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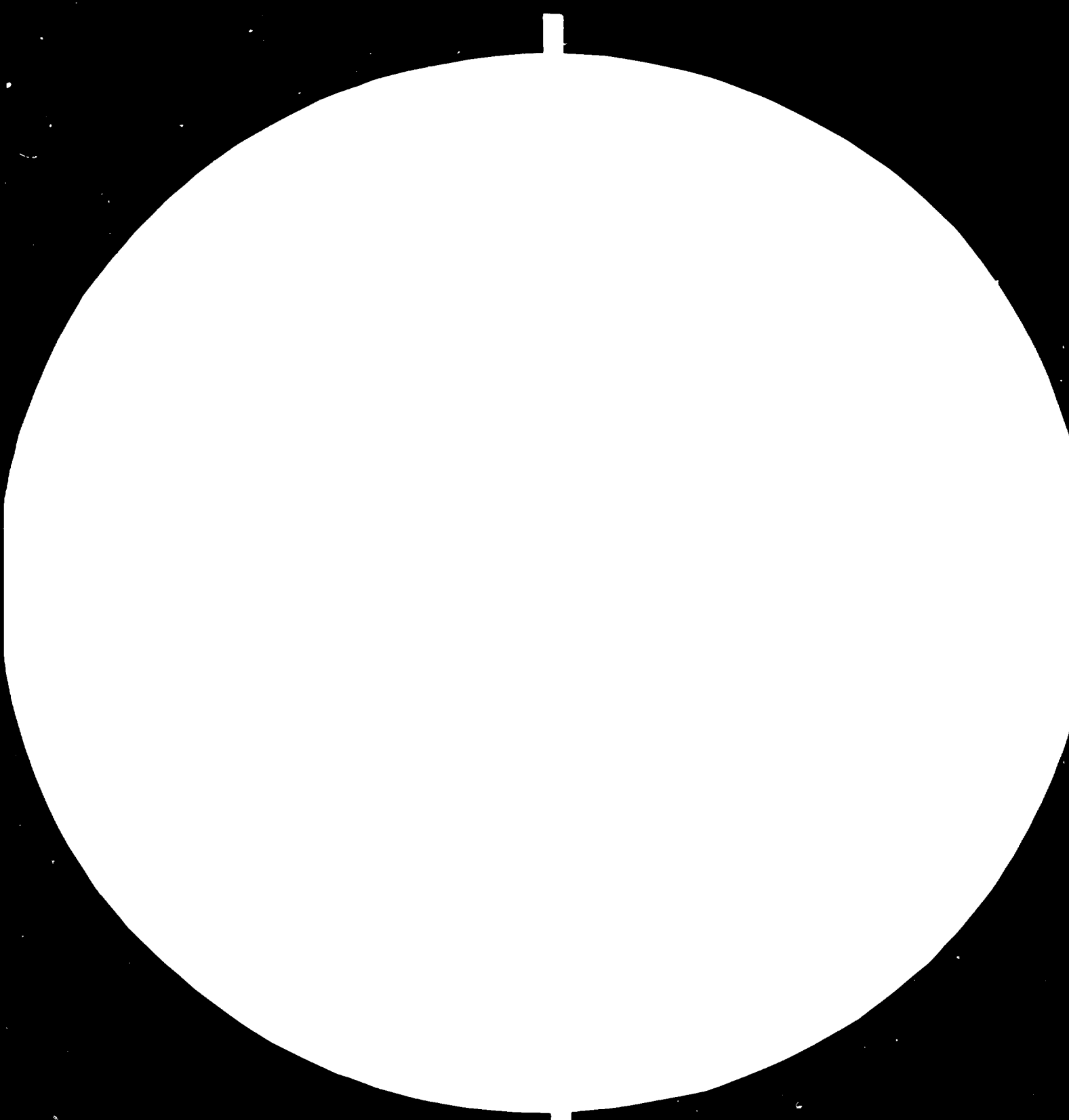
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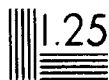
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DP/ID/SER.A/274  
28 January 1981  
English

CONSOLIDATION OF THE MEXICAN INSTITUTE  
FOR ASSISTANCE TO THE INDUSTRY

DP/MEX/78/011

MEXICO

Technical report: Packaging and preservation of fresh  
and processed foods in Mexico\*

