INSTA-PRO® International ST, Ltd.

PURPOSES OF EXTRUSION

Insta-Pro International, a Division of Triple "F", Inc., has developed a process for creating heat with friction. This equipment was developed in the early '60's and was placed on the market in the U.S. in 1969. It now enjoys location in 37 countries in the world with several hundred extruders of two types in operation.

The use of "Dry Extrusion" is utilized in several basic ways, those being as follows: Cooking, Sterilization, Expansion, Dehydration, and Stabilization.

Cooking: The use of the Insta-Pro Dry Extrusion method in cooking is primarily related to inhibitor destruction. With an extremely short processing time and oxygen-free atmosphere, there is very little effect on the protein, energy, or vitamin content of the product. In addition, there is less browning reaction because of the oxygen free atmosphere.

Sterilization: The heat and pressure produced in the Insta-Pro Extruder can be utilized for bacterial destruction, mold, and yeast destruction. These are natural ingredients that occur on almost all living plant material and can be very harmful with respect to storage.

Expansion: The continuous pressure, cooking, and sudden release of pressure allows for the gelatinization of starch cells, oil cell rupture, and shaping and texturizing the product.

Dehydration: Within certain parameters, a 50% loss in moisture can be achieved through the extrusion process. This allows for dehydrating many products which have too high a moisture level for storage.

Stabilization: The use of heat and pressure can also be used to inactivate enzymes such as would occur in rice bran or various other ingredients causing rapid destruction of the nutritional properties.

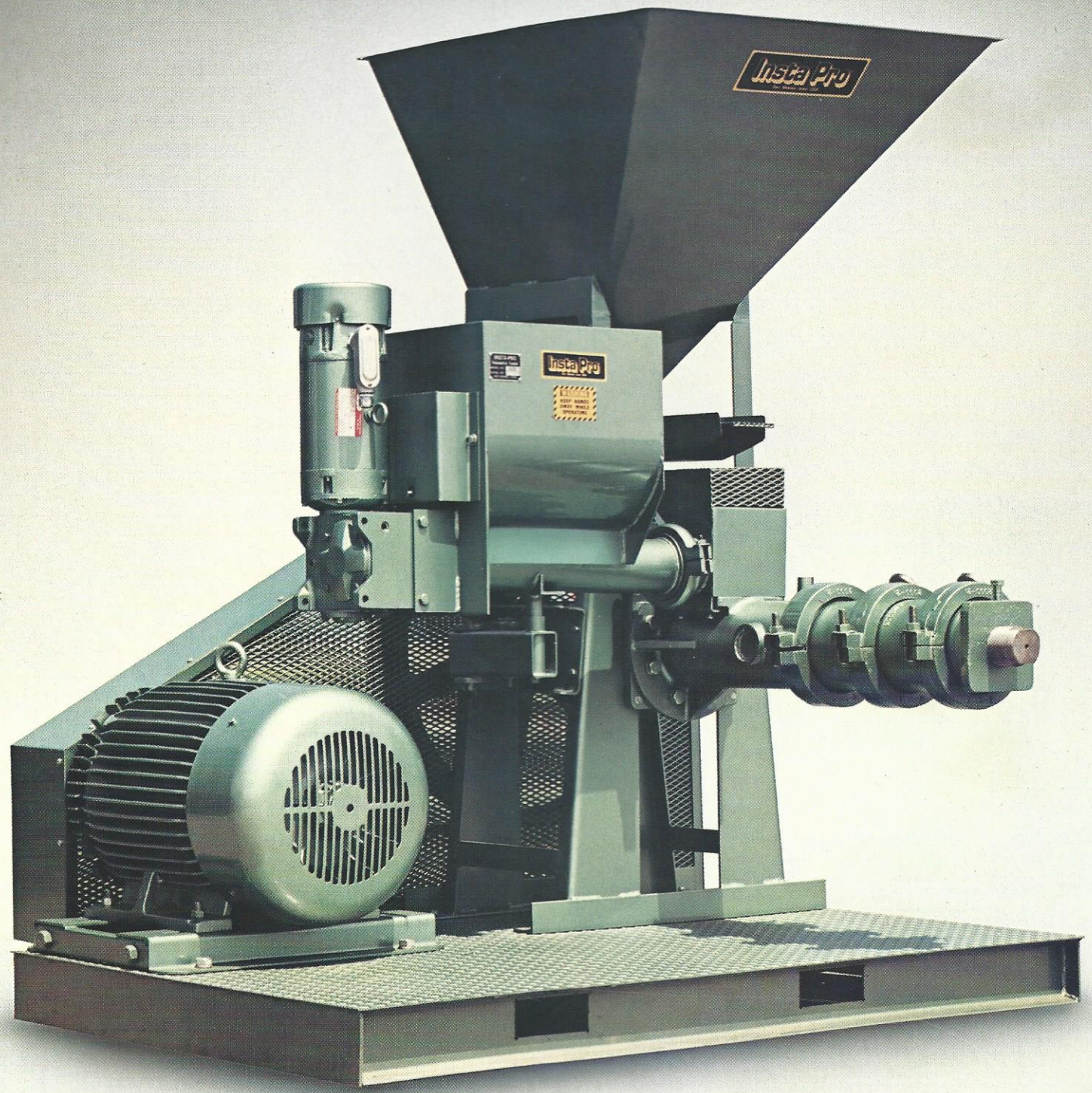
The "Dry Extrusion Process" has been developed for a low capital investment, low energy input, and a controlled automatic process. It is engineered to fit all sizes and types of installations, with a minimum amount of training required for the operator. It is easily maintained, and the wear is controlled.

The "Dry Extrusion Process" is now being used to process oil seeds, grains, high moisture fresh ingredients, protein from animal, fish, or milk origin, and various combinations of these things. With more emphasis on efficiency, cost of production, and becoming self-reliant in foods, the Insta-Pro Extruder is playing a larger role in local processing of feed and food.

10301 Dennis Drive • Des Moines, Iowa 50322 • Ph. (515) 276-4524 Telex: 478375 Fax: (515) 276-5749

Insta-Pro®

Extruder Products



Dry Extrusion Nutrition

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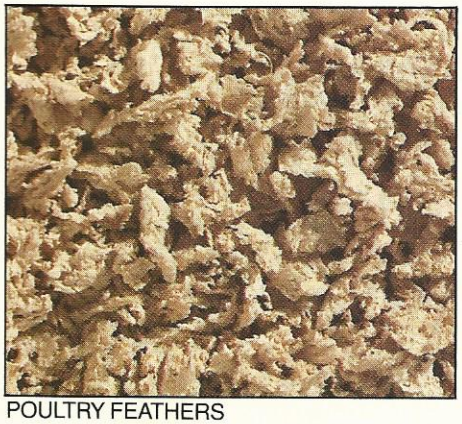
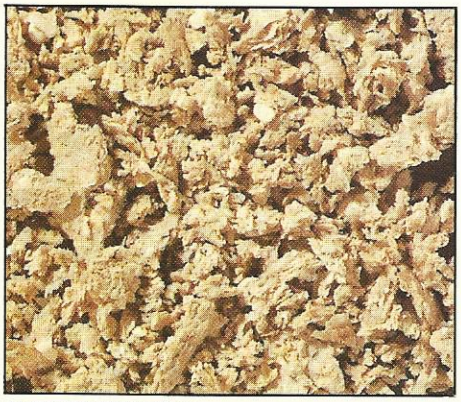
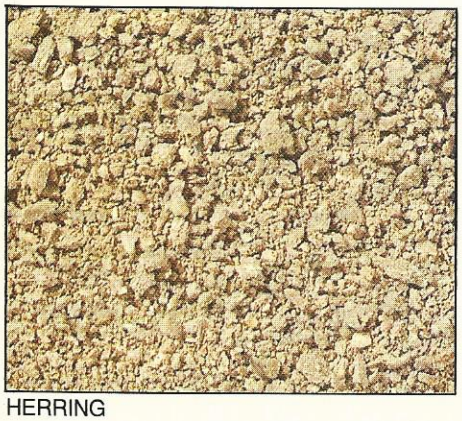
Make these products a



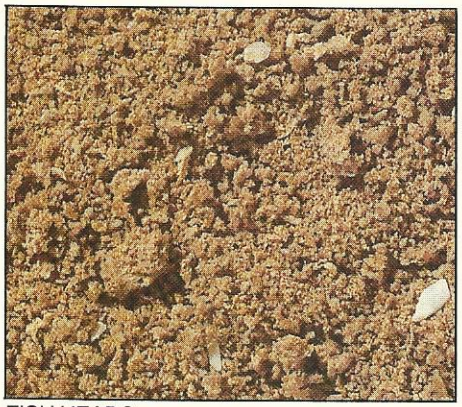
POULTRY FEATHERS



TURKEY RESIDUE



HERRING



FISH HEADS

You can use ...

the Insta-Pro Dry Extrusion process to **Cook...Extrude...Expand... Sterilize...Dehydrate...** even **Shape** and **Texture** nutritional products, quickly and economically.

The patented Insta-Pro process...

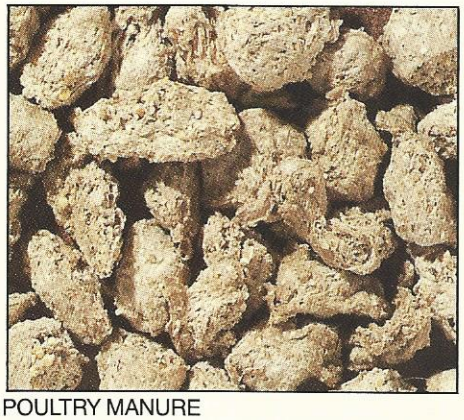
Deactivates anti-metabolites in oilseeds and ruptures the oil cells.

Modifies starches in grains and cassava for easy digestion.

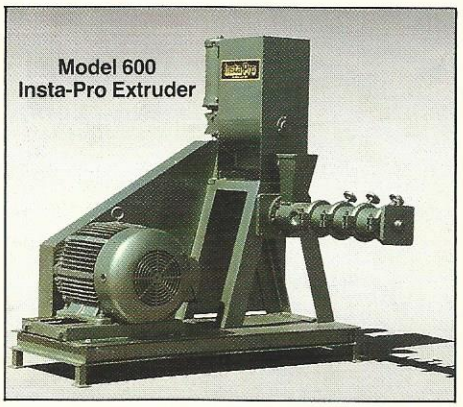
Stabilizes vegetable oils as well as animal and poultry fats.

