

COMITROL APPLICATIONS

The ⁵Comitrol[®] Processor has been successfully used in a wide spectrum of processing applications throughout the world.

Designed and manufactured by Urschel[®] engineering for maximum productivity and energy efficiency, this unique line of milling machines is an effective solution for a multitude of dry, semi-dry, and liquid size reduction applications.



Dehydrated fruit and vegetable powder for flavoring is processed on a Model 1700 equipped with an optional HMI.



The Model 9300 stationed remotely processes high yields of an active pharmaceutical ingredient.



Uniform milling of poultry skin is finished on two Model 1700's for the production of a soup base.



BAKERY, SNACK, & CONFECTIONERY

- Granulate almonds for inclusion in various confectionery products
- Reduction of broken bakery and confectionery items for rework, toppings, and coatings
- Puree a variety of dried fruits, nuts, and berries
- Production of coarse or smooth creamy nut butters
- Uniformly mill corn for production of chips, tortillas, cereal, and breading
- Flake cut beef trimmings for production of salted meat snacks
- Mill vanilla beans into a fine powder for bakery and pastry additives
- Puree pumpkin, squash, and apples for pie fillings
- Reclamation of imperfect chocolate bars and hard candy

FEATURED PRODUCTS

- | | | | | |
|---|---|--|--|---|
| 1. Elbow Macaroni Powder
Model 1500 | 6. Almond Flour
Model 1700 | 11. Sandwich Cookie Granulation
Model 3640 | 16. Cashew Butter
Model 1700 | 20. Candy Cookie Granulation
Model 3600 |
| 2. Peanut Butter Cracker Granulation
Model 3600 | 7. Almond Coarse Butter
Model 1700 | 12. Jelly-filled Cookie Granulation
Model 3600 | 17. Cashew Granulation & Meal
Model 3600 | 21. Brownie Granulation
Model 3600 |
| 3. Sunflower Seed Butter
Model 1700 | 8. Hazelnut Flake
Model 1700 | 13. Peanut Butter
Model 9310 | 18. Cracker Granulation
Model 3600 | |
| 4. Bread Powder
Model 3600 | 9. Granola Granulation
Model 1700 | 14. Raisin Paste
Model 3600 | 19. Cream-filled Cookie Granulation
Model 3600 | |
| 5. Flour Tortilla Granulation
Model 3600 | 10. Wafer Cookie Granulation
Model 1700 (Precut on Sprint 2 [®] Dicer) | 15. Vanilla Bean Granulation
Model 1700 | | |





FRUITS, VEGETABLES, & BEVERAGE

- Production of nut milks
- Reduce all types of ingredients including plant-based into smooth-flowing purees
- Milling of carrots, celery, and tomatoes for production of vegetable juices
- Mill pineapple, guava, pear, and peaches into single strength puree
- Puree fruits and vegetables for baby and geriatric food
- Uniform particle size reduction of flour for dehydrated potatoes
- Puree cabbage for flavorings used in frozen meals
- Comminution of corn for cream style corn component
- Size reduction of peppers for hot sauces and flavoring bases
- Puree or comminute fruits and berries for flavor and flavor bites in yogurt and ice cream

FEATURED PRODUCTS

- | | | | |
|--|--|---|--|
| 1. Coconut
Shred
Model 1700
(Precut on Sprint 2" Dicer) | Puree
Model 1700 | 17. Black Pepper
Powder
Model 1700 | 26. Potato
Puree
Model 3600 |
| 2. Soy, Rice, Oat, Almond, and Coconut
Milk
Model 1500 | 9. Mango
Puree
Model 1500 | 18. Creamed Corn
Puree
Model 3000 | 27. Potato
Flake
Model 3600 |
| 3. Canelle, Citronelle, Tea, Valerion, and Anis Spices
Granulation
Model 3600 | 10. Ginger
Paste
Model 2100 | 19. Broccoli
Rice
Model 1700 | 28. Hot Sauce
Puree
Model 9310 |
| 4. Baby Food
Puree
Model 9310 | 11. Ginger
Granulation
Model 1700 | 20. Red Bean
Paste
Model 3600 | 29. Chili Pepper
Coarse & Fine Puree
Model 1700 |
| 5. Dried Citrus Peel
Granulation
Model 3600 | 12. Pesto
Coarse Puree
Model 3600 | 21. Coffee Bean
Granulation
Model 1700 | 30. Hummus
Puree
Model 1700 |
| 6. Tangerine
Coarse Puree
Model 3600 | 13. Acai
Granulation
Model 1700 | 22. Pineapple
Coarse & Fine Puree
Model 1700 | 31. Chickpea
Granulation
Model 3600 |
| 7. Cranberry
Puree
Model 1700 | 14. Avocado
Coarse Puree
Model 3600 | 23. Vegetable Juice
Puree
Model 9310 | 32. Apple
Coarse Puree
Model 3600 |
| 8. Blueberry | 15. Kale
Puree
Model 1700 | 24. Ketchup
Puree
Model 1500 | |
| | 16. Kale
Coarse Puree
Model 3600 | 25. Mustard
Puree
Model 9310 | |





MEAT, POULTRY, FISH, & DAIRY

- Comminute beef, fish, and poultry used in pet food production
- Reduce a wide gamut of alternative protein products
- Flake cut poultry or ham used in canned meats
- Emulsify pork for sausage and sandwich meats
- Flake cut beef, veal, lamb, and pork for portion control products
- Shred beef for barbecued meat products
- Production of meat slurry used in nutritional supplements
- Comminute beef, fat, and pork rind for sausage production
- Reduction of gristle and connective tissue in fabricated meat products
- Mill cheese curd to a fine consistency for processed cheese products
- Granulate parmesan and romano cheese to a uniform size
- Mill casein and dried milk solids
- Emulsify and smooth natural cheeses for spreadable product

FEATURED PRODUCTS (shown from right to left)

- | | | | | |
|---|--|--|---|--|
| 1. Restructured Steak Emulsion
Model 5600 | 5. Cooked Beef Slurry
Model 1700 | 10. Beef Jerky Crumble
Model 1700 | 15. Seaweed Flake
Model 1700 | 19. Salmon Paste
Model 2100 |
| 2. Beef Stick Emulsion
Model 2100 | 6. Turkey Roll Emulsion
Model 5600 | 11. Cartilaginous Skin Organ Material Flake
Model 2100 | 16. Seaweed Paste
Model 9310 | 20. Pea Protein Extrusion Flake
Model 1700 |
| 3. Breaded Chicken Patty Emulsion
Model 5600 | 7. Ground Beef Flake
Model 2100 | 12. Ricotta Cheese Puree
Model 3000 | 17. Fish Waste Paste
Model 3640 | |
| 4. Breaded Chicken Nugget Emulsion
Model 5600 | 8. TVP Flake
Model 1700 | 13. Coconut Yogurt Puree
Model 1700 | 18. Insect Paste
Model 1700 | |
| | 9. TVP Crumble
Model 1700 | 14. Parmesan Cheese Granulation
Model 1700 | | |



BULK, PHARMACEUTICAL, & CHEMICAL

- Mill aloe vera for production of dermatological creams
- Emulsify creams for ointments and cosmetics
- Size reduction and dispersion of various pharmaceutical liquids and ointments
- Size reduction of glandular products for solvent extraction
- Reduce and deagglomerate steroids for acne skin cream
- Size reduction of plastics for powder coatings
- Mill organic active ingredients for production of gelatin capsules

FEATURED PRODUCTS

- | | |
|---|---|
| 1. Tablet Powder
Model 9310 | 7. Collagen Emulsion
Model 1500 |
| 2. Cannabis Powder
Model 1700 | 8. Rubber Flooring Reduction
Model 1700 |
| 3. Gelatinized Corn Starch Powder
Model 1700 | 9. Polymer Deagglomeration
Model 3600 |
| 4. Tobacco Flake
Model 3640 | 10. Bentonite Clay Based Grease Mill
Model 1700 |
| 5. Aloe Cream
Model 1700 | 11. Benzoyl Peroxide Emulsion
Model 1500 |
| 6. Colestipol Hydrochloride Powder
Model 9310 | |

Comitrol

COMMINUTING MACHINES

A Complete Line of Controlled Size Reduction Equipment

The entire Urschel Comitrol line of processors is available to meet your production requirements, and offers a wide range of feed and discharge configurations.