Prepared for the Government of Mexico  
by the United Nations Industrial Development Organization,  
executing agency for the United Nations Development Programme

Based on the work of Chaim Mannheim, expert in packaging  
and preservation of fresh and processed foods

United Nations Industrial Development Organization  
Vienna

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V.81-20778

1. Objectives of this Work.

To elaborate a list of food processing and packaging Pilot Plant equipment for the laboratory of the Mexican Institute of Assistance to Industry (IMAI) in order to complement the work carried out by the expert in the field from July 1st, 1980 to September 30th, 1980.

2. The Role of a Pilot Plant.

In every field of higher education and research in the technological sciences, the availability of facilities on a semi-industrial scale is an important factor in the success of the specific program. The Pilot Plant is the mandatory link between the laboratory and industrial production. The functions of a Pilot Plant are: research, process, product and equipment development, teaching and service to industry.

2.1 Research

Food packaging, engineering and technology requires extensive use of experimental set-ups on a Pilot Plant scale. For example, engineering data needed for the design of a new plant utilizing a new process or making a new product include material and energy balances which can be obtained in a Pilot Plant and used for scale-up calculations.

2.2 Process, Product and Equipment Development

Industry must always be involved in new product and process development so as to maintain and improve its market position. Trials on an industrial line are very costly since they involve large amounts of materials and considerable manpower in addition to the damage of stopping industrial production. A pilot plant can be used to prepare samples of new products for nutritional evaluations as well as for limited market testing. New process development can also be carried out on small pilot

scale before being introduced into industry.

### 2.3 Teaching

Pilot Plant facilities are needed for teaching and demonstration in all aspects of food engineering, technology and packaging. There is no better way to acquaint technical personnel, engaged in production or research, with process equipment than actual work on the machinery. The Pilot Plant equipment can serve to teach the basic principles of heat and mass transfer as well as demonstrate operational problems with specific equipment.

### 2.4 Service to Industry

Most industry in developing countries in general, and in Mexico specifically, have no Pilot Plant facilities of their own. Therefore, often the bottle-neck to new industrial developments or conversion of new scientific developments to production know-how are the lack of suitable pilot facilities. A central Pilot Plant at IMAI can therefore fill this gap and offer its service to the entire Mexican food industry.

#### Types of Pilot Plant

There are basically two types of pilot plants:

- a) On the basis of processes of the main food industries such as dairy, meat, fish, baked goods, fruits, vegetables etc.
- b) On the basis of unit operations common to all food industries.

The first type is only warranted for facilities which are intended to serve one single specialized industry. For example, in several European countries there exist

research organizations for single industries such as dairy or meat. In such cases these specialized institutes will have highly specialized pilot plants. Also, large companies dealing with only one line of products will have such facilities.

However, it has been shown that institutes which must cater to the needs of the entire food industry must have versatile facilities, which means equipment based on unit operations common to all food industries. Naturally, such pilot plants are complemented with specific process equipment as demand arises.

This latter concept is parallel to the food science and technology teaching program adapted today in most countries. In the past there were, in Europe and U.S.A., special schools for dairy or meat science. Today all these schools have been incorporated into food science, technology and engineering departments stressing basic scientific principles. Specialization takes place either in industry itself or during studies for advanced degrees.

Since at this point there is no single dominating food processing industry in Mexico, I strongly recommend obtaining pilot plant equipment based on the UNIT OPERATIONS CONCEPT and augment this with specialized equipment as the need arises.

The following list includes unit operation equipment needed for most food industries and some specialized equipment for the meat, dairy and baking industries.

The list is based on the author's experience in establishing such a Pilot Plant in Israel which is serving the local food industry adequately. It is also based on the author's experience in several countries in Western Europe, the U.S.A. and South America.

FOOD ENGINEERING AND PILOT PLANT EQUIPMENT

1. Baking.
2. Closing, sealing & marking.
3. Drying.
4. Evaporation
5. Heating and cooling.
6. Meat.
7. Measuring and recording instruments.
8. Mixing and homogenizing.
9. Pumps.
10. Separation equipment.
11. Size reduction and mills
12. Sterilizing equipment



1. Baking Equipment

1. Baking Oven  
Pilot Plant baking oven with temp. controls. At least 2 trays  
about 20" x 36".  
Supplier: National Manufacturing Ltd.,  
P.O.Box 30226, Lincoln, Nebraska. 68503.
  
