



# OPTIMA EXTRUDER

*The **next generation** Single Screw  
Extruder for Petfoods and Aquatic Feeds.*

# OPTIMA SINGLE SCREW EXTRUDERS

*The New Benchmark for performance, productivity, efficiency and return.*

Many important refinements have been incorporated into this new family of single screw cooking extruders. Such refinements are the result of Wenger's four decades of extrusion experience and persistent efforts to perfect and expand its proprietary extrusion technology. Production advantages offered by this newest of extrusion disciplines have been demonstrated in the Wenger Technical Center and in hundreds of commercial installations in production environments worldwide.

Optima extruders assure greater production potential with more available energy. This greater production potential is the result of the new drive and unique design of the screw flighting and the barrel ribbing. The combination of the flight depth, pitch profile, and effective helix angle optimize the conversion of mechanical energy into heat through friction while minimizing shear damage.



Barrel components - screws, barrel sleeves, and shearlocks - are proprietary stainless steel alloys. The result is greater resistance to wear, increased barrel life, and significant reductions in extruder maintenance and operating costs.



- 30 to 50% increase in production capacity
- Improved control of product textural attributes
- Improved control of product bulk density
- Improved mechanical energy utilization
- Lower capital costs per unit throughput
- Reduced sensitivity to component wear
- Improved processing of rations with high carbohydrate content
- Reduced processing costs
- Models available with V-belt or gear drive



## *innovative* Design

The pioneer in extrusion cooking systems, Wenger continues to lead the industry with unique designs and new process innovations. Our engineers are dedicated to assuring that Wenger's customers have the most efficient extrusion processing systems available anywhere in the world.

## Application *know how*

Through comprehensive research conducted at the Wenger Technical Center, we evaluate your particular extrusion processing needs and then satisfy those needs by applying the best and most relevant technology. As the leading manufacturer of both SINGLE SCREW and TWIN SCREW extruders, Wenger is uniquely positioned to provide - without prejudice - the extruder that is most suitable for your products.

It is our vast experience coupled with the exceptional versatility of Wenger extruders that allow our customers to more profitably produce the products that best meet consumer demands.

## *Unmatched* service

As a Wenger customer you receive unmatched pre- and post-installation engineering support, thorough training of your operating personnel, in-plant assistance with quality control and operational problems, complete field service and support as well as prompt shipment of premium quality replacement parts.

This attention to service helps ensure long, trouble-free operation of your extrusion system.

# OPTIMA EXTRUDER

*superior*

## **Stainless Steel Pneumatic Product Pick-up Hood**

(Patent No. 5,054,965) assures cleaner operation by removing waste steam, vapors and fines at the extruder discharge. The extrudate is transported gently by negative air directly from the die to the dryer, minimizing product distortion. An access port permits samples to be drawn for examination without diverting flow or risk of injury.

Remote or PLC activated diverter valves incorporated in the design facilitate extruder start-up and shut-down by allowing waste products to by-pass air transport to the dryer.

**Swing-Into-Place Die/Knife Assembly** permits rapid die change and precise knife-to-die adjustment, minimizing changeover and knife set-up time between products of different size and shape.

The Cutter Head is mounted on the die in such a fashion as to spread blade wear over the entire blade length. This rigid mounting arrangement extends blade life, and assures accurate, uniform sizing of extrudate.

## **Back Pressure Valve (BPV) ▶**

mounts on the end of the extruder prior to the final die and provides on-line control of shear stress and SME for regulation of product characteristics, including: size and uniformity of cell structure, shape definition, starch gelatinization, bulk density and liquid absorption.

**Larger Dies** permit more holes, yielding increased capacity. This is especially desirable on small products such as fish and shrimp feeds, and small delicate products such as cat and puppy foods.

**Deeper Screw Flow-Channels and New Barrel Wall Geometries** provide more surface area over which wear is distributed, resulting in longer life of these parts, and increased capacity.

**Extruder Barrel** design delivers nutritive benefits to the finished product. Shear sensitive constituents are not degraded, and positive nutritive benefits are achieved through a moisture, temperature, shear and time relationship proven to destroy growth inhibitors and pathogens.