Every model features continuous single pass operation with no operator adjustments. Stainless steel construction and other corrosion resistant materials provide easy clean-up and sanitary operation.

Conventional Comminution

Comminution is the process of reducing a product to a smaller size. Conventional methods of comminution employ some type of grinding, smashing, or tearing action which can produce excessive heat and degrade the quality of the finished product. This can also generate a higher percentage of particles which fall outside the target range of the desired particle size and negatively impact the yield, quality, and final particle size.

Controlled Comminution

The word "Comitrol" means controlled comminution. The Comitrol Processor uses the principle of incremental shear to ensure highly efficient comminution by rotating the product inside a stationary reduction head at high rotational speeds. In addition, continuous single pass operation achieves consistently uniform particle size reduction at high capacities. The result is the most efficient type of comminution available today. The versatile Comitrol Processor has been used in thousands of processing applications throughout the world.

Comitrol Versatility

- Various consistencies from dry to paste to liquids
- Precision particle size reduction down to microdimensions
- Wide spectrum of product applications

Standard operations include:

- Granulating • Flaking • Slicing • Dispersing**
Blending • Homogenizing • Milling
Shredding • Liquefying • Emulsifying • Pureeing

Comitrol models can accommodate different styles of reduction heads. The colored dots identify which style(s) of head(s) are used on each model.



18



Model 1700

19



Model 1500

20



Model 3000

21



Model 2100

22



Model 3600 Slant

23



Models 3640, 3660, & 3675 Slant

24



Model 3600F

24



Model 3640F

25



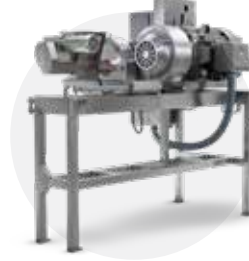
Model 5600

26



Model 9310

26



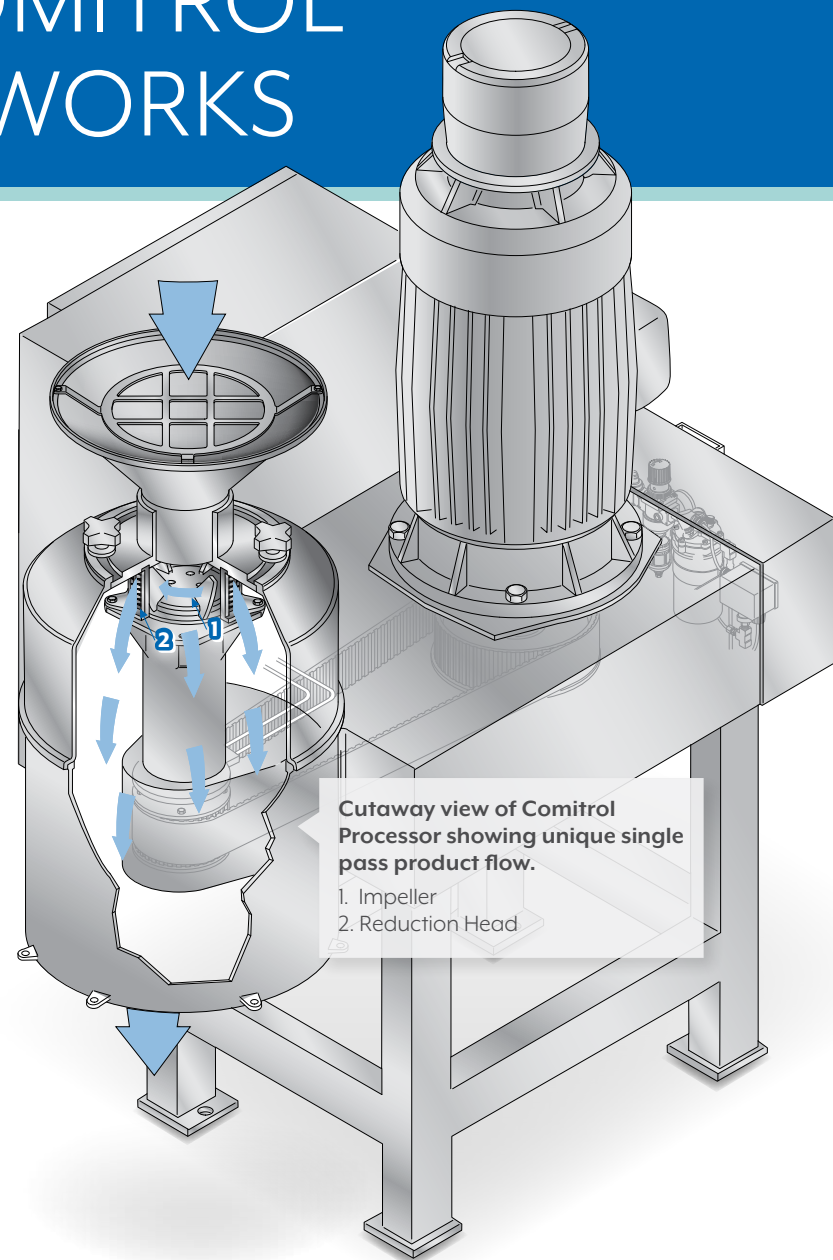
Model 9310 with Feeder

HOW THE COMITROL PROCESSOR WORKS

Product to be reduced in size enters the stationary reduction head and is rotated by the impeller. The resulting centrifugal force moves the product outward and against the inner periphery of the cutting edges. The impeller pushes the product against the cutting edges of the reduction head reducing it into precise increments.

Size reduction is accomplished by cutting the product with no metal to metal contact. The absence of random particle movement ensures highly efficient comminution in a single pass operation.

Three types of reduction heads — the cutting head, the microcut head, and the slicing head — utilize the same operating principle but provide different types of cuts.



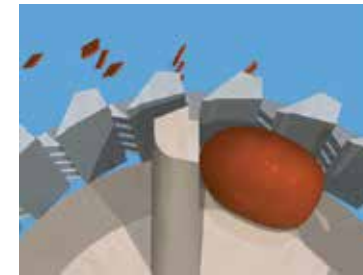
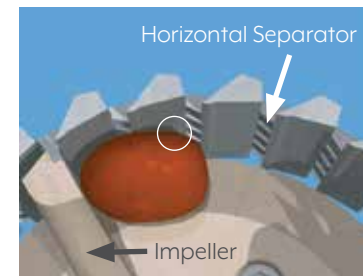
Cutaway view of Comitrol Processor showing unique single pass product flow.

1. Impeller
2. Reduction Head



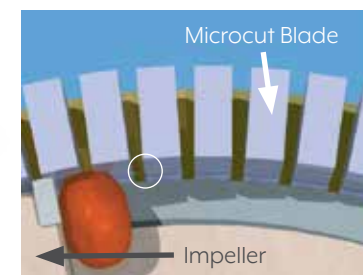
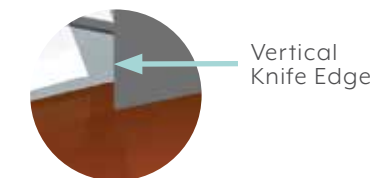
Feed Assemblies

The selection of a suitable feed assembly is critical to the efficient operation of the Comitrol Processor. Urschel manufactures an array of feed assemblies to accommodate your production requirements.



Cutting Head

1. Inside the cutting head, the impeller forces the product against uniformly spaced, thin horizontal separators.
2. Small portions of product projecting into the spaces between the separators are cut off into particles by spaced columns of vertical knives.
3. These particles fly outward and away from the cutting head. The wall surfaces between the vertical knives are relieved to eliminate rubbing friction that would produce heat.