2. Bread Mixer  
Type: High Speed  
Model: Tweedy 35X Dough Mixer.  
Manufacturer:  
Gannow Lane, Burnley, Lane. England.
  
3. Measuring equipment for doughs and baked products- see chapter 7.

2. Closing, Sealing and Marking Equipment

1. Can-Opener

Type: Westco can opener

Model: M-119

Manufacturer: Dixie Canner Equip. Co.,  
P.O.Box 1348, Athens, Georgia, 30601.

2. Capper

Type: White Cap Steam flow capper.

Manufacturer: Continental Group Inc., White Cap Division,  
3000 Sand Hill Rd., Menlo Park, Calif. 94025.

3. Closing Machine - Cans

Type: Vacuum Sealer

Model: 1A

Manufacturer: Metal Box Ltd., Machinery Building Group,  
Queens House, Forbury Rd., Reading RG1 3JH. England.

4. Closing Machine - Cans

Type: Semi-automatic

Model: 23 Electric sealer with change parts for 4 diff. size cans.

Supplier: Dixie Canner Equipment Co., P.O.Box 1348,  
Athens, Georgia 30603.

5. Labeler

Type: King Label Gluer

Model: KF-6

Manufacturer: Dixie Canner Equipment Co.,  
P.O.Box 1348, Athens, Georgia.

6. Sealer - Flexible Materials

Type: Mobile Vacuum Tester

Model: Mo-Vac II

Manufacturer: Woodward Research Co., Inc.,  
45 Carlton Av., East Rutherford, New Jersey, 07073.

7. Alternative: Multivac Pouch Packager

Model: M3 II

Manufacturer: Koch Supplies Inc., 1411 West 29th St.,  
Kansas City, Mo. 64108.

8. Sealer - For Flexible materials

Type: Combination sealer

Model: 12- 12AS

Manufacturer: Packaging Industries Inc.,  
145 Pine St., Mont Claire, N.J. 07042.

3. Drying Equipment

1. Drying - Agglomeration

Type: Fluid bed spray

Model: Strea - 1

Manufacturer: Aeromatic Ltd.,  
Technical Air Installation,  
Farnsburgerstrasse 6,  
4132 Mutenz/Swiss.

2. Drying

Type: Fluidized bed

Model: STP KE 5EX

Manufacturer: Aeromatic Ltd., Technical Air Installation,  
Farnsburgerstrasse 6,  
4132 Mutenz - Basle, Switzerland.

3. Dryer

Type: Cabinet batch through flow drier with temp & air circulation controls.

Model: Pilot Plant with 4 to 10 trays of about 36" x 36" each.

Suppliers: 1) The National Drying Machinery Co.,  
Hancock St and Lehigh Ave.,  
Philadelphia, PA 19133.

2) C.G. Sargent's Sons Corp.,  
P.O.Box 409, Westford Mass. 01886.

3) Proctor & Schwartz.,  
Sub. of SCM Corp.,  
7th St., & Tabor Rd., Philadelphia, PA 19120.

4. Dryer

Type: Double Drum

Size: 6" diameter, 6" long or larger

Specification: Chromium coated steel drums  
Working pressure 5 atm  
With vapor hood.

Manufacturer: Buflovak Div.,  
Blaw Knox Food and Chem Equipment Co,  
Box 1041 Buffalo, N.Y. 14240.

5. Drying - Spray

a) Anhydro AS

8 Ostmarben,  
DK 2860 Soborg, Copenhagen, Denmark.

b) Niro Atomizer

9165 Rumser Rd., Columbia Md., 21045  
Available at Lanfá.

6. Freeze-Dryer

Type: Plate

Model: Pilot Plant

Manufacturer: Stokes Food Systems Dept.,  
Pensalt Chemical Corp.,  
5500 Tabor Road,  
Philadelphia, Pa 19120.

Alternative: FMC  
San Jose, California.