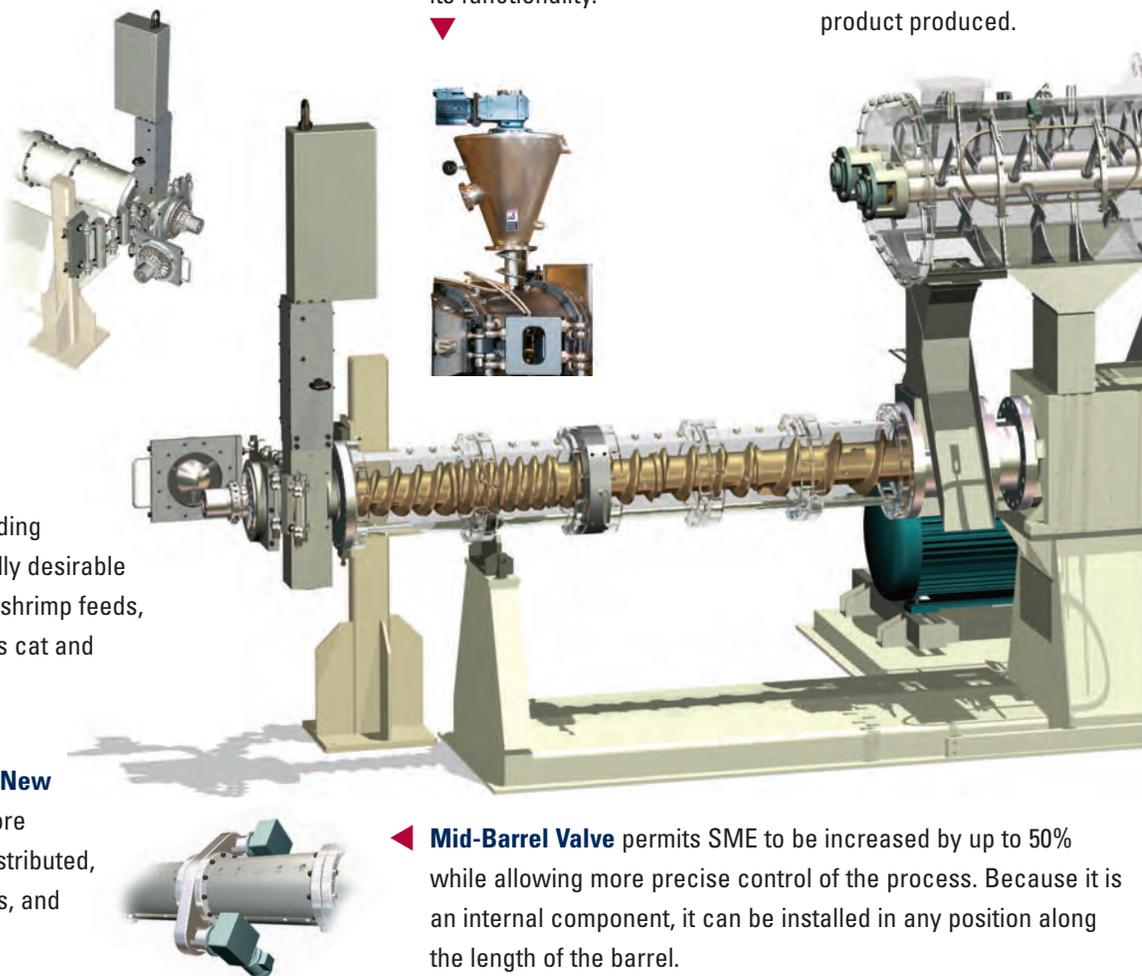
**Barrel Venting Options** either atmospheric or DMS vacuum (Patent No. 4,763,569) are available for applications where the control of product bulk density is critical to its functionality.

**Direct Injection of Steam** into the processing zone helps to control final product characteristics.

**The Tapered Inlet Section** of the extruder housing. Mechanical seals prevent leakage between the processing zone and the inlet.

**DDC Preconditioner** (U.S. Patent No. 5,054,965) premoistening and preheating (for granular slurries) ahead of the extruder. The preheating can be controlled from a few seconds to minutes, ensuring penetration of every feed particle and makes it practical to successfully produce products with internal fat.