Microcut Head

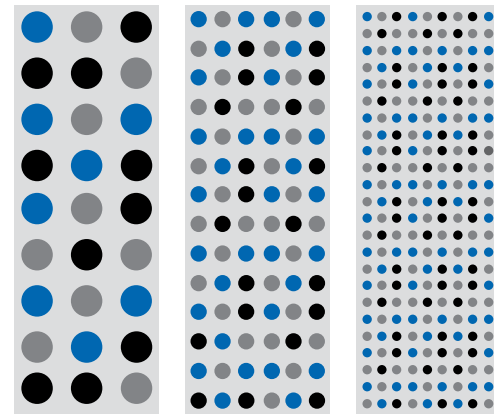
1. Product is fed to the high speed rotating impeller, and strikes the exposed cutting edges of the microcut blades with great velocity.
2. This action results in the removal of small particles until reduction is completed.
3. Particles are discharged through the spaces between the blades. Because of high impeller speeds, product remains in the microcut head only a fraction of a second. The product is reduced in precise increments, emerging a uniform size.



CUTTING HEAD

The Cutting Head is comprised of uniformly spaced, vertical knife columns arranged in a circular fashion and held in place by thin horizontal separators. The leading edge of each vertical knife is a sharp knife edge. Cutting heads are constructed of special wear and abrasion resistant alloys and can usually be resharpened for extended use.

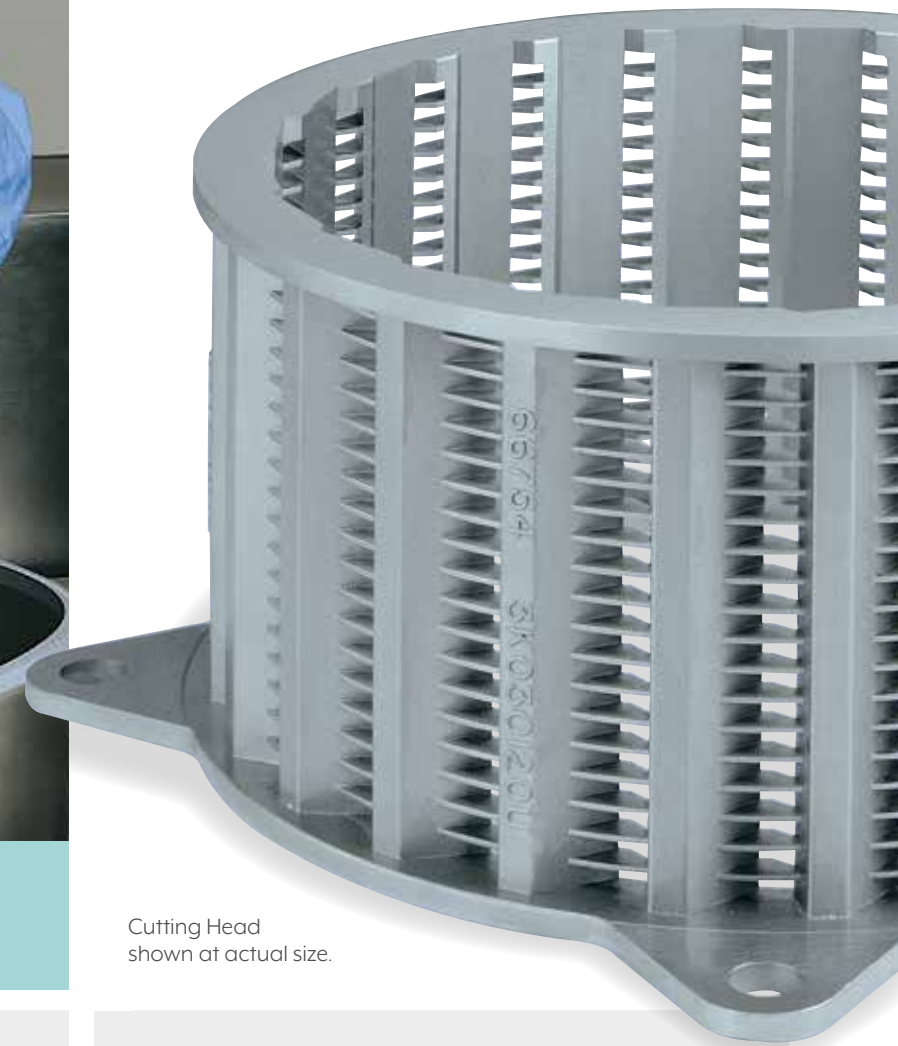
The distance between the horizontal separators and the vertical knife columns defines the opening through which the product must pass and helps determine the final particle size and shape.



Particles of uniform size can be achieved with any of the hundreds of available cutting heads.



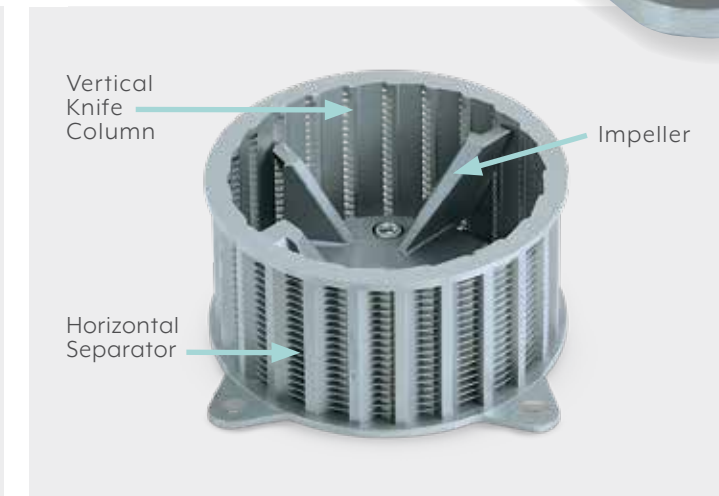
Cutting heads and impeller are easily changed to facilitate other applications, cleaning, or maintenance.



Cutting Head shown at actual size.



A variety of impellers are designed specifically to meet the unique requirements of your application and can be retipped for extended use.

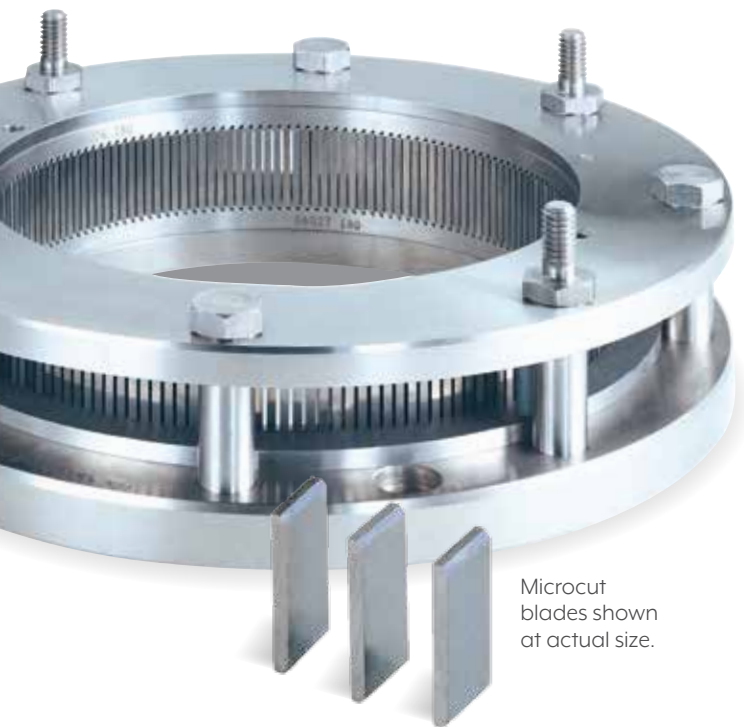


The Comitrol Processor uses the principles of incremental shear to ensure highly efficient comminution by rotating the product inside the cutting head at high rotational speeds.

