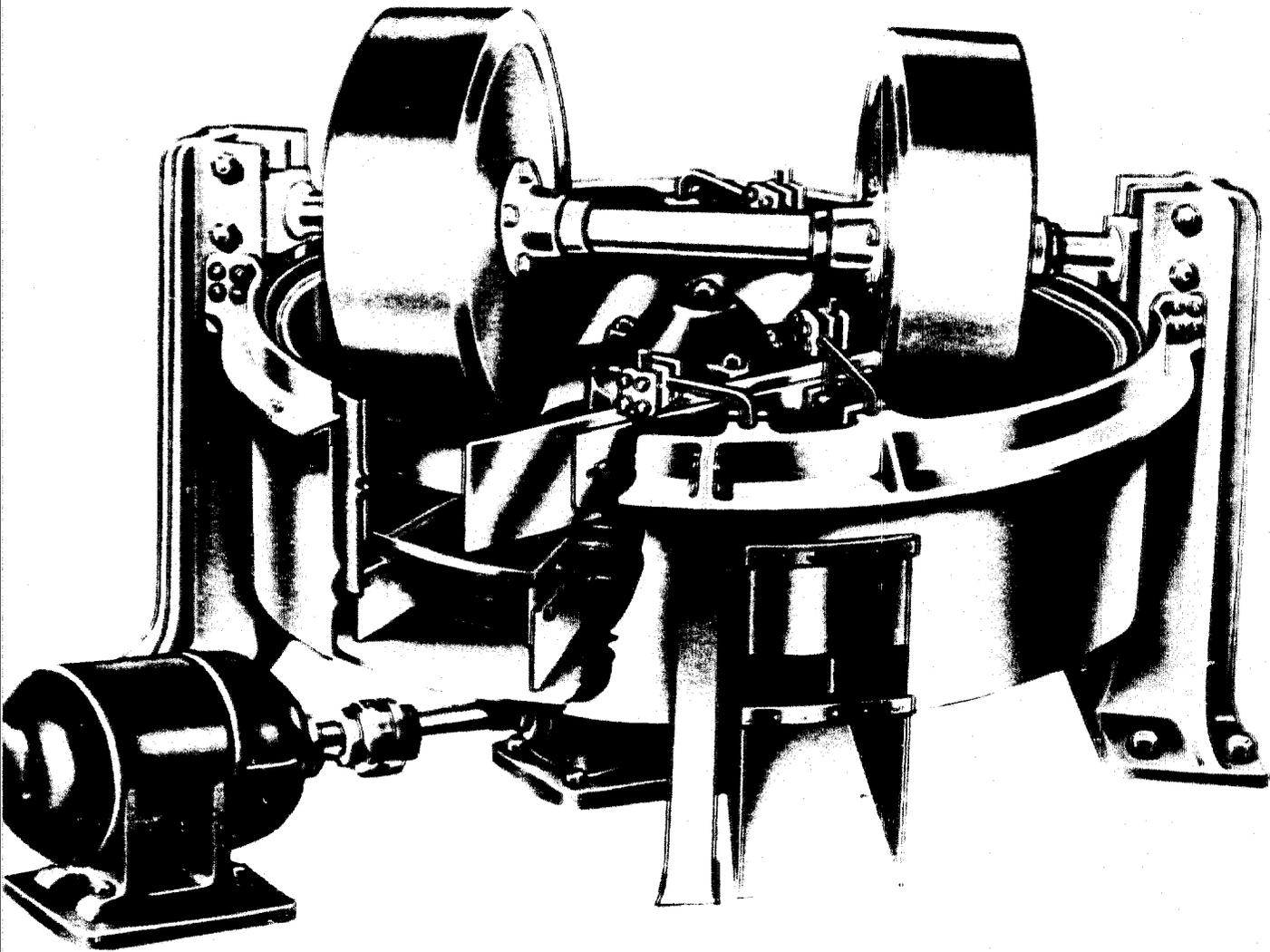
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ABBREVIATIONS

° F.	Degrees Fahrenheit
'	Feet
"	Inches
hp.	Horsepower

MIXER



Courtesy:
Clearfield Machine Company
Clearfield, Pennsylvania

PLANT LAYOUT

ARROWS INDICATE WORK FLOW