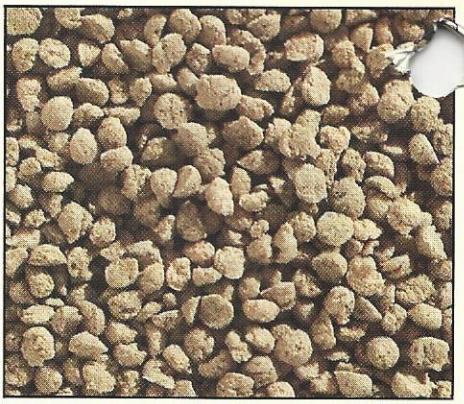
Recycles waste — you can make useful, nutritious feed ingredients from such wet wastes as Fish and Shrimp Offal • Chicken Bones, Feathers, Blood, Heads, Feet & Egg Shells • Animal Waste • Cheese Waste • Meat Scraps • Fruits or Fruit By-Products.

Shown in actual size are some of the many products you can make with Insta-Pro Dry Extrusion.

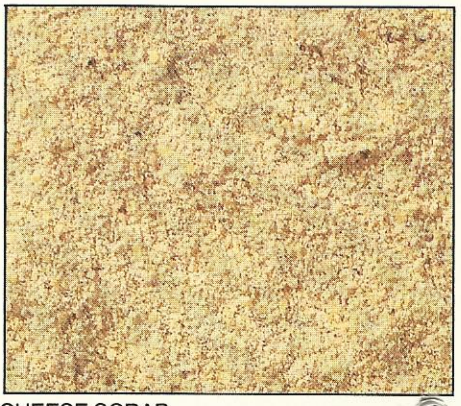


POULTRY MANURE

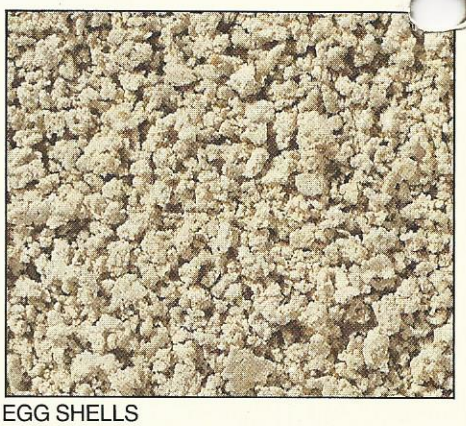




RICE BRAN



CHEESE SCRAP

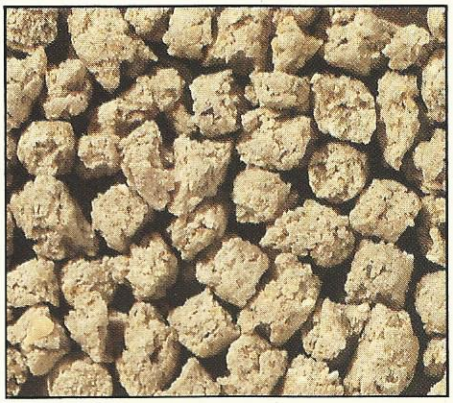


EGG SHELLS

FISH OFFAL

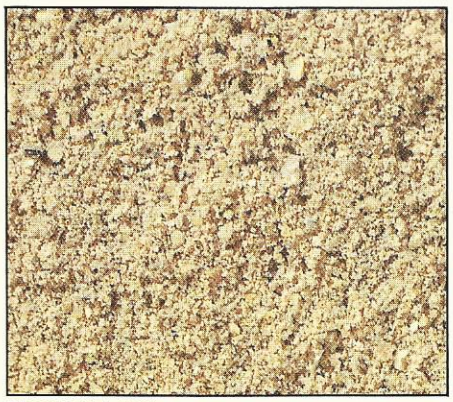
nd more with economical

EXTRUDED SOYBEANS



CORN/SOY

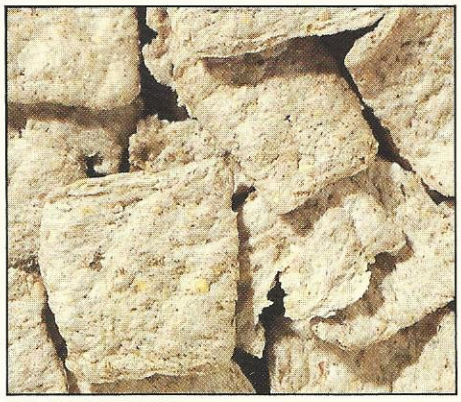
EXTRUDED CORN



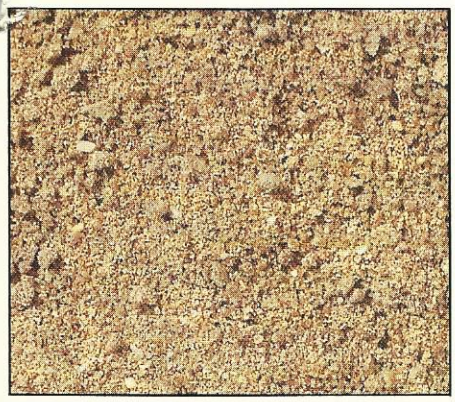
BEEF TALLOW

Make Your Own...

Whole Soy Protein
Other Oilseed Supplements
Pig Starters
Calf Starters
Dairy Feeds
Dog Food • Cat Food
Rabbit Food
Horse Feed
Cattle, Sheep & Goat Supplements
Rumen Bypass Protein
Encapsulated NPN for Ruminants
Specialty Products
Fur Animal Feeds
Fish & Shrimp Diets

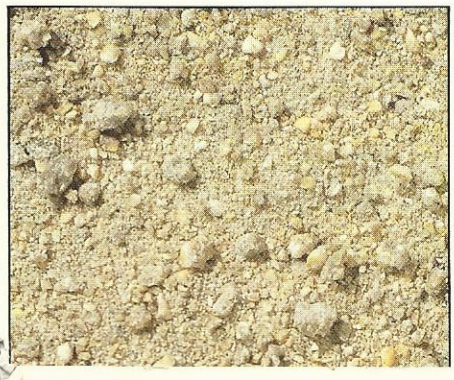


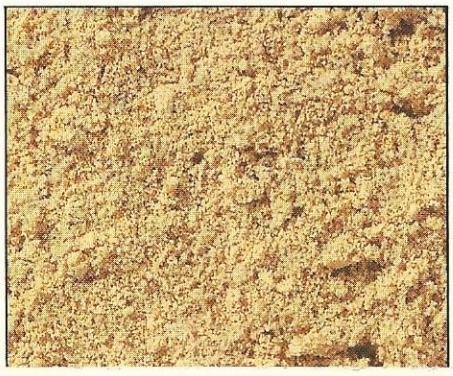
ELEVATOR DUST

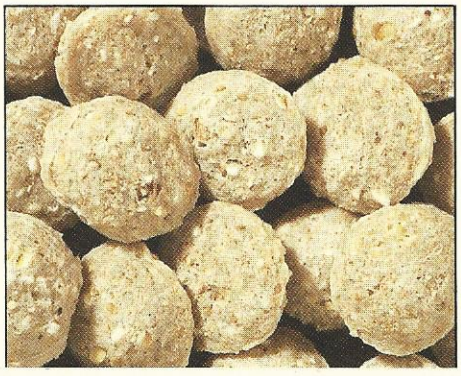


BYPASS PROTEIN

POULTRY BONE RESIDUE







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No. 1 in Extruder Technology

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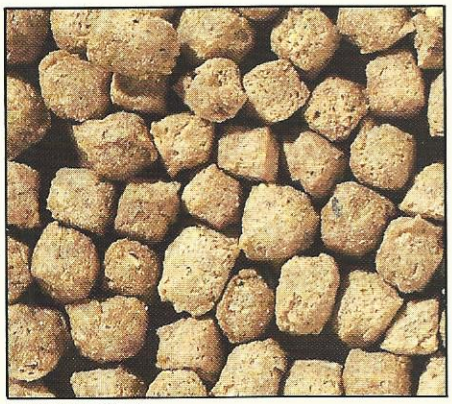
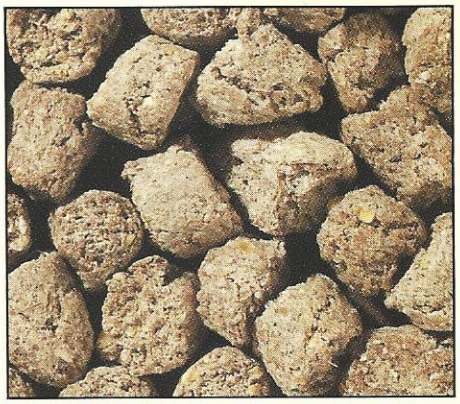
Insta-Pro® Dry Extrusion