MICROCUT HEAD

The Microcut Head is a 6" (152.4 mm) diameter ring of closely spaced blades. When product is revolved inside this ring of blades at very high speed, centrifugal force causes pressure against the blades equal to several thousand times the weight of the product. The leading edge of each blade is a sharp shear edge for cutting accuracy, and the blades are carefully positioned to effectively reduce products down to microdimensions.

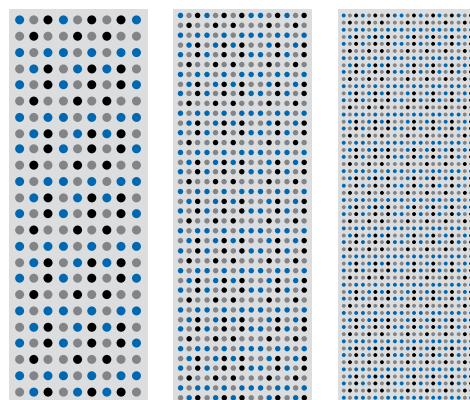
Depending on your application, a factory assisted program is available that greatly increases the use of each blade. Motor power is effectively utilized to cleanly cut the product into uniform particles instead of producing destructive heat.



Microcut blades shown at actual size.



A variety of impellers are designed specifically to meet the unique requirements of your application and can be retipped for extended use.



Particles of uniform size can be achieved with any of the hundreds of available cutting heads.

	Impeller R.P.M. Speed	Centrifugal Force in G's
	2504	535
	3600	1105
	5636	2707
	6480	3580
	7200	4419
	8295	5866
	9390	7516

The impeller speed combined with centrifugal force delivers precise cutting action in fractions of seconds.

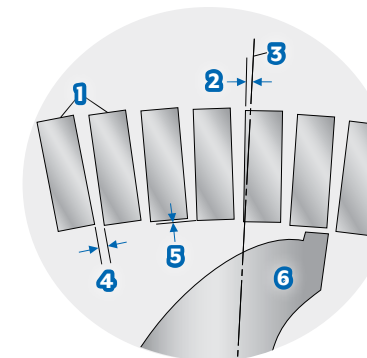


Impellers and Microcut Heads are easily changed to facilitate other applications, cleaning, or maintenance.

Microcut Blade

Top View

1. Blades
2. Blade Tip Angle
3. Center Line
4. Opening
5. Depth of Cut
6. Impeller



Microcut Head	Depth of Cut		Opening		% of Area Open Area
	inches	mm	inches	mm	
050156	.0237	.6020	.2214	5.6236	58.69
050156-10	.0886	2.2504	.2198	5.5829	58.27
055156	.0196	.4978	.1872	4.7549	54.59
070156	.0121	.3073	.1137	2.8880	42.20
080156	.0093	.2362	.0800	2.0320	33.93
090156	.0073	.1854	.0538	1.3665	25.67
100156	.0059	.1499	.0328	.8331	17.39
140084	.0030	.0762	.0508	1.2903	37.71
140084-10	.0264	.6706	.0492	1.2497	36.52
150084-10	.0244	.6198	.0403	1.0236	32.05
160084	.0023	.0584	.0339	.8611	28.76
160084-2	.0064	.1626	.0339	.8611	28.76
160084-5	.0126	.3200	.0337	.8560	28.59
165084-2	.0062	.1575	.0303	.7696	26.46
170084-2	.0059	.1499	.0270	.6858	24.34
170084-5	.0117	.2972	.0267	.6782	24.07
180084	.0018	.0457	.0208	.5283	19.85
180084-1	.0037	.0940	.0208	.5283	19.85
180084-2	.0055	.1397	.0208	.5283	19.85
180084-5	.0109	.2769	.0205	.5207	19.66
190084	.0016	.0406	.0153	.3886	15.41
190084-1	.0034	.0864	.0153	.3886	15.41
190084-2	.0051	.1295	.0153	.3886	15.41
190084-5	.0103	.2616	.0151	.3835	15.21
200084	.0015	.0381	.0103	.2616	10.92
200084-1	.0031	.0787	.0103	.2616	10.92
200084-2	.0048	.1219	.0103	.2616	10.92
206084	.0014	.0356	.0076	.1930	8.30
206084-1	.0030	.0762	.0076	.1930	8.30
209084	.0014	.0356	.0063	.1600	6.98
210084	.0013	.0330	.0058	.1473	6.46
212084	.0013	.0330	.0050	.1270	5.62
212084-1	.0029	.0737	.0050	.1270	5.62
214084	.0013	.0330	.0042	.1067	4.77
216084	.0013	.0330	.0033	.0838	3.78
216084-1	.0028	.0711	.0033	.0838	3.78
218084	.0012	.0305	.0025	.0635	2.89
220084	.0012	.0305	.0018	.0457	2.10
222084	.0012	.0305	.0010	.0253	1.18

SLICING HEAD



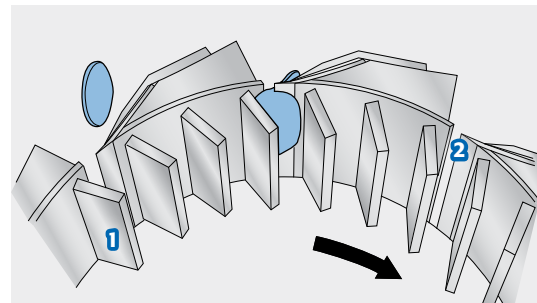
The Slicing Head is a precise, miniaturized version of other Urschel centrifugal slicers. It consists of a ring of stationary slicing knives held in place by adjustable knife holders. Centrifugal force created by the rotating impeller causes the product to press firmly against the inner surface of the knife holders to produce uniform slices at each knife location.

Designed for applications where the final dimension is a specific slice thickness from .020 to .060" (.5 to 1.5 mm).

Slicing Head

Cutting Overview

- 1. Impeller
- 2. Slicing Knife



Slicing knife assembly shown at actual size.



Proven Productivity, Efficiency, and Savings

ACCURACY

High degree of particle size uniformity through a wide range of sizes – down to microdimensions.

VERSATILITY

Different Comitrol models and hundreds of reduction heads from which to choose.

EFFICIENCY

Effective use of motor energy in a single pass with lower product temperature rise

CONTROLLED COMMINUTION

The absence of random particle movement ensures a high degree of accuracy. Incremental cutting principle has proven an effective solution in many wet, dry, and viscous product applications.

WORLDWIDE SERVICE

Extensive inventories, spare part availability in hours, and factory trained personnel to assist you in locations throughout the world.

OPERATIONAL SAVINGS

Increased yield and lower operational costs.



Uniform particle size reduction of cooked meats and vegetables with a high moisture content is easily accomplished on the Model 3000.



Yields increase when processing tomatoes through Model 1500 for production of bright, speck-free catsup.



Model 5600 produces flake cuts for cooked ham products.



Poultry skin is precut on a Model 1700 equipped with a cutting head.



You are Invited to Test Cut Your Product

Urschel has a complete network of test facilities and experienced service and sales representatives around the world ready to work for you on any size reduction application. Contact your local Urschel representative to schedule a comprehensive, no-obligation test today at www.urschel.com.



Model 9300 is used to mill fruits and vegetables into a fine puree for production of baby food.



Aloe vera is milled on the Model 1700 for use in a variety of dermatological products.



Peppers are uniformly produced in a two stage milling operation using two Model 1500 units.

COMITROL® PROCESSOR MODEL 1700

ACCOMMODATES ALL THREE REDUCTION HEADS FOR MAXIMUM VERSATILITY

The Comitrol Processor Model 1700 accommodates all three types of reduction heads (shown below). It is recommended for free-flowing dry and semi-dry product applications including textured vegetable protein, peanut butter, corn masa, and cheese.

This precision cutting principle has proven to be a processing breakthrough, with the versatility to meet your size reduction needs from dime size particles to fine emulsions. Standard operations include comminuting, granulating, milling, flaking, slicing, liquefying, dispersing, and pureeing.