7. Dryer

Type: Rotary

Model: Bench Scale

Manufacturer: Bench Scale Equipment Co.  
A subsidiary of Chemineer, Inc.  
P.O.Box 1123  
Dayton, Ohio 45401

4. Evaporation Equipment.

1. Evaporator

Type: Centrifugal

Model: Centritherm

Manufacturer: Alfa-Laval, Lund, Sweden.  
Exists in LANFI.

2. Evaporator

Type: plate evaporator

Model: Junior evaporator 80 sq.ft.

Supplier: Crepaco Inc., 8303 W. Higgins Rd.,  
Chicago, Ill. 60631.

3. Evaporator

Type: Vacuum Pan

Model: TDX Table Model or

DVA Tilting

316 stainless steel, with agitator (anchor type)

40 psi (min) working pressure

Manufacturer: Groen Division,  
Dover Corp., 1900 Pratt Blvd.,  
Elk Groen Village, Ill. 66007.

Alternative: Vacuum pan, 10 gallons capacity  
31 gallons/hr evaporation.

Manufacturer: Dixie Canner Equip. Co., P.O.Box 1348,  
Athens, Georgia, 30601.

4. Evaporator

Type: Pfaudler wiped film evaporator

Model: 12" diameter with 4 sq.ft. evaporating area and 37.5 sq.ft.  
of condensing surface.

Made of 316 type stainless steel.

Manufacturer: Pfaudler Permutit Inc., Pfaudler Div.,  
Rochester 3, N.Y.

Alternative: Votator Turba Film Processor,  
Laboratory unit, 1 sq.ft.

Manufacturer: Votator Div., Chemetron Co., P.O.Box 35600  
Louisville, Kentucky 40232.

5. Heating and Cooling Equipment

1. Blancher-Cooler

Type: Dixie Steam Blancher-Cooler  
Model: M-6. Complete with 4 trays  
Manufacturer: Dixie Canner Equipment Co., P.O.Box 1348,  
Athens, Georgia.

2. Cheese Vats

1. Double jacketed Vats to be heated with hot water (not under pressure) made of 316 stainless steel.
    - a) Capacity 60-100 liters  
Size - 70cm length, 350cm width 30cm height with bottom exit.
    - b) Round vessel about 100 liter, diameter 45 cm, height 60cm.
- Supplier: Local.

3. Cooker-Blender (Vacuum)

Type: Stephan Universal Machine  
Model: UMM/SK 25  
Manufacturer: A. Stephan N. Sohne,  
Hameln, West Germany.

4. Exhauster

Type: Steam  
Model: M2  
Supplier: Dixie Canner Equipment Co., P.O.Box 1348,  
Athens, Georgia 30601.

5. Freezer

Type: Dole Freze-cel  
Model: 2735-6 Refrigeration unit.  
Manufacturer: Dole Refrigerating Company,  
5910 North Pulaski Rd.,  
Chicago, Ill 60646.

Alternatives:

- 1) Frigoscandia pilot model,  
Frigoscandia Contracting Inc., 117 Church Lane,  
Cockeyville, Baltimore, Maryland 21030, USA.
- 2) Americo Laboratory Model Freezer  
St. Regis 1243 W. Washington, Chicago Ill. 60607
- 3) Speed Freeze Mini-Mini Four Station Packaged Plate Freezer.  
Manufac. A.P.V. Parafreeze Ltd.,  
Stephenson Way - Thetford, Norfolk, England CP24 3RP

6. Frying:

Purpose: Breading and frying of meats, fish, potatoes, etc.  
Model: Pilot Fryer FA/3 and Mini batter breeder MB-2B  
Manufacturer: Sam Stein Associates, Inc.  
Box 1350 Sandusky,  
Ohio, 44870. U.S.A.

7. Head Exchanger

Type: Screw

Size: 8 inch diameter  
6 ft. length

Specification: Hollow single screw and jacketed trough for direct and indirect heating.

Material: 316 Stainless steel  
40 psi (min) working pressure

Manufacturers: a) Rietz Manufacturing Co., 150 Todd Rd.,  
Santa Rosa, California.

b) Oscar K&enz Inc.,  
Ashby Ave. & 6th Street,  
Berkeley California.