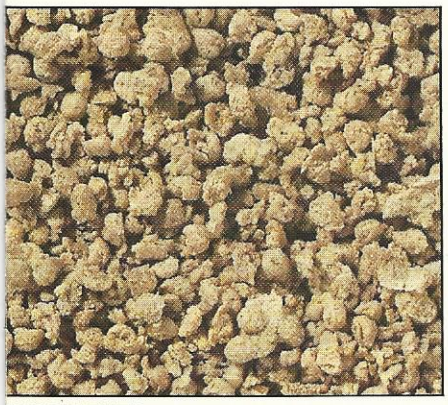
DOG FOOD



PUPPY FOOD

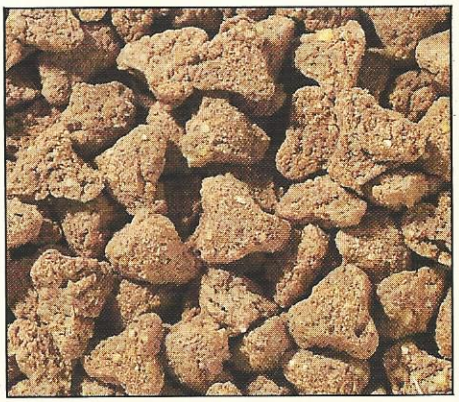


DOG FOOD

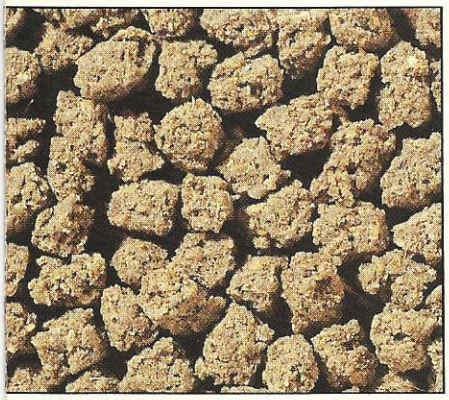


PIG STARTER

SHRIMP FOOD



CAT FOOD

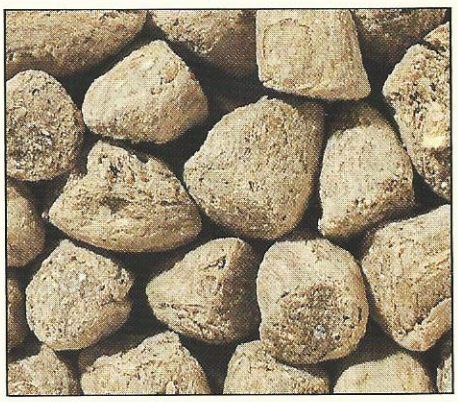


CATFISH FOOD

Technology You Can Use

Dry extrusion processes and nutritional applications from Insta-Pro help you get the most from your extruder and your own available feedstuffs and/or waste products.

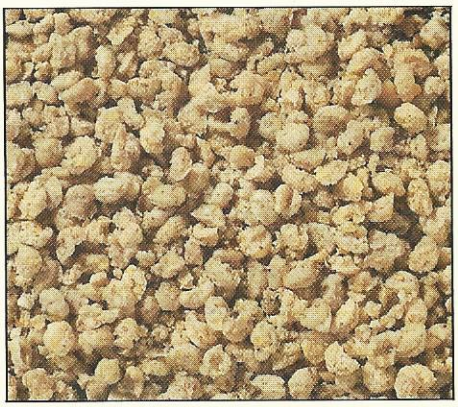
Since 1969, Insta-Pro technology has been bringing significant new efficiencies to animal nutrition. It will continue to do so in the future.



DOG TREATS

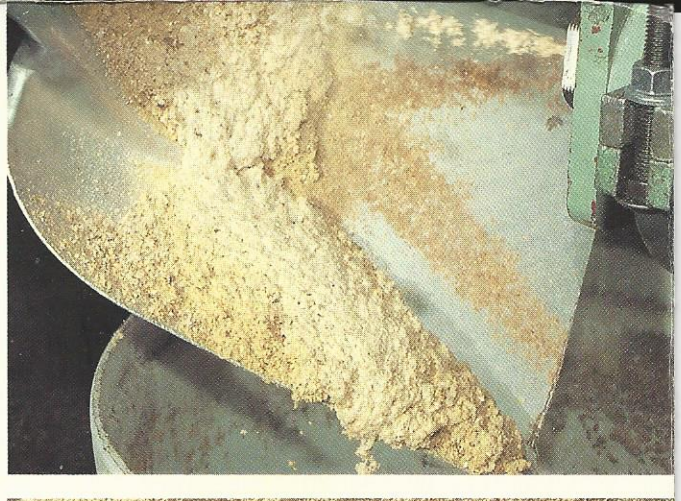
FLAKED CORN

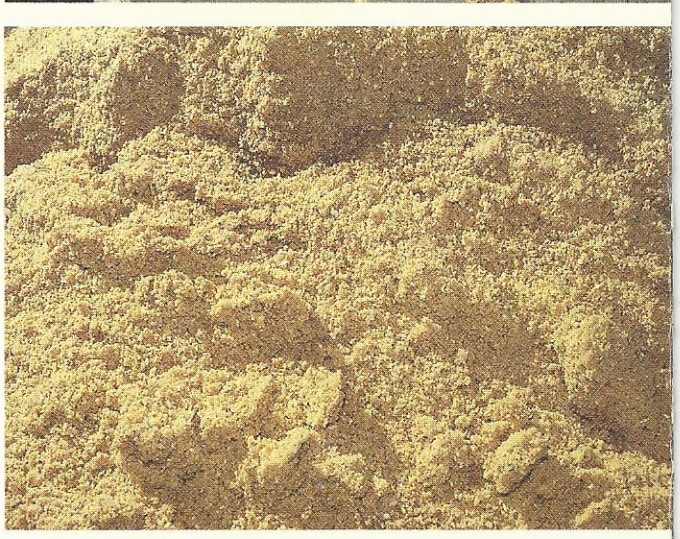
PUFFED CORN



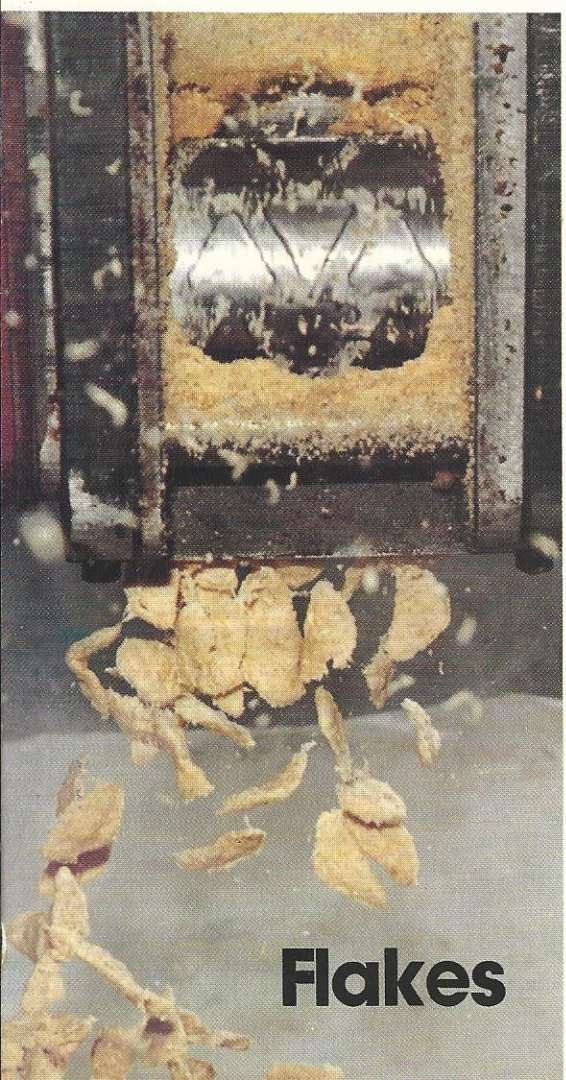
CORN CRISPIES

Making Full Energy Soy

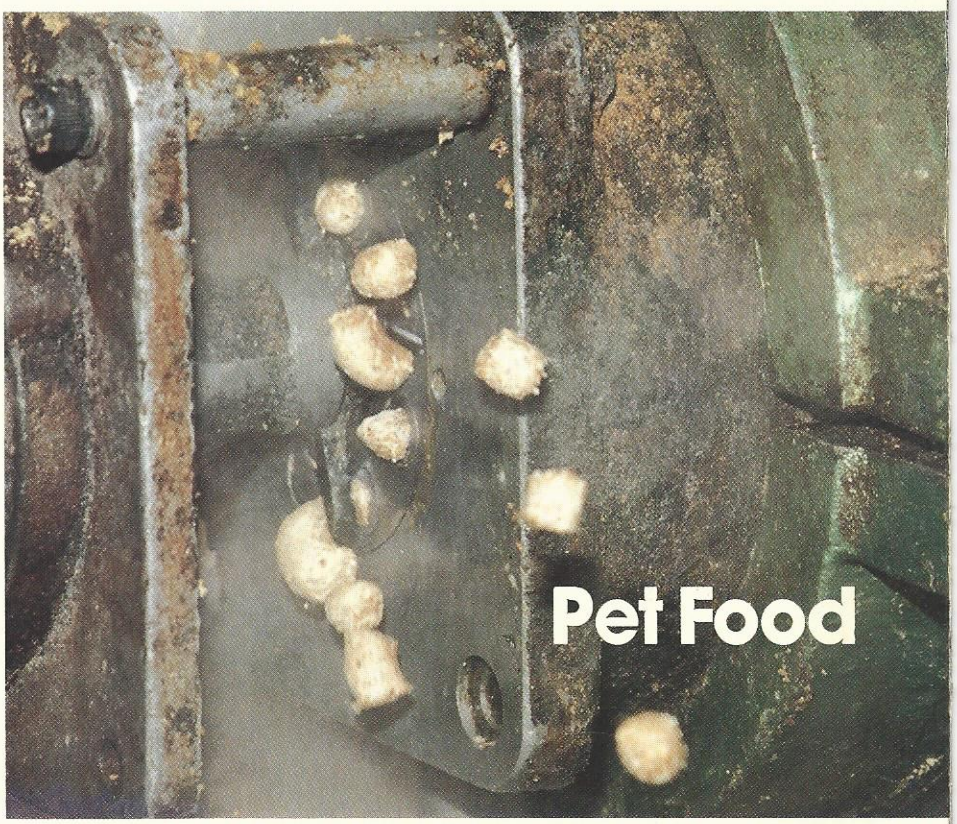




EXTRUDED SOYBEANS shoot from extruder barrel *(above)* at a temperature of 300°. Less than 30 seconds before, these were raw beans at room temperature. Dry extrusion cooks and expands beans rapidly to deactivate their anti-metabolites and rupture their oil cells without damaging the protein. Liberated oil gives the product a liquid quality as it flows across a shovel after leaving the extruder *(top right)*. In a few more seconds, the extruded meal absorbs the oil *(below right)*. Now, however, the oil remains in its new highly available, stable and digestible form.