Sealed enclosure deters escape of dust, vapor, and liquid when the Comitrol Processor is installed in conjunction with a collection system. Stainless steel construction ensures maximum durability and sanitation. HMI option available.

HMI benefits include: identifies misaligned sensors, soft start faults and fixes, total machine runtime, motor loads and overfeeding issues, and remote start/stop when connected to a control center.



COMITROL® PROCESSOR MODEL 1500

SPECIFICALLY DESIGNED FOR VISCOUS AND LIQUID PRODUCT APPLICATIONS

The Comitrol Processor Model 1500 is recommended for specific applications including finishing liquids or slurries.

The Model 1500 is equipped with the microcut head and corresponding impeller to produce a variety of products such as fruit nectars, tomato catsup, barbecue sauce, vegetable purees, and beverage concentrates.



TYPES OF CUTS



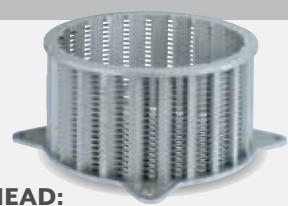
SLICING HEAD:

Slices: .020 to .060" (.5 to 1.5 mm)



MICROCUT HEAD:

Offers the smallest in particle sizes from .0012 to .0237" (.03 to .6 mm)



CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

TYPES OF CUTS



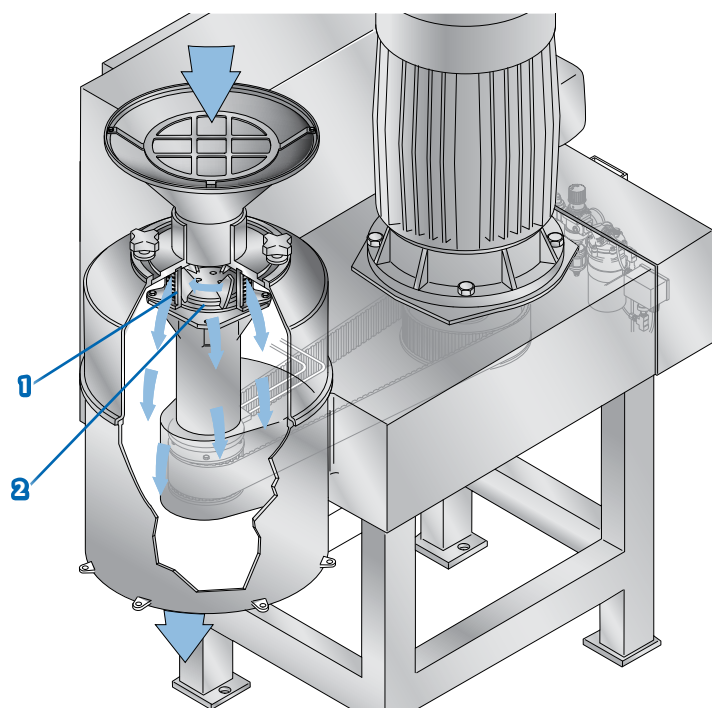
MICROCUT HEAD:

Offers the smallest in particle sizes from .0012 – .0237" (.03 – .6 mm)

SPECIFICATIONS

Length:..... 51.90" (1318 mm)
 Width:..... 33.03" (839 mm)
 Height:..... *72.17" (1833 mm)
 Net Weight:..... 1100 lb (499 kg)
 Motor:..... 15, 30, or 40 HP
 (11.2, 22.4, or 30 kW)

*Usual height with 40 HP motor. This height will vary depending on horsepower and motor manufacturer.



CUTTING OVERVIEW

1. Impeller
2. Reduction Head

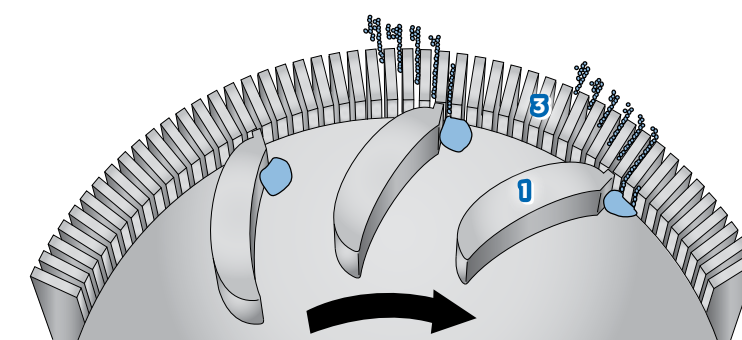
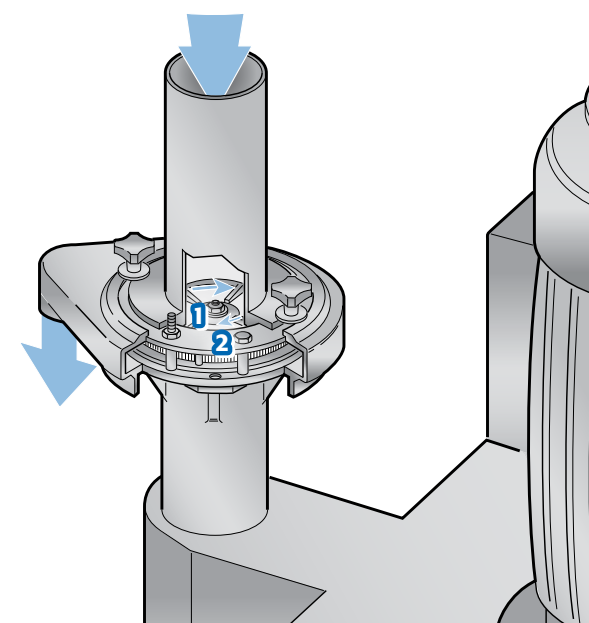
SPECIFICATIONS

Length:..... 49.62" (1260 mm)
 Width:..... 34.62" (879 mm)
 Height:..... *70.12" (1781 mm)
 Net Weight:..... 1100 lb (499 kg)
 Motor:..... 15, 30, or 40 HP
 (11.2, 22.4, or 30 kW)

*Usual height with 40 HP motor. This height will vary depending on horsepower and motor manufacturer.



Model 1700 featuring optional HMI.



CUTTING OVERVIEW

1. Impeller
2. Microcut Head
3. Microcut Blades

COMITROL® PROCESSOR MODEL 3000

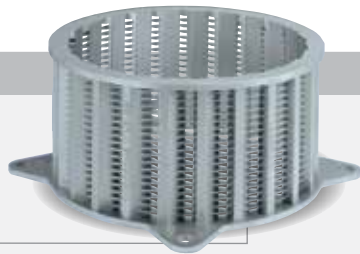
UNIFORM MILLING OF HIGH MOISTURE CONTENT PRODUCTS

The Comitrol Processor Model 3000 is ideally suited for milling products with a high moisture content such as whole kernel sweet corn, cooked meats, and vegetables.

Processors can choose from a variety of cutting heads and impellers to produce the desired finished particle size. The two piece enclosure simplifies disassembly, cleaning and care of the cutting parts.