8. Heat Exchanger

Type: APV Paraflow plate heat exchanger Kit.

Model: Junior

Supplier: Crepaco Inc. 8303 W. Higgins Rd., Chicago, Ill, 60631.

Alternative: Laboratory Plate Heat Exchanger PL-1-HB.

Manufacturer: Alfa Laval Thermal Inc.,  
1181 U.S. Hwy 202 S, Somerville, N.J. 08876.

9. Heat Exchanger

Type: Contherm scraped surface heat exchanger for heating, cooling and freezing.

Model: Portable 6x2 Lab unit 31½"

Manufacturer: De Laval,  
Contherm Corporation Plant  
P.O.Box 352 Newburyport, Mass. 01950.

Alternative: 1) Chemetron Food Equipment Corp., Votator Division,  
Louisville Kentucky, 40232

Pilot Plant Model  
2) Crepaco Inc., 1243 W. Washington Blv.,  
Chicago Ill. 60607  
CP Model VT -422 Vertical swept surface heat exchanger.

10. Kettle

Type: Agitated Cooker Mixer

Model: 20 quart DTA/3

Specification: 45 psi working pressure  
type 316 stainless steel

Manufacturer: Groen Division, Dover Corp.,  
1900 Pratt Blvd., Elk Grove Village,  
Illinois, 60007.

Alternative: Dixie Canner Equip. Co.,  
P.O.Box Athens, Georgia, 30601.

11. Kettle

Type: All purpose double jacketed kettles.

Model: TS/6

Size: 10 quart, 20 quart & 40 quart on one stand.  
316 stainless steel.  
45 psi working pressure.

Manufacturer: Groen Division, Dover Corp.,  
1900 Pratt Blvd., Elk Grove Village, Ill. 60007.

Alternatives: Tilting Type-Table Mounting Model TDC-2, 10 quart size.

Manuf: Dixie Canner Equip Co., P.O.Box 1348, Athens, Georgia 30601.

12. Microwave Oven

Model: All purpose - pilot plant.

- Suppliers:
- 1) Photovolt Corp.,  
115 Broadway, New York  
N.Y. 10010.
  - 2) Boldt Industries Inc.,  
2777 S.W. 30th,  
Des Moines, IOWA, 50315.
  - 3) Food Processing systems Corp.,  
8106 Stayton Drive,  
Jessup. Md. 20794.

13. Roaster

Type: Probenroster Sample Roaster

Model: RE1. 220 Volt 50/60 cyc  
1400 Watt.

Manufacturer: Probat Werke 424 Emmerich, Postfach 1220,  
Germany.



6. Meat Equipment

1. Meat-Cutter

Type: Mixer-grinder

Model: KA 110 ALPINA

Manufacturer: Koch Supplies Inc.,  
1411 West 29th St.,  
Kansas City, Mo 64108.

2. Meat-deboner

Suppliers: a) Stephen PAOLI International,  
520 South Sixth Street,  
Rockford, Illinois 61108.  
b) Beehive Machinery, Inc.,  
3375 S. West Temple,  
P.O.Box 15806, Salt Lake City, UTAH. 84115.

3. Meat - Sausage Stuffer.

Model: Vogt Upright Stuffer

Size: Smallest available.

Manufacturer: Koch Supplies Inc.,  
1411 West 29th St.,  
Kansas City, Mo 64108.

4. Meat & Vegetable Chopper

Model: No 12 Type: With 3 types of plates and extra knives

Manufacturer: The Hobard Manuf. Co.,  
Troy, Ohio 45374. U.S.A.

Alternative: Koch Supplies Inc.,  
1411 West 29th St.,  
Kansas City, Mo. 64108.

5. Smoke House:

Purpose: For smoking meat, fish, etc.

Type: "Grand Prize" p.88 with electric heating.

Accessories: Koch Smoke Producer  
Window & Interior Light  
Smoke trays,  
Temp. Control kit. for Electric heating.

6. Meat Equipment

See also mixers and infussion pump .