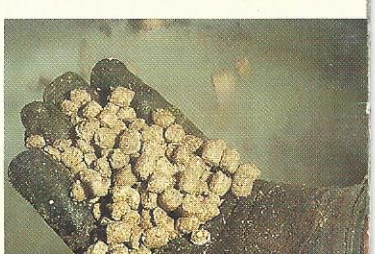


Flakes



Pet Food

CORN-SOY FLAKES are formed on a flaking roll attachment turning in front of extruder nose *(left)*. **DOG FOOD CHUNKS** are shaped in die attached to extruder, then cut off with revolving blades *(above)*. Operator catches a handful in thermal glove at right. Safety shields and deflecting equipment were removed to take these high-speed photos.



Insta-Pro at Work

886

THE AUTOMATED PRODUCTION FACILITY *above* uses up to 6 Insta-Pro extruders to produce special supplements or modified proteins from such ingredients as fish, poultry offal and feathers, animal fats, cheese or other wet wastes. At *right* below is another multiple extruder setup with control panel. At *left* below are the Insta-Pro home offices and research plant at Des Moines, Iowa USA.

Insta-Pro International ST, Ltd.

No. 1 in Extruder Technology

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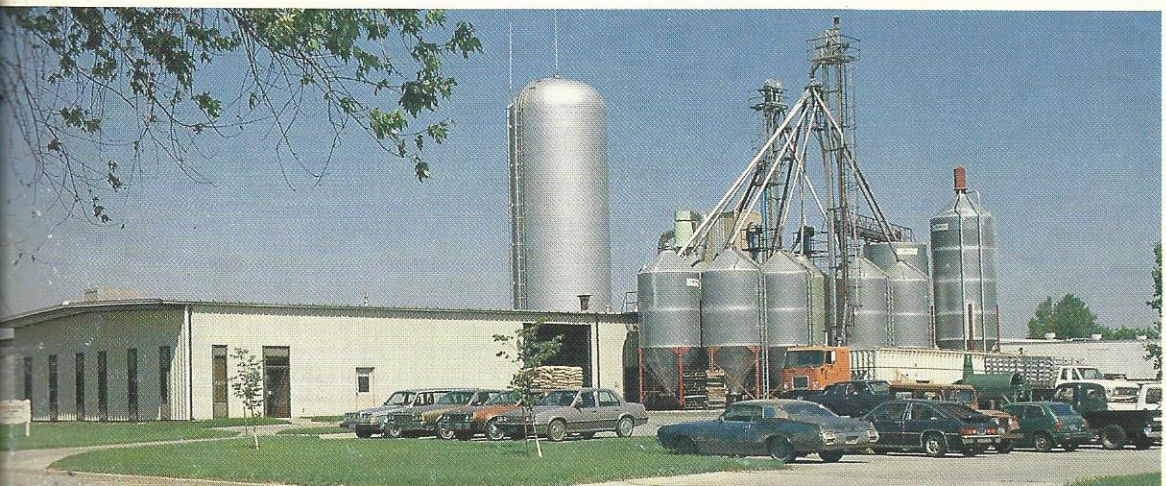
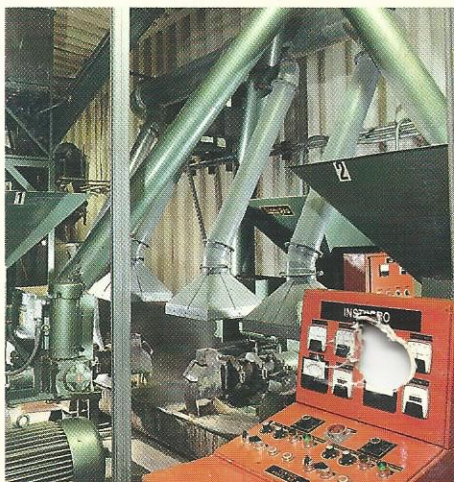
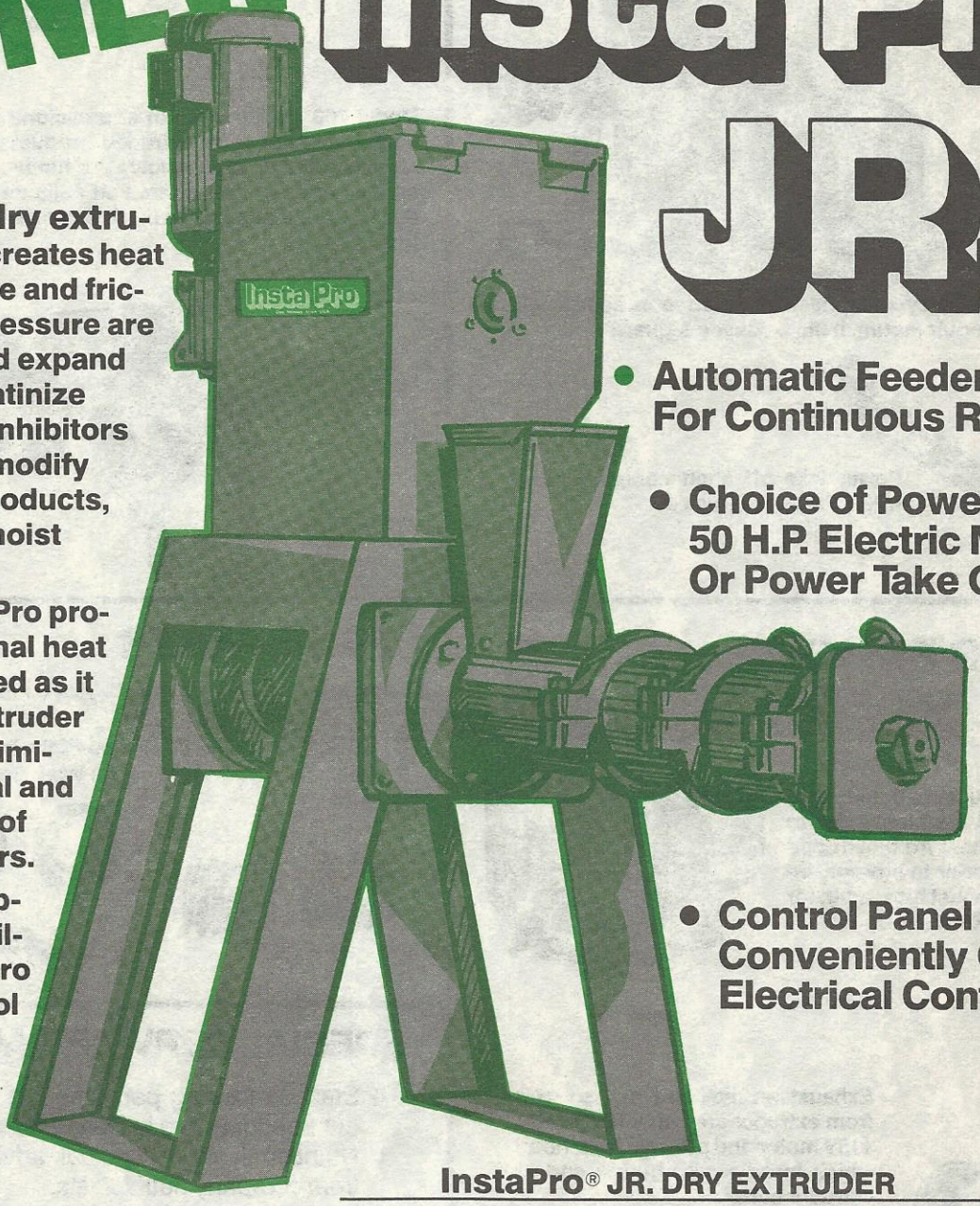




The Dry Extrusion Process – Now available in a complete, compact and functional unit...

The NEW Insta Pro® JR.



The InstaPro dry extrusion process creates heat through pressure and friction. Heat and pressure are used to cook and expand ingredients, gelatinize starch, destroy inhibitors where present, modify or sterilize by-products, and dehydrate moist waste products.

With the InstaPro process, no additional heat source is required as it relates to the extruder function, thus eliminating the capital and operating costs of boilers and dryers.

Auxiliary equipment is also available from InstaPro to shape and cool extruded products, and to facilitate material handling.

- **Automatic Feeder/Blender For Continuous Run**
- **Choice of Power Train... 50 H.P. Electric Motor Or Power Take Off**
- **Control Panel With Conveniently Grouped Electrical Controls**

InstaPro® JR. DRY EXTRUDER

Horse Power	
Electric	50 HP
Tractor	100 HP
Motor RPM	1,725
Extruder RPM	550
Capacity	600-800 LSS/Hr
Dimensions	Height: 57¼" Width 54½" Length: 61½"
Weight	
w/ Motor	1,400 lbs.
w/o Motor	772 lbs.
Electrical Requirements	240/460 V 3 Phase 120/60 Amps
Amps	240V 120 Amps 460 V 60 Amps

INSTAPRO Division of Triple "F", Inc.
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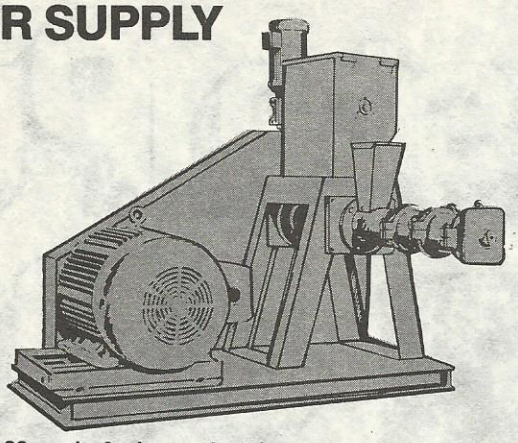
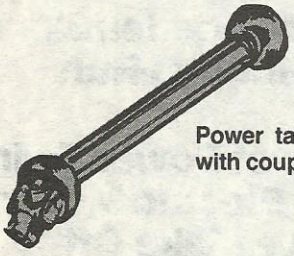
InstaPro® JR. Assesory Equipment

POWER SUPPLY

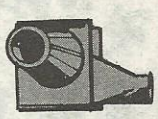


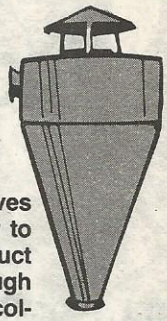
50 H.P. 60 cycle 3 phase electric motor complete with motor mount, belts, sheeves & guard



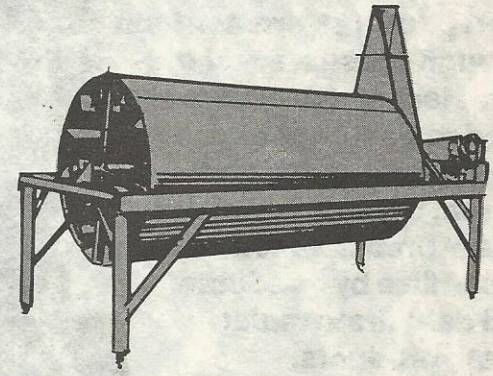
Power take off shaft complete with couplings & guard

COOLER



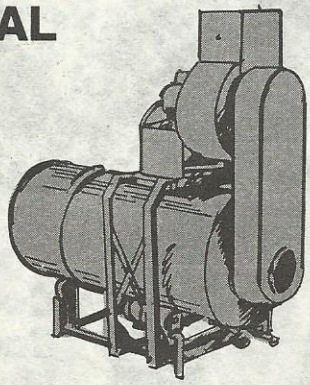


Model 700 cooler with fan and cyclone removes heat and vapor from extruded products prior to storage. Cooler drum revolves to tumble product and move it through drum. Fan pulls air through drum and exhausts it through cyclone fines collector.