TYPES OF CUTS

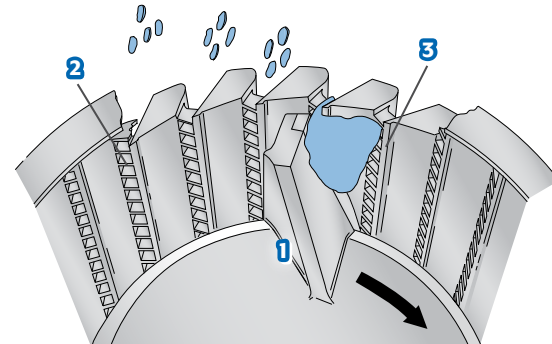
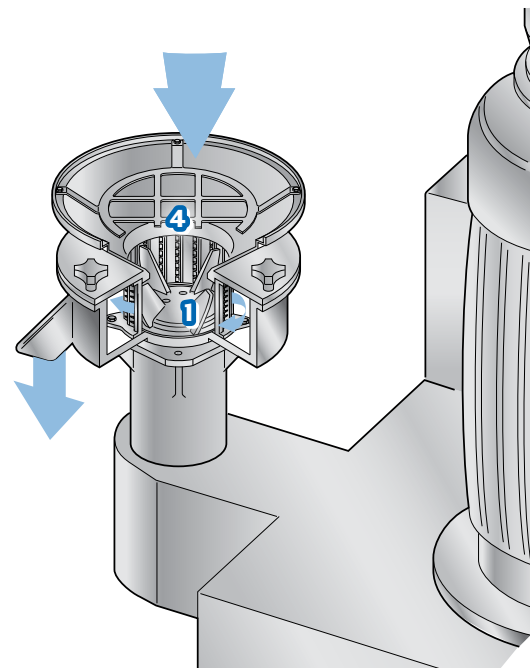


CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

SPECIFICATIONS

Length:	51.69" (1313 mm)	*Usual height with 40 HP motor. This height will vary depending on horsepower and motor manufacturer.
Width:	32.92" (836 mm)	
Height:	*71.75" (1822 mm)	
Net Weight:	1100 lb (499 kg)	
Motor:	15, 30, or 40 HP (11.2, 22.4, or 30 kW)	



CUTTING OVERVIEW

1. Impeller
2. Horizontal Separators
3. Vertical Knives
4. Cutting Head

COMITROL® PROCESSOR MODEL 2100

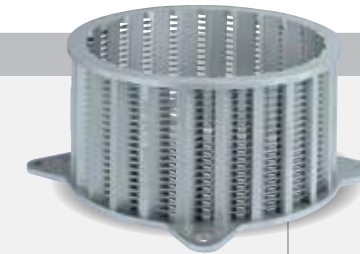
LARGE HOPPER CAPACITY AND POSITIVE PRODUCT FEED ASSISTANCE

The Comitrol Processor Model 2100 features large hopper capacity and positive product feeding for cutting fresh and frozen tempered meat through a wide range of sizes.

The Model 2100 provides maximum utilization of all types of meat for flaked and formed products, as well as other applications including bakery rework. A wide range of cutting heads and impellers are available for tailor-made particle size requirements.



TYPES OF CUTS



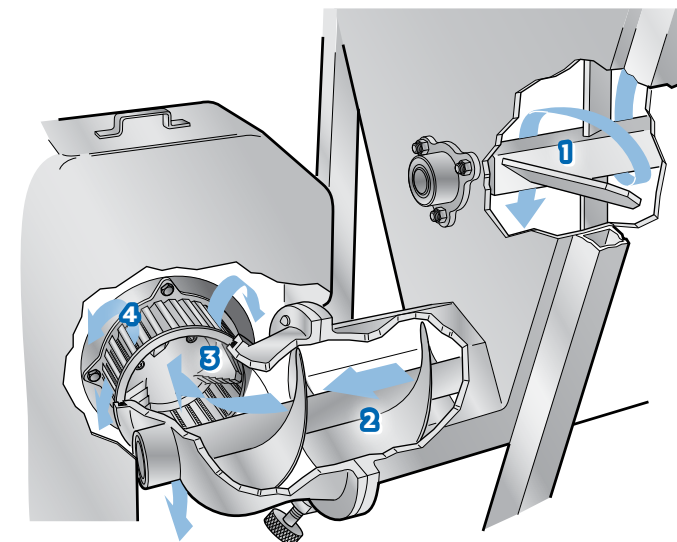
CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

SPECIFICATIONS

Length:	69.04" (1754 mm)	Screw Feeder –
Width:	*65.00" (1651 mm)	5 HP (3.7 kW)
Height:	70.24" (1784 mm)	Agitator –
Net Weight:	2260 lb (1025 kg)	2 HP (1.5 kW)
Motors:	40 HP (30 kW) or 60 HP (44.7 kW)	

*Usual height with 40 HP motor. This height will vary depending on horsepower and motor manufacturer.



CUTTING OVERVIEW

1. Agitator
2. Screw Feeder
3. Impeller
4. Cutting Head



Cutting unit with cover removed (for illustration)

COMITROL® PROCESSOR MODEL 3600 SLANT

SMALL VOLUME TO HIGH CAPACITY ENVIRONMENTS

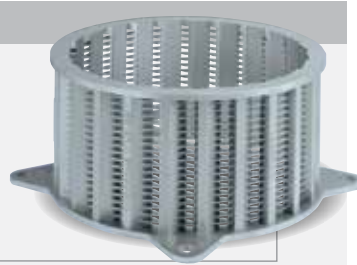
The Comitrol Processor Slant Model 3600 is designed for low to high capacity production environments.

Processors benefit from the wide selection of cutting heads and impellers that are available for diverse applications such as chopping, flake cutting, granulating, pureeing, and emulsifying.

Foods such as meats, poultry, fruits, vegetables, and cheeses can be processed as well as chemical and pharmaceutical products.



TYPES OF CUTS



CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

SPECIFICATIONS

MODEL 3600 SLANT

Length:.....36.72" (933 mm)
Width:.....29.76" (756 mm)
Height:.....38.80" (985 mm)
Net Weight: 400 lb (191 kg)
Motor:.....10 HP (7.5 kW)

COMITROL® PROCESSOR SLANT MODELS 3640, 3660, & 3675

PARTICLE SIZES RANGING FROM COARSE TO FINE EMULSIONS ARE POSSIBLE

The compact size of the Comitrol Processor Slant Models 3640, 3660, and 3675 makes each machine ideal for a wide range of small volume to high capacity production environments. Each model varies in dimension, weight, and horsepower.

Processors benefit from the wide selection of cutting heads and impellers that are available for diverse applications such as chopping, flake cutting, granulating, pureeing, and emulsifying.

Foods such as meats, poultry, fruits, vegetables, and cheeses can be processed as well as chemical and pharmaceutical products. The machine features continuous operation for uninterrupted production, and is designed for easy cleanup and maintenance.



SPECIFICATIONS

MODEL 3640 SLANT

Length:.....51.30" (1303 mm)
Width:.....40.98" (1041 mm)
Height:.....62.43" (1586 mm)
Net Weight: 1196 lb (542 kg)
Motor:.....40 HP (29.8 kW)

MODEL 3660 SLANT

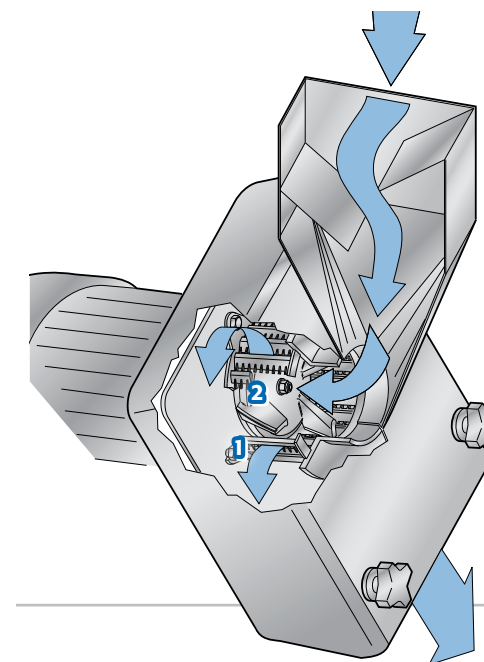
Length:.....59.36" (1508 mm)
Width:.....42.88" (1089 mm)
Height:.....62.43" (1586 mm)
Net Weight: 1400 lb (636 kg)
Motor:.....60 HP (44.8 kW)

MODEL 3675 SLANT

Length:.....63.54" (1614 mm)
Width:.....42.88" (1089 mm)
Height:.....62.43" (1586 mm)
Net Weight: 1500 lb (681 kg)
Motor:.....75 HP (56.0 kW)