A major benefit in addition to improved product quality is reduction of operation costs achieved through wear and reduced power requirements per product produced.



◀ **Mid-Barrel Valve** permits SME to be increased by up to 50% while allowing more precise control of the process. Because it is an internal component, it can be installed in any position along the length of the barrel.

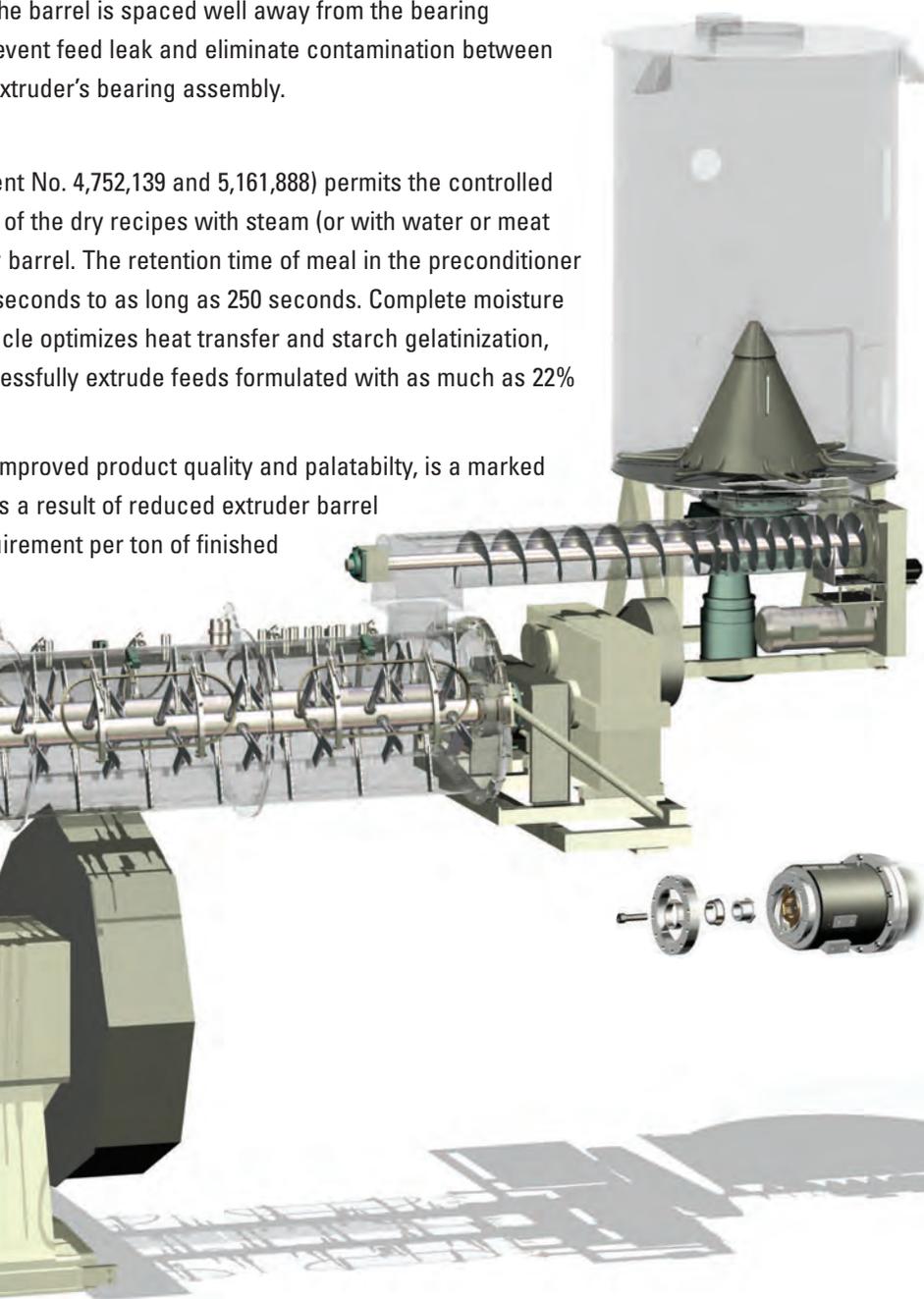
# features for Superior Production

Extruder barrel increases cook, reduces shear, and density.