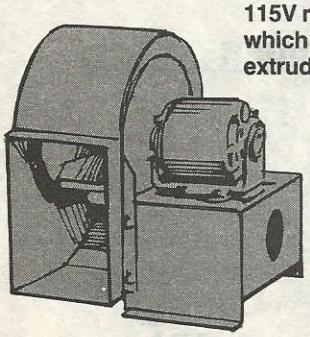


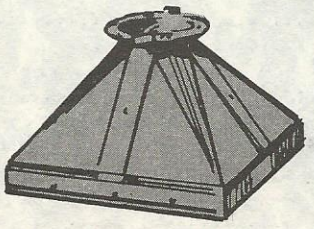
VAPOR REMOVAL

Model 300 exhausted conditioner: A tumbler-cooler to dissipate heat from extruded products prior to storage. Includes exhaust blower fan for vapor removal.



Exhaust fan and hood moves vapor from extruder area. Fan has ½ H.P. 115V motor and pulls air from hood which installs over output end of extruder barrel.

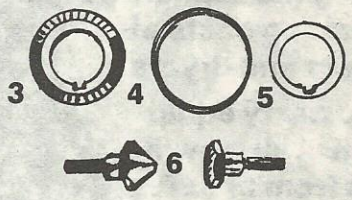




SPARE PARTS

Spare parts sufficient for 1 year operation (8 hrs./DA.)

(1) Single-Flight Screw (2) Double-Flight Screw
(3) Steam Lock (4) Wear Ring (5) Wear Spacer
(6) Bullets.



SPECIAL SERVICES AVAILABLE

- Start up training performed at no charge at our headquarters in Des Moines, Iowa.
- Nutritional and technical advice available from company nutritionists.
- Export service, including crating and shipping.

INSTAPRO Division of Triple "F", Inc.
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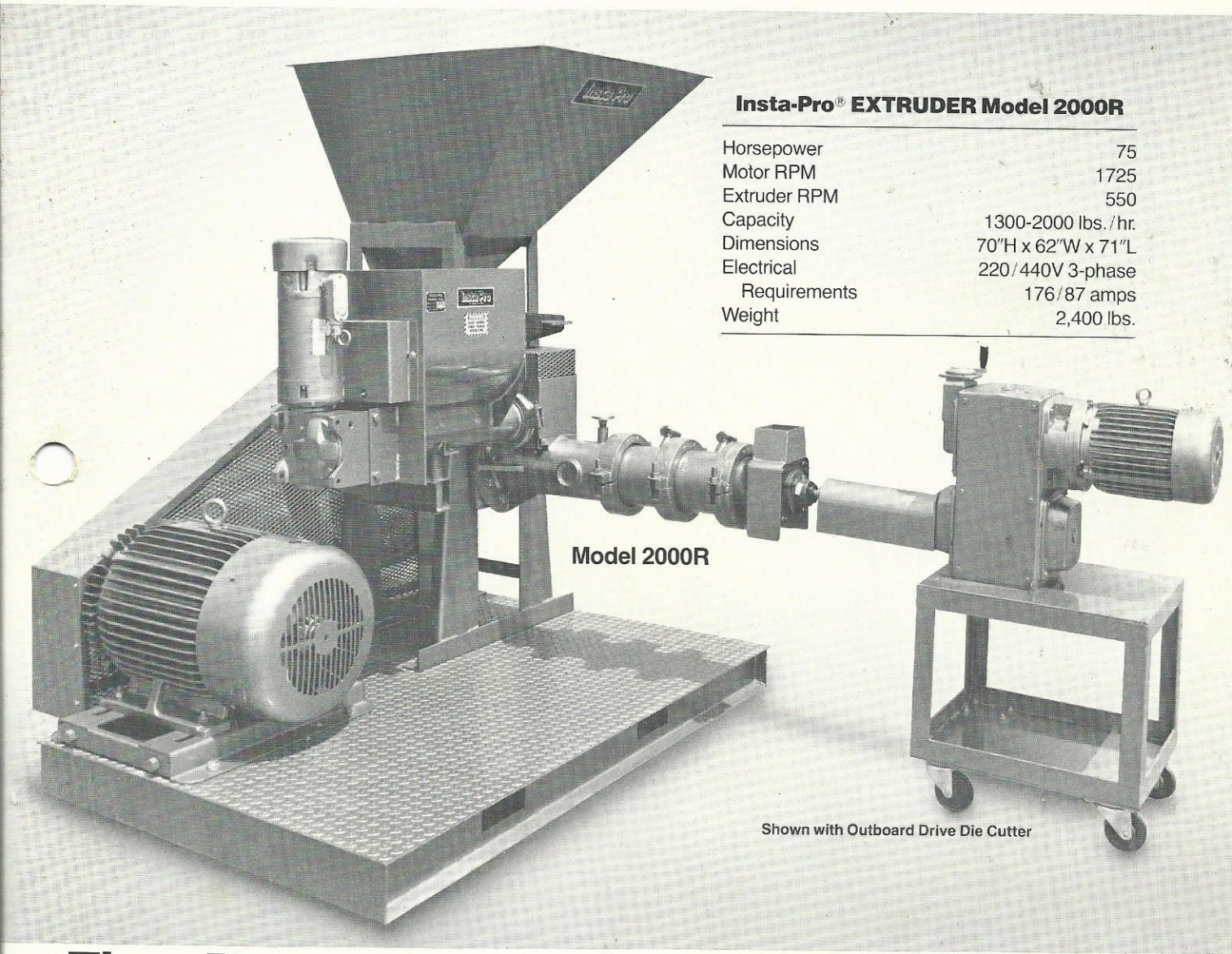
Insta-Pro® Extruders

Equipment & Accessories



Insta-Pro® EXTRUDER Model 2000R

Horsepower	75
Motor RPM	1725
Extruder RPM	550
Capacity	1300-2000 lbs./hr.
Dimensions	70″H x 62″W x 71″L
Electrical	220/440V 3-phase
Requirements	176/87 amps
Weight	2,400 lbs.

Model 2000R

Shown with Outboard Drive Die Cutter

The Dry Extrusion Process

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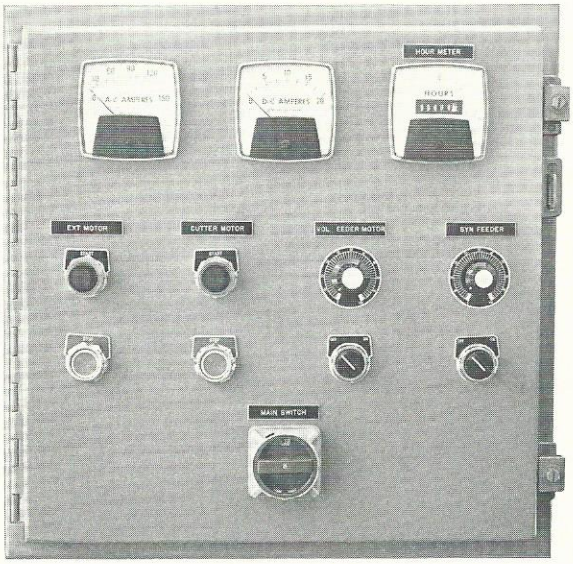
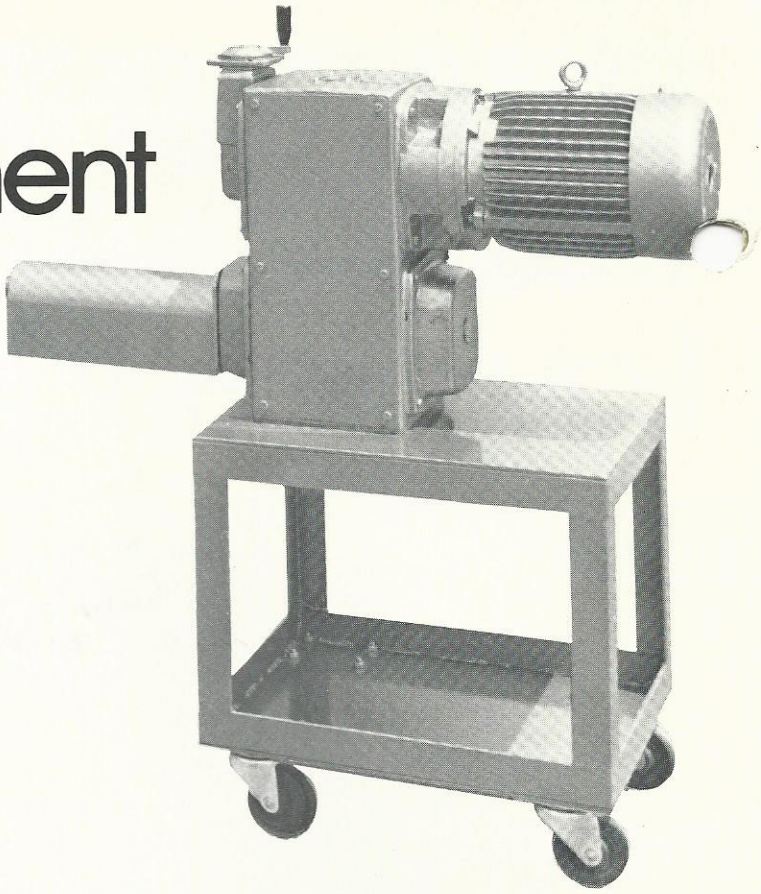
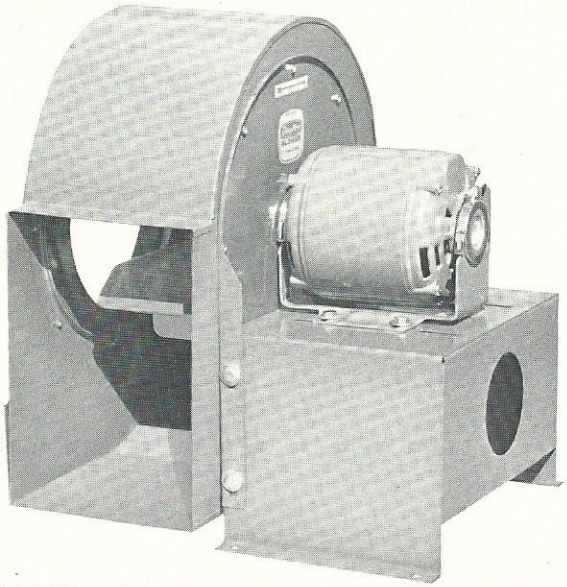
Insta-Pro®
Auxiliary Equipment