7. Measuring and Recording Instruments

1. Balance 20 Kg. Capacity  
Model: Ohaus No 1119 D  
Manufacturer: Ohaus Scale Corp.,  
29 Hanover Rd.,  
Florham Park, N.J. 07932.
2. Colorimeter  
Type: Hunterlab Colorimeter  
Model: D25A - 2  
Manufacturer: Hunterlab, 9529 Lee Highway,  
Fairfax, Virginia 22030. U.S.A.
3. Dough Mixer  
Type: Laboratory  
Model: National 100-200 gram complete mixer.  
Manufacturer: National MFG. Co.,  
P.O.Box 30226, Lincoln, Nebraska 68503.
4. Farinograph  
Type: Babender Farinograph  
Purpose: To evaluate flour quality  
Manufacturer: C.W. Babender Inst. Inc.,  
50 East Wesley St.,  
South Hackensack N.J.
5. Flow meters  
A set of various sizes of flowmeters suitable for gas and liquid flow  
at various flow rates.  
Manufacturer: Fischer & Porter Co.,  
Warminster, Penn. 18974.
6. Mixograph  
Type: Recording Dough Mixer  
Manufacturer: National MFG. Co.,  
P.O.Box 30226, Lincoln, Nebraska 68503.
7. Moisture Balance:  
Type: Infra Red- Direct Reading Moisture Balance.  
Model: Cenco  
Supplier: Arthur Thomas Co.,  
P.O.Box 779  
Philadelphia PA 19105.
8. Recorders  
Type: Multipoint 12 points for temp. measurements with Cu-Co thermocouples.  
Temp. ranges: - 50 - +50<sup>o</sup>c.  
                  0 - 100<sup>o</sup>c  
                  0 - 200<sup>o</sup>c  
Suppliers: Honeywell  
2) Type: Strip chart recorder, single or double pen. Multirange,  
multispeed.  
Suppliers: Honeywell, Hewlett-Packard.

9. Scale  
Type: Grocery store type with dial with 10g division, capacity to 20 Kg.  
Supplier: Local.
10. Scale  
Type: Platform scale, capacity to 100 kg.  
Supplier: Local.
11. Shear Press - Texture Evaluation  
Type: Kramer Shear Press  
Manufacturer: Food Technology Corp.,  
12300 Parklawn Drive,  
Rockville Rd., 20852.

8. Mixing & Homogenizing

1. Blender

Type: Waring Commercial Blender complete with housing and SS container  
Model: Cat. No. CB-6 (ONE GALLON)  
Manufacturer: Waring Service Center,  
New Hartford, CT 06057, U.S.A.

2. Homogenizer - Vacuum (Deaerator)

Type: Vacuum homogenizer  
Model: 159 AV  
Manufacturer: Maschinenfabric August  
Herbert - Hamburger St., 268  
Braunschweig, West Germany.

3. Homogenizer

Type: Laboratory homogenizer with spare gaskets and plunger packing.  
Model: 15M-8TA  
Manufacturer: Gaulin Co. 44 Garden St.,  
Everett, Mass. 02149, U.S.A.  
  
Gaulin Co., Insurgents Sur 1188-802  
Mexico 12 D.F. Tel. 5759878.

4. Mixers

- a) Type: Lightnin mixer, laboratory mixer, propeller type.  
Model: F 1/30 HP, 1600 RPM max. with shaft and propeller.
- b) Type: Gear Drive mixer  
Model: DV-1A, variable speed, 50-383 RPM with shaft propeller  
Manufacturer: Mixing Equipment Co. Inc.,  
135 Mt. Read Blvd.,  
Rochester, N.Y. 14603.

5. Mixers

Type: Ribbon, vacuum with heating and cooling mantle for meat etc.  
Model: Laboratory  
Manuf: Wenger Manuf. Sabetha, Kansas 66534, U.S.A.  
Alternatives: b) Manuf. Keebler, Chicago, Ill . 60636  
c) Lee Industries Inc., 514 West Pine St.,  
Philipsburg, Pa, 16866.  
d) Koch Supplies Inc.,  
1411 West 29th St., Kansas City, Mo 64108.

6. Mixer:

Type: All purpose  
Model: A-200  
Size: 12 and 20 quart  
Manufacturer: The Hobart Manuf. Co., Troy, Ohio, 45374.  
Accessories: 12 & 20 quart stainless bowls  
Beaters: B flat beater  
D Wire whip  
E Dough arm  
for both 12 & 20 quart  
9" Vegetable cutter with adjustable slicer plate  
Holder plus grater plate  
" " 3/32 Shredder plate  
" " 5/16 " "  
" " French fry plate  
Meat & Food chopper.