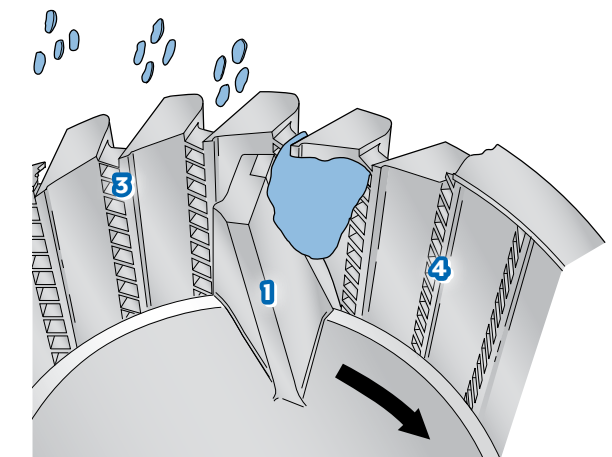


Cutting unit with cutting enclosure removed (for illustration)



CUTTING OVERVIEW

1. Impeller
2. Cutting Head
3. Horizontal Separators
4. Vertical Knives



COMITROL® PROCESSOR MODELS 3600F & 3640F

POSITIVE PRODUCT FEED LOW TO HIGH VOLUME PRODUCTION ENVIRONMENTS

The compact size of the Comitrol Processor Models 3600F & 3640F is ideal for a wide range of small volume to high capacity production environments. Screw feeder assists with positive feeding of product.

Processors benefit from the wide selection of cutting heads and impellers that are available for diverse applications such as chopping, flake cutting, granulating, pureeing, and emulsifying. Widely used for rework of gelatin capsules, biscuits,

candy, noodles, and a full spectrum of bakery goods, 3600F & 3640F also reduce meats, fish, textured vegetable protein, fruits, vegetables, spices, seaweed, cheeses, and chemical and pharmaceutical applications. The machine features continuous operation for uninterrupted production, and is designed for easy cleanup and maintenance.



SPECIFICATIONS

A. MODEL 3600F

Length:..... 61.18" (1554 mm)
Width:..... 32.13" (816 mm)
Height:..... 69.41" (1763 mm)
Net Weight: 800 lb (363 kg)
Motors: 10 HP (7.5 kW)
 Screw Feeder – 2 HP (1.5 kW)

B. MODEL 3640F

Length:..... 82.25" (2089 mm)
Width:..... 48.00" (1219 mm)
Height:..... 69.27" (1759 mm)
Net Weight: 1850 lb (840 kg)
Motors: 40 HP (29.8 kW)
 Screw Feeder – 2 HP (1.5 kW)

TYPES OF CUTS

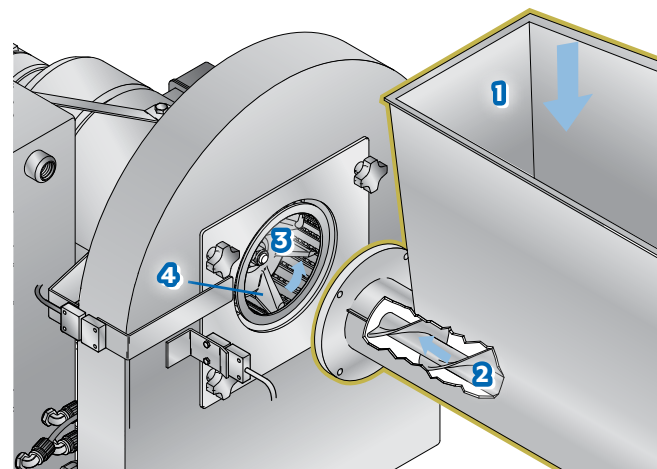


CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

CUTTING OVERVIEW

1. Feed Hopper
2. Screw Feeder
3. Cutting Head
4. Impeller



Cutting unit (for illustration)

COMITROL® PROCESSOR MODEL 5600

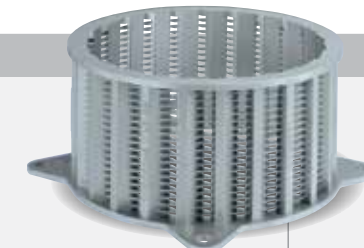
POSITIVE PRODUCT FEED COMBINED WITH CLOSE TOLERANCE CUTTING

The Comitrol Processor Model 5600 has all of the benefits of the unique Comitrol size reduction principle, plus close cutting tolerances at an increased impeller speed of 5,600 revolutions per minute. The unit offers a high degree of particle size control to meet your product specifications and texture requirements.

The Model 5600 has a positive product feed and will deliver precise, cleanly cut particles from a variety of fresh or frozen tempered raw meat materials with little temperature rise. The equipped screw feeder employs a gearmotor and a VFD (variable frequency drive) to vary speed and maximize throughput. The Model 5600 produces consistent, high quality particles without the variance experienced using typical screw, pump-fed grinder-plate, or chopper-bowl style machines.



TYPES OF CUTS

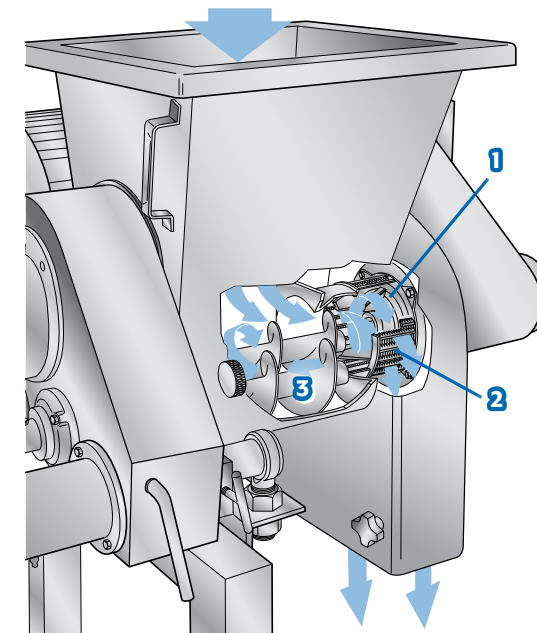


CUTTING HEAD:

Offers sizes from .010 to 1.5" (.254 to 38.1 mm)

SPECIFICATIONS

Length:..... 93.19" (2367 mm)
Width:..... 58.78" (1493 mm)
Height:..... 67.75" (1721 mm)
Net Weight: 3300 lb (1497 kg)
Motors:..... 100 HP (75 kW)
 Screw Feeder – 5 HP (3.7 kW)



CUTTING OVERVIEW

1. Impeller
2. Cutting Head
3. Screw Feeder



Cutting unit with cutting enclosure removed (for illustration)

COMITROL® PROCESSOR MODEL 9310

HIGH CAPACITY, SINGLE PASS PRODUCTION OF SLURRIES, PASTES, OR LIQUIDS

The 5patented Comitrol Processor Model 9310 replaces the model 9300. Features include an integrated HMI, improved airflow system, newly designed cutting enclosure, and an extended shaft spindle. Integrated standard HMI monitors amperage, temperature of the motor bearings and inside air of the support housing, identifies misaligned safety sensors, and flags machine runtime, motor loads, and overfeeding issues.

The airflow system incorporates a new screened-in fan within a support housing working to consistently cool the motor and belt and deter the support housing from thermally expanding. Air ducts divert warm air away from the product zone. Stainless steel mesh on fan screen may be easily removed for routine cleaning.

Robust cutting enclosure is contoured to alleviate product pressure inside the impeller with seals firmly seated for containment of processed products. Different bolt-on discharge designs are available to suit different production lines.

Extended shaft spindle inserts additional space between the spindle and cutting enclosure and maintains a primary and labyrinth seal to deter product from entering the spindle bearings. It is also outfitted with a bypass to prevent build-up and back-up of product.

The Comitrol Processor Model 9310 is recommended for particle size reduction when the final product will be a slurry, paste, or liquid. The 9310 is designed for one-pass size reduction due to the rapid velocity speed of the impeller. Vegetables, fruits, and meats for baby food, as well as nut milks and butters are routinely processed implementing this machine.