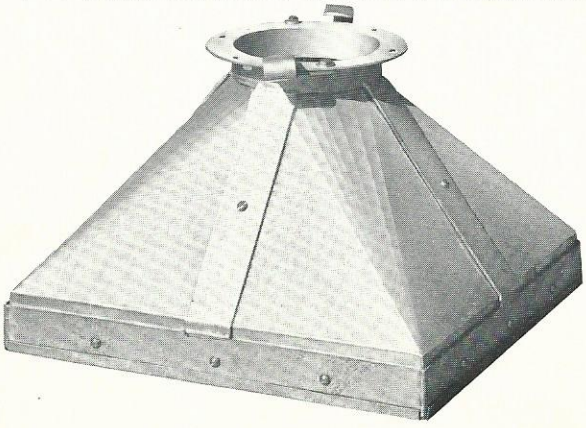
CONTROL PANEL conveniently groups electrical controls for extruder and accessories.

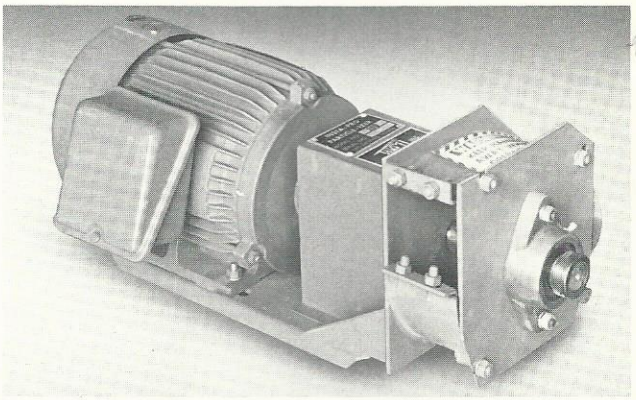


OUTBOARD DRIVE DIE CUTTER is a variable-speed, 8-die cutter for particlizing products into various shapes and sizes. Mounts on extruder barrel as seen in cover photo.

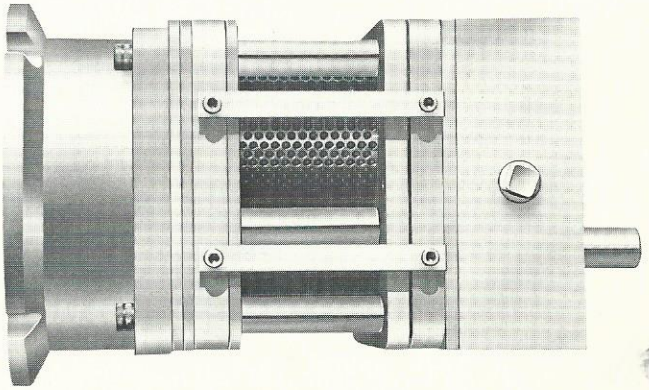


EXHAUST SYSTEM moves vapor from extruder area. Fan (above) has ½ HP 115V motor and pulls air from hood (below), which installs over output end of extruder barrel.

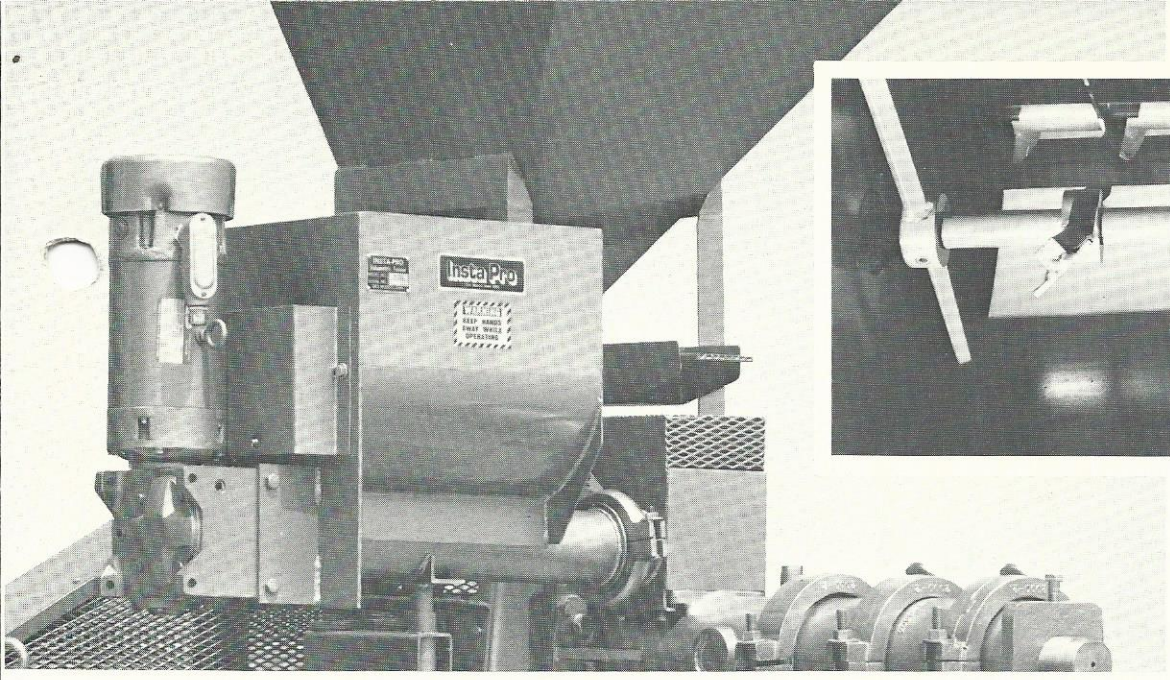


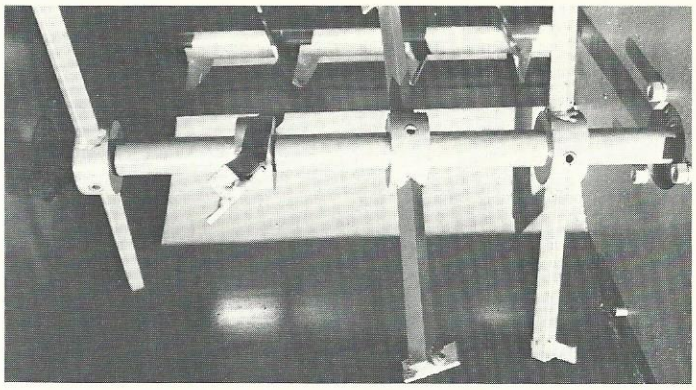


PARTICLIZER/CUTTER: A cutter for reducing gelatinous extruded materials into particle sizes which can be conveyed and handled.

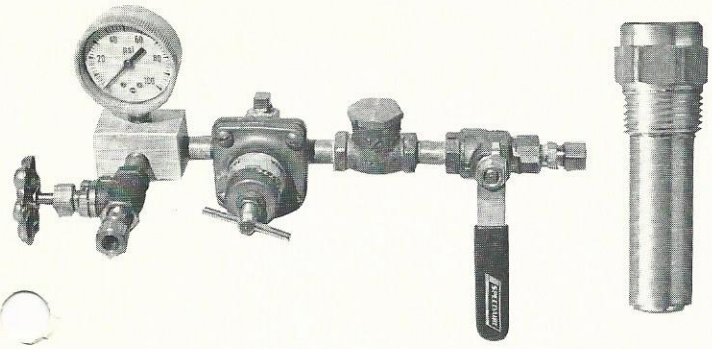


FLAKING ROLL has hardened, custom perforated rolls to shape extruded mixtures. It replaces the outboard cutter mechanism and is driven by the variable-speed cutter motor.