9. Pumps

1. Pumps

- a) Type: Waukesha metered flow control pump complete with variable motor drive  
Model: MFC - 100 Mark III Unit  
Manufacturer: Waukesha Foundry Co. Inc.,  
1300 Lincoln Av., Waukesha, Wis. 53186. U.S.A.
- b) Type: Moyno progressing cavity sanitary pump.  
Model: B 15 or SSO Frame 1L2  
Manufacturer: Hoyno Pump Div., Robbins & Myers,  
Springfield, Ohio, 45501.
- c) Type: APV Puma ss. centrifugal pump  
Model: Shrouded, 1 1/2 hp.  
Manufacturer: Crepaco Inc. , 8303 W. Higgins Rd.,  
Chicago, Ill. 60631. U.S.A.

2. Pump

Type: Peristaltic Pump  
Model: T86, complete with variator and motor.  
Manufacturer: Sigmamotor, Inc.,  
3 North Main St., Middleport, N.Y. 14105.

3. Pump

Type: Ham Infusion Pump  
Model: Cat No 2318  
Supplier: Koch Supplies Inc.,  
1411 West 29th St., Kansas City, Mo 64108.

4. Pump -- Vacuum

Type: Water sealed vacuum pump  
Model: Bronze housing, Model MD  
Manufacturer: NASH Engineering Co., Wilson Ave.,  
South Norwalk, Conn., 06856  
Alternative: Sihi Pumps Ltd.,  
P.O.Box 432,  
Guelph, Ontario, Canada.

10. Separation Equipment - Filters' Centrifuges, Screens

1. Centrifuge - basket type  
Type: Scraper-type centrifuge  
Model: HS-400  
Manufacturer: Escher Wyss,  
798 Ravensburg/Wurtt, Postfach 105, Germany.  
Alternative: De Laval Separators,  
350 Dutchess Turnpike, Pough Keepsie, N.Y. 12602.
  
2. Centrifuge - bowl type  
Type: Westfalia Labor Separator with chamber bowl, disc bowl &  
concentrating bowl.  
Model: LWA 205  
Manuf: Westfalia Separator, AG/Oelde (Westf).  
Alternative: De Laval, 250 Dutchess Turnpike, Poughkeepsie, N.Y. 12602
  
3. Filter  
Type: Plate & Frame filter press  
Model: Pilot ZW. Size of plates 20 x 20 cm.  
Manufacturer: Seitz Werke,  
Kreuznacher Maschinenfabrik,  
D 6550 Bad Kreuznach, Postfach 1049. W. Germany.  
Accessories: Different filter plates  
100 each KK layers  
KOK7 layers
  
4. Juice Extractor  
Type: Screw  
Model: "F" with 4 different screens.  
Manufacturer: Chisholm Ryder Co. Inc.,  
Niagara Falls, New York.
  
5. Peeler  
Type: Carborundum  
Model: Bench Potato Peeler E 6007  
Manufacturer: The Hobart Manuf. Co.,  
Troy, Ohio 45374.
  
6. Peeler  
Type: Hot water or lye peeler-scalder  
Model: M-4  
Manufacturer: Dixie canner Eq. Co., P.O.Box 1348,  
Athens, Georgia, 30601.
  
7. Press  
Type: Hydraulic  
Model: HAFICO No 76  
Manufacturer: H. Fischer & Co., P.O.Box 1106,  
4040 Neuss 21 Norf, West Germany.

8. Pulper

Type: Paddle

Model: Langseuhamp Indiana Junior Pulper # 175 with 4 different screens with variable speed drive

Manufacturer: A.K. Robins & Co.,  
713-729 East Lombard St.,  
Baltimore, Maryland, 21202.

9. Screens

Type: Vibro Screen

Model: LS 18 (18" screen diameter) with set of 4 screens all stainless steel

Manufacturer: Sweco Separators,  
Dept 303-583, P.O.Box 4151,  
Los Angeles Calif. 90051.