The barrel is spaced well away from the bearing to prevent feed leak and eliminate contamination between extruder's bearing assembly.

Patent No. 4,752,139 and 5,161,888 permits the controlled use of the dry recipes with steam (or with water or meat) in the barrel. The retention time of meal in the preconditioner barrel. The retention time of meal in the preconditioner barrel ranges from a few seconds to as long as 250 seconds. Complete moisture cycle optimizes heat transfer and starch gelatinization, and allows to effortlessly extrude feeds formulated with as much as 22% fat.

Improved product quality and palatability, is a marked result of reduced extruder barrel wear. Requirement per ton of finished



## Cylindrical Live-Bottom Bin & Variable Speed Screw Feeder

assures an uninterrupted and uniform flow of all granular or floury raw materials or mixtures to the extruder. Gravimetric feed rate control is optional.

**New Shearlock Options** improve efficiency and versatility by promoting barrel fill, increasing dispersive mixing, and providing a wide range of mechanical shear inputs.

**Shaft Supports** at the discharge end reduce wear and centers the shaft within the extruder barrel.

**Variable or Fixed-Speed V-belt or Gear Drive**, depending upon kW/tonne application desired. Drives are quiet, low maintenance, and deliver power required through the maximum selected operating speed range desired to ensure optimum control of the extrusion process.

**Extruder Screws, Sleeves, and Shearlocks** of proprietary wear resistant, heat treated, stainless steel increase wear performance. Entire surface of screws and sleeves is polished maximizing extruder capacity and efficiency. Screw ends are precision ground to maintain alignment.

**Barrel Segments** bolt together for more rigid assembly. This eliminates barrel movement and reduces screw contact with the sleeved barrel wall increasing sleeve and screw life.

# OPTIMA

*More available energy for More Output.*



By optimizing the utilization of all available input energy - both mechanical and steam - process throughputs 30% to 50% greater than previously practical are achieved. This improvement in performance is accomplished by re-engineering the extruder's drive components and preconditioning assembly, without compromising extruder control capabilities, finished product quality, ease of operation, or life of critical extruder components.

For all commercial aquatic feed and petfood applications, Optima extruders assure a superior performance/investment ratio over other single screw extruders. Greater production output results in reduced capital equipment cost per unit of throughput.

While many previous generation Wenger extruders may be retrofitted with the necessary hardware to yield the increased production advantages offered by this latest generation of Wenger extruders, it should be noted that the attendant increase in the extruder's production rate may require expansion of post-extrusion operations such as product drying & cooling.

**The Wenger Automated Process Management (APM)** controls start-up, operation, and shut-down of the system. It regulates extruder throughput, process temperature & liquid addition and monitors all integrated post-extrusion process functions required to optimize product quality, process efficiency, personnel safety and machine loading.

**The Loss-in-Weight Controller** is an independent micro-processor based PLC programmed to manage the dry ingredient feed system.

**Steam, Water and Slurry Flow Rate** may be pre-programmed through the PLC for the product(s) desired.

## CAPACITY DATA – OPTIMA EXTRUDERS

STANDARD OPTIMA L/D RATIO:11.2:1 (L/D RATIO 13.1:1 AVAILABLE ON REQUEST)

Model No.	Screw Diameter	Motor kW	Capacity* kg/h
X-85	85 mm	30-55	200-800
X-115	115 mm	75-132	500-2000
X-165	165 mm	90-250	1000-6000
X-185	216 mm	160-630	2000-14000
X-235**	235 mm	315-750	4500-20000

Notes:

\* Maximum capacities shown are typical for dry expanded dog food at 350 grams per liter (22 lbs/cubic ft.) and 22% protein. Actual production capacity and required drive kW will vary with recipe, the product specifications and the extruder configuration. Wenger will guarantee the system capacity after your project and product(s) have been suitably defined.

\*\* Larger capacity single screw extruders are available.



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