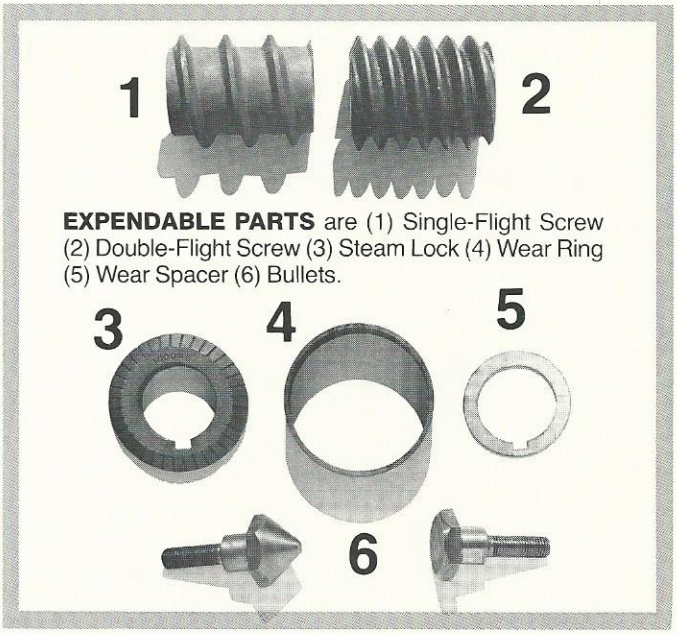




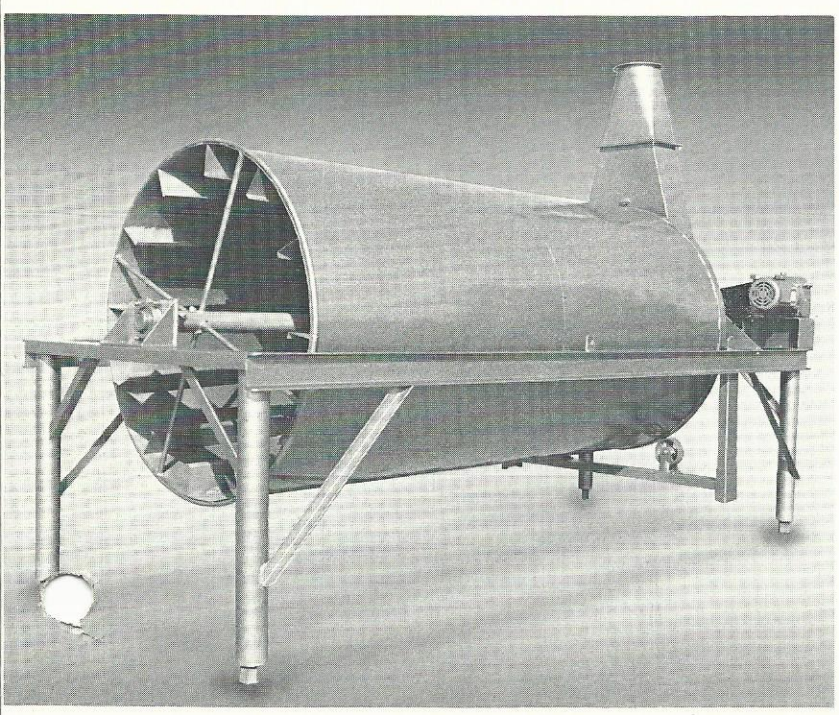
VOLUMETRIC BLENDER/FEEDER
A variable-speed system for introducing ground mixtures into the barrel of the extruder. INSET shows interior paddle mechanism.

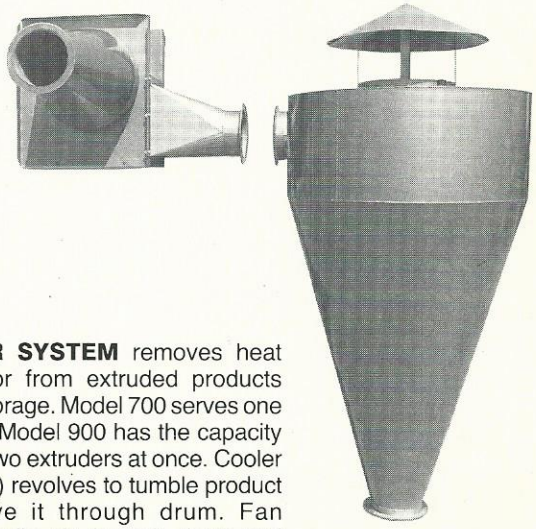


WATER MANIFOLD and valve standardize water pressure for injecting liquids into the extruder barrel. Liquids must be injected at a minimum of 50 psi.



EXPENDABLE PARTS are (1) Single-Flight Screw (2) Double-Flight Screw (3) Steam Lock (4) Wear Ring (5) Wear Spacer (6) Bullets.



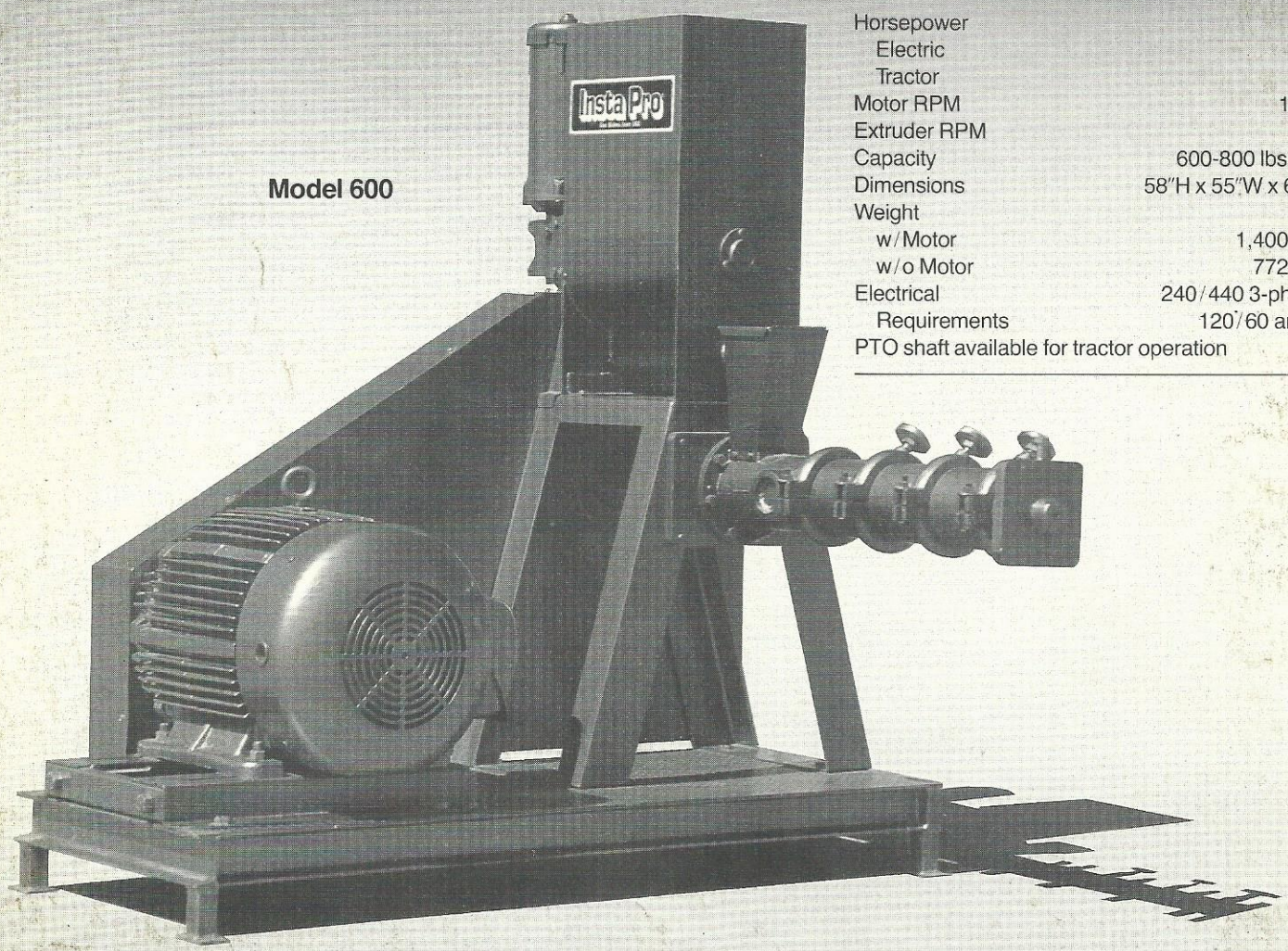


COOLER SYSTEM removes heat and vapor from extruded products prior to storage. Model 700 serves one extruder; Model 900 has the capacity to serve two extruders at once. Cooler drum (left) revolves to tumble product and move it through drum. Fan (above) pulls air through drum and exhausts it through cyclone fines collector (right).

Insta-Pro® Auxiliary Equipment Specifications

	H.P.	Weight (lbs.)	Dimensions	Electrical Requirements	Amperage
Model 8200 Volumetric Feeder/Blender	1	139	24″H x 11″W x 29″L	110V	10.7
Model 8100 Volumetric Feeder/Blender	1½	218	28″H x 14″W x 36″L	220V	7.7
Particlizing Cutter	2	79	12″H x 8″W x 21″L	440V 3-Phase 220V 3-Phase	2.9 5.8
Model 8000-30A Hydraulic Drive Cutter	2	285	37″H x 18″W x 41″L	440V 3-Phase 220V 3-Phase	3.0 6.0
Outboard Drive Die Cutter	5	363	45″H x 18″W x 41″L	440V 3-Phase 220V 3-Phase	6.5 13.0
Model 700 Cooler	3/4	1500	85″H x 48″W x 115″L	440V 3-Phase 220V 3-Phase	1.5 3.0
Model 900 Cooler	3/4	1850	90″H x 55″W x 139″L	440V 3-Phase 220V 3-Phase	1.5 3.0
Cooler Cyclone		147	80″H x 43″W x 36″L		
Cooler Fan	3	190	25″H x 38″W x 48″L	440V 3-Phase 220V 3-Phase	4.2 8.4

Model 600



Insta-Pro® EXTRUDER Model 600

Horsepower	
Electric	50
Tractor	100
Motor RPM	1725
Extruder RPM	550
Capacity	600-800 lbs./hr.
Dimensions	58″H x 55″W x 62″L
Weight	
w/Motor	1,400 lbs.
w/o Motor	772 lbs.
Electrical Requirements	240/440 3-phase 120/60 amps

PTO shaft available for tractor operation

Insta-Pro International ST, Ltd.
10301 Dennis Drive • Des Moines, Iowa 50322 USA • Tel. (515) 276-4524 • Telex 47-8375

InstaPro® Unlocking New Soy Protein Potentials

Introduction of the InstaPro Dry Extrusion Process in 1969 unlocked previously unknown soy protein potentials for those who feed livestock, poultry and other animals.