Alternatives: Sharples "Superseal" Vibroscreen  
Sharples Pennsalt Chem. Equipment.  
Tower Works, Doman Rd., Camberley, Surrey England.

10. Sieves

Type: Sieve & Shaker

Model: Benco Model 4R

Manufacturer: Bench Scale Equipment Co,  
P.O.Box 1123, Dayton Ohio 45401.

Alternative: C.E. Tyler Industrial Prod.  
W.S. Tyler Inc.,  
8200 Tyler Blvd., Mentor, Ohio, 44060.

11. Ultra Filtration

Type: Tubular

Model: UF 44/180S Sanitary Ultrafiltration Pilot Unit.

Manufacturer: ABCOR,  
850 Main Street,  
Wilmington, Ma 01887.

12. Washer

Type: Rod Washer

Model: Model "C" Midget M-10 or "D" Junior (M-10-2)

Manufacturer: Dixie Canner Ee. Co.,  
P.O.Box 1348, Athens, Georgia, 30601.

Alternatives: 1) Type: Midget,  
Chisholm Ryder Co., Drawer F., Bridestation,  
Niagra Falls, N.Y. 14305.  
2) Junior type.  
A.K. Robins, 713-729 East Lombard St.,  
Baltimore, Maryland 21202.

11. Size Reduction and Mills.

1. Cutter - Cuber.

Type: Dicer, slicer cuber

Model: Junior RG 2A

Manufacturer: Halde Vegetable Mill,  
Halde Maskiner, Gastrikegatan 1,  
Box 6035, S- 10231 Stockholm 6, Sweden.

Alternative: 1) O'Brien Dicer Inc.,  
Model: Dice-O-Matic  
4401 S. Figueroa Street, Los Angeles CA.  
2) URSCHEL Laboratories Inc.,  
Valparaiso Indiana 46383.

2. Mill

Type: Colloid Stone, grinding stainless

Model: ML 150/M2 70-110 MK 95  
Combination stone and stainless mill

Manufacturer: Fryma,  
4310 Rheinfelden, Switzerland.

3. Mill

Type: Colloid

Model: 4A

Manufacturer: Gaulin Manuf. Co.,  
44 Garden Street, Everett, Mass. 02149.  
in Mexico: Gaulin Corp.  
Insurgentes Sur 1188-802, Mexico 12 D.F.  
Tel. 575 98 78

4. Mill

Type: Coffee Mill

Model: E 2120

Manufacturer: The Hobart Manuf. Co.,  
Troy, Ohio, 45374.

5. Mill:

Type: Ball,

Model: Laboratory Mill DYNO KDL

Manufacturer: Willy A. Bachofen A,  
Maschinenfabrik,  
Utengasse 15/17, CH 4005, Basel/Switzerland.

6. Mill:

Type: Universal Lab Mill

Model: 100 LU

Accessories: Ultraplex Fan Beater with 30° ribbed grinding track  
Perplex Beater plus screen mounting ring  
Sets of 5 screen for both ultraplex & perplex  
Discharge hopper 304 stainless with bottle & filter bag

Manufacturer: Alpine American Corp.,  
P.O.Box 389,  
5 Michigan Drive,  
Natick, Mass 01760. \$5000



7. Mill:  
Type: Disintegrator - Comminuting  
Model: DA S06  
Fitzpatrick Comminuting Machine with 4 different screens  
Manufacturer: Fitzpatrick Export Co.,  
832 Industrial Drive,  
Elmhurst Illinois 60126.  
Price about \$7000

12. Sterilizing Equipment

1. Laminar Flow Cabinet

Type: Bench for aseptic filling

Model: HLF/4/B

Manufacturer: Envair (UK) Ltd.,  
22 Newman St.,  
London, W 1P 3HD. England.

2. Retort

Type: Pouch/Tray sterilizer

Model: Pilot Plant Model

Manufacturer: F.M.C Co. P.O.Box 580, Santa Clara,  
Calif. 95022.

3. Retort

Type: Vertical or horizontal retort capacity for about 100 A/2 cans  
equipped with temperature and pressure controls and with  
stuffing box for thermo\_couples.

Manufacturer: Available at LANFI.



**C-645**

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