The InstaPro Process does much more than deactivate the anti-nutritional factors in soybeans. It also makes the protein, energy and other nutritional components of the bean more available to animals, with consequent improvements in gain, feed efficiency or level of production.

The InstaPro concept brought a rapid revolution in soy processing and soy economics. More importantly, InstaPro research continues to produce an expanding range of extruder-made proteins. These are designed not only to meet the nutritional requirement of individual species, but also for each critical phase of their development.

InstaPro recognizes that the best protein supplement for swine is not necessarily the best for dairy cattle. We have demonstrated that heat-treated protein (HTP) is an effective means of increasing milk production in dairy cows. We have developed soy proteins for piglets that are low in trypsin inhibitors, and for sows a high-fat soy supplement that helps them produce hearty litters and achieve maximum milk production. Research has proven that ruminants can utilize our slow-ammonia-releasing form of nitrogen more effectively than urea alone.

In short, InstaPro Proteins are designed to maximize production and profit for those who produce meat, milk and eggs. This brochure is an introduction to the InstaPro product line.

MX-Pro™ Full Energy Soybeans

MX-Pro is the InstaPro designation for its family of chemically modified and extruded soy protein products.

MX-Pro Full Energy Soybeans are chemically modified, dry extruded soybeans. This is the basic product in the InstaPro Protein line, and is the only product of its kind in the world today. These fully cooked soybeans provide a highly available protein-energy source for livestock and poultry.

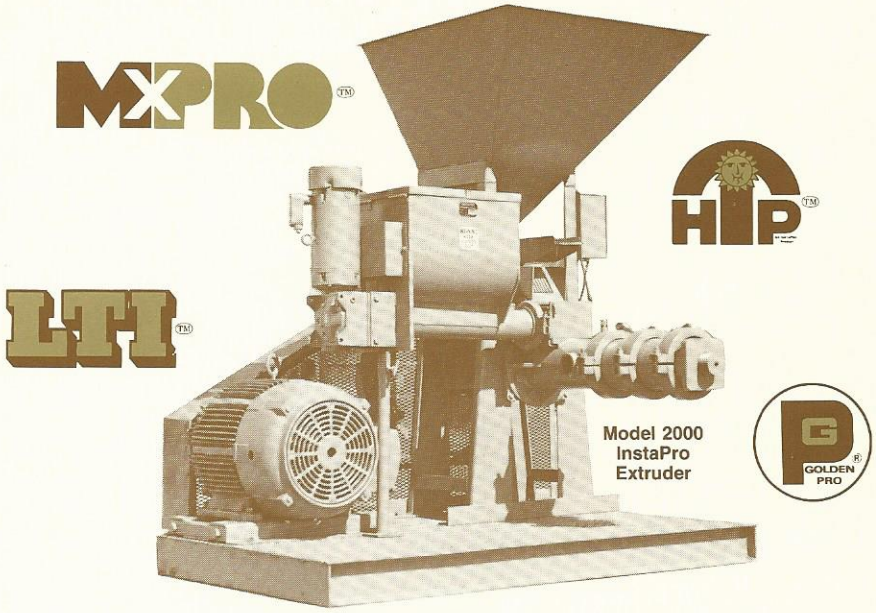
Raw soybeans must be cooked or extruded to inactivate their anti-nutritional factors, trypsin inhibitor and urease. *Trypsin inhibitor* is a protein that has a detrimental effect on pancreatic function. Failure to inactivate this growth inhibitor results in decreased nutrient digestibility and reduced growth. *Urease* is an enzyme found in raw soybeans that breaks down urea into ammonia. This enzyme may interfere with dietary urea utilization by ruminant animals. Chemical modification in conjunction with cooking of the soybean results in a more efficient and complete destruction of these anti-nutritional factors.

Cooking is done with the InstaPro Extruder, which generates heat by friction under tremendous pressure. The chemical modifier is activated during extrusion. Since less than 30 seconds are needed to completely cook the bean, the original quality of the protein is preserved. InstaPro extrusion also ruptures the oil cells of the bean, making its energy content more available to the animal. Soybean oil is rich in linoleic acid, an essential fatty acid, and lecithin, an important phospholipid which improves skin and hair appearance in most species. The oil also contains natural tocopherols which serve as an antioxidant.

Studies show that **MX-Pro Full Energy Soybeans** improve livestock feed efficiency 8%-15% compared to rations containing oil-extracted proteins. Average daily gain is improved 10%-20% when rations are formulated according to our recommendations and fortified with our base mixes.

In summary:

- Chemical modification during dry extrusion produces cooked soybeans with the anti-nutritional factors reduced to consistent and safe levels.
- The ultra-fast InstaPro extrusion/cooking process retains the high quality of the protein.
- The InstaPro Dry Extrusion Process makes the energy-rich soybean oil more available to the animal.
- The InstaPro Extruder puts processing on a local basis. Because soybeans can be processed locally and economically, MX-Pro Full Energy Soybeans provide the best value in a protein-energy supplement on the market today.



MX-Pro™ Hi-Fat Full Energy Soybeans

This product combines the fatty acid from animal fat with the vegetable oil of the whole bean. It consists of MX-Pro Full Energy Soybeans in combination with 10% animal fat.

Swine producers make tremendous demands on the reproductive ability of their sows, but often neglect to provide the nutrition their animals need to reach full potential.

MX-Pro Hi-Fat Full Energy Soybeans is a convenient and economical means of feeding the protein and energy necessary to produce vigorous piglets and heavy-milking sows. It is also recommended for horses and show animals.

MX-Pro™ LTI™ and Hi-Pro LTI™

These are specially processed low-trypsin-inhibitor soy flours. Average trypsin inhibitor level is 5 units per mg. as determined by the method of Kakade, et al.[1]

Research has documented that baby pigs, young calves, fur-bearing animals and fish are sensitive to the trypsin inhibitor level normally found in conventionally processed soybean meal. For these sensitive species, successful replacement of costly milk or fish protein with soy protein requires that trypsin inhibitor activity be reduced to a minimum level without heat damage to the protein. This is made possible by the patented InstaPro Dry Extrusion Process.

MX-Pro Hi-Pro LTI is a unique combination of extruded soy protein concentrate and dehulled soybeans. Its high protein content (50%) and moderate fat level (9%) make it ideal in formulations as a milk protein substitute. Feeding trials have demonstrated that the performance of weanling animals consuming rations containing Hi-Pro LTI is equal to that of diets containing milk protein.

MX-Pro LTI Soy Flour is a protein-energy supplement for young animals produced by the InstaPro Process from whole soybeans. With a protein level of 40% and a fat level of 20%, this product may be fed to young animals after the critical weaning period when they are able to derive more of the dietary energy from soybean oil. This product has the same low trypsin inhibitor level as Hi-Pro LTI and is an effective supplement during the period when animals are still sensitive to trypsin inhibitors, yet do not require a milk substitute.

Heat Treated Protein (HTP™)

The rumen does an efficient job of converting roughages and non-protein nitrogen (NPN) to microbial protein. But the rumen also converts natural proteins to ammonia and then to microbial protein, which is extremely wasteful. Heat treatment of protein reduces its solubility, thus increasing the proportion of protein which will bypass the rumen without being converted to microbial protein. Ruminants can therefore utilize it more efficiently.

HTP aids in breaking the efficiency barrier in ruminants. University research has shown that HTP can provide amino acids to improve milk yield in high-producing dairy cows, as well as daily gain and feed efficiency of feedlot animals when the protein requirement is greater than that which can be met by microbial protein alone.

[1]Kakade, M.L., J.J. Rackis, J.E. McGhee and G. Puski. 1974. Determination of trypsin inhibitor activity of soy products: a collaborative analysis of an improved product. Cereal Chem. 51:376.

Golden Pro®

Golden Pro is a new non-protein nitrogen source proven effective for ruminants. It is a combination of sodium bentonite, urea and whole grain starch processed by the InstaPro method. During extrusion the starch gelatinizes, expands and encapsulates this mixture into a non-protein nitrogen-energy product.

Golden Pro offers major advantages over other non-protein nitrogen sources. In the rumen its slow release of ammonia enables it to be efficiently converted to microbial protein. This results in increased performance and reduced incidence of ammonia toxicity. The gelatinized starch is an excellent source of energy for ruminants. With conventional urea supplements, energy may be a limiting factor for the efficient conversion of ammonia to microbial protein.

Palatability of Golden Pro is excellent. Feedlot cattle and dairy cattle producing less than 50 lbs. of milk may be fed Golden Pro as the sole source of supplementary nitrogen. It is effective for growing cattle over 600 lbs. and finishing cattle fed high-concentrate, low-roughage rations. Because it is in dry form, Golden Pro is easily handled with conventional feed manufacturing equipment. This provides complete flexibility for ration formulation.

As the demand for natural protein increases, non-protein nitrogen must be used more for ruminant feeding. Golden Pro makes it possible to efficiently substitute all the supplementary protein in the ration with non-protein nitrogen. Golden Pro is the ruminant protein product of the future, available now to help cut the cost of producing meat and milk.

InstaPro® APPLICATIONS AT A GLANCE

PRODUCT	SPECIES/USAGE
MX-Pro Full Energy Soybeans	**SWINE** growing & finishing rations, gestation rations. **POULTRY** — Broiler, Layer, Turkey, Geese & Duck rations. **PET FOODS.**
MX-Pro Hi-Fat Full Energy Soybeans	**SWINE** farrowing & lactation rations. **HORSE** supplements. **SHOW ANIMALS.**
MX-Pro Hi-Pro LTI	**SWINE** preweaning & starting rations. **CALF** milk replacer, starter rations. **FISH** foods. **FUR** ANIMAL rations.
MX-Pro LTI Soy Flour	**SWINE** starters/growers. **CALF** rations.
HTP (Heat Treated Protein)	**DAIRY** — High-production rations (over 50 lbs. of milk). **FEEDLOT** starters. **COW-CALF** pasture supplements. **SHEEP** supplements.
Golden Pro	**FEEDLOT** growing & finishing. **DAIRY** supplements. **SHEEP** supplements.

InstaPro® Proteins are available from:

INSTAPRO® division of Triple "F", Inc.
10301 Dennis Drive • Des Moines, Iowa 50322
Tel. (515) 276-4524 • Telex 47-8375