TYPES OF CUTS

Size of cut is determined by the number, spacing, and angle of blades in the microcut head. A wide range of microcut heads enable the Model 9310 to produce a variety of particle sizes. Other factors such as hardness of the product will affect size of cut.



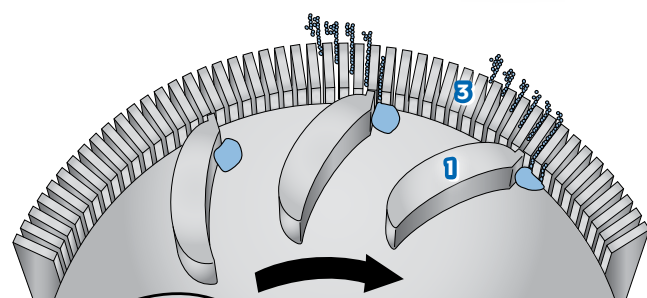
A



New 9310 comes standard with HMI

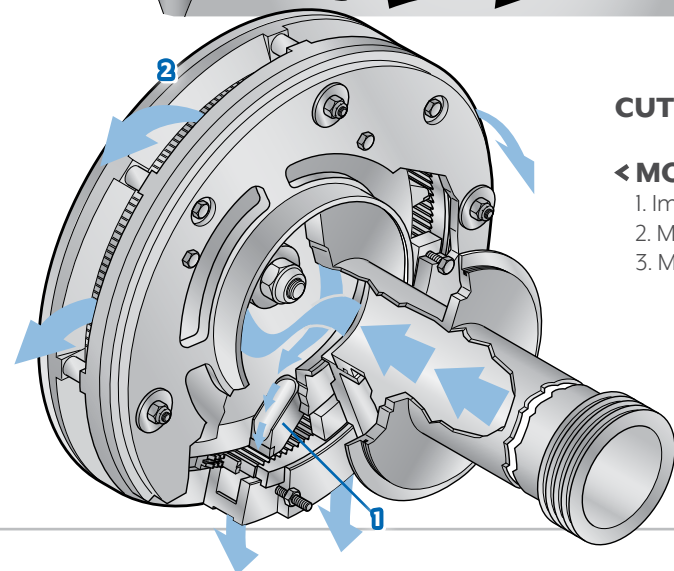


B



CUTTING OVERVIEW

- < MODEL 9310**
1. Impeller
 2. Microcut Head
 3. Microcut Blades



Acai Berry reduction.



The 12" (304.8 mm) diameter microcut head and impeller compared to the 6" (152.4 mm) microcut head (used on other Comitrol Processors).

SPECIFICATIONS

A. MODEL 9310 WITH FEEDER

Length:..... 107.00" (2718 mm)
Width:..... 60.90" (1547 mm)
Height:..... 94.00" (2388 mm)
Net Weight:..... 4000 lb (1814 kg)
Motors:..... 150 or 200 HP
 (112 or 149.1 kW)
Screw feeder – 2 HP (1.5 kW)

B. MODEL 9310

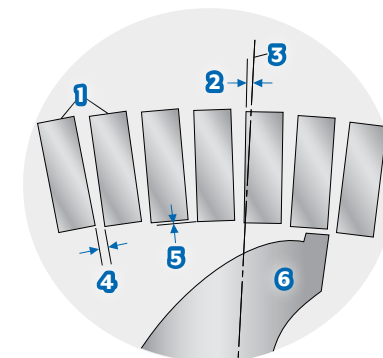
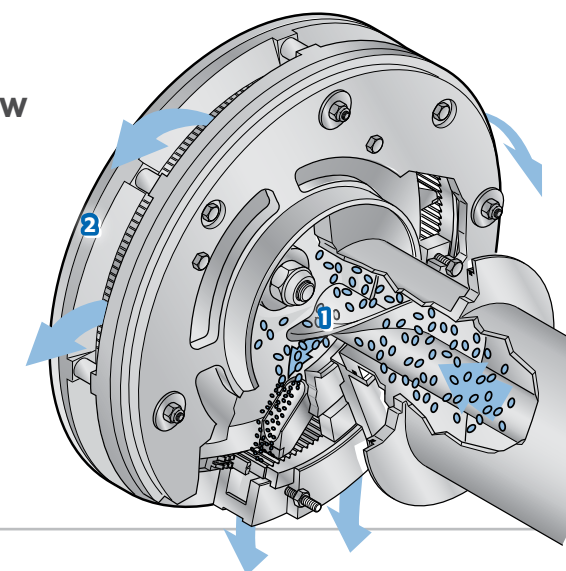
Length:..... 66.57" (1691 mm)
Width:..... 58.97" (1498 mm)
Height:..... 94.00" (2388 mm)
Net Weight:..... 3800 lb (1724 kg)
Motor:..... 150 or 200 HP
 (112 or 149.1 kW)

The Model 9310 series can be equipped with or without a feeder. The massive twelve inch diameter reduction head (twice the size of reduction heads in other Comitrol models) make it possible to achieve smaller particle sizes and generate less frictional heat. The equipped screw feeder employs a gearmotor and a VFD (variable frequency drive) to vary speed and maximize throughput.

By using as much as 200 horsepower (149.1 kW), much larger throughputs are possible. In some cases, the Model 9310 can process certain products that cannot be accomplished with any other size reduction equipment.

CUTTING OVERVIEW

- MODEL 9310 WITH FEEDER >**
1. Feed Screw
 2. Microcut Head
 3. Microcut Blades



< MICROCUT BLADE

- Top View
1. Blades
 2. Blade Tip Angle
 3. Center Line
 4. Opening
 5. Depth of Cut
 6. Impeller

Comitrol Model 9310 Microcut Heads

Head Description	Depth of Cut		Opening	
	inches	mm	inches	mm
160156-5	.0251	.6375	.0792	2.0117
172156-10	.0420	1.0668	.0606	1.5392
1801156-5	.0219	.5563	.0530	1.3462
190156-1	.0062	.1575	.0362	.9195
200156-1	.0062	.1575	.0326	.8280
206156-(-.25)	.0020	.0508	.0270	.6858
212156-(-.25)	.0019	.0483	.0219	.5563
220156-1	.0054	.1372	.0154	.3912
224156-(-.74)	.0002	.0051	.0123	.3124
225156-1	.0052	.1321	.0117	.2972
226156-(-.25)	.0016	.0406	.0108	.2743
230156-(-.74)	.0001	.0025	.0079	2.007
230156-1	.0051	.1295	.0080	.2032
234156-(-.25)	.0015	.0381	.0051	.1295
238156-(-.25)	.0014	.0356	.0024	.0609
240156-(-.25)	.0014	.0356	.0011	.0279
241156-(-.25)	.0014	.0356	.0005	.0127

Production Proven in Hundreds of Applications

abalone	brewer's hops	copra	granola	lobster	pickles	spinach
acai	broccoli	corn	grape juice	macadamia nuts	pimentos	squash
agave	brussel sprouts	corn flakes	grapefruit	macaroni	pineapple juice	starch
albacore	bulgar	corn syrup	grapefruit juice	mackerel	pineapples	steroids
alfalfa	cabbage	cornmeal	grapefruit peel	mangoes	pizza cheese	strawberries
almonds	cakes	cottage cheese	grapes	marmalade	plasma	string beans
anchovies	candy	crab	graphite	marshmallows	plums	stuffing
animal fat	candy bars	crackers	grease	masa	polymers	suet
animal glands	cantaloupes	cranberries	greens	mayonnaise	popcorn	sugar
antibiotics	capons	cream	grits	meat	poppy seed	sunflower seeds
apple juice	capsules	croustons	guava	melon rinds	pork	sweet potatoes
apples	carbon black	cucumbers	gum	melons	poultry	syrup
applesauce	carrots	curd	gumbo	mincemeat	prune juice	tapioca
apricots	casein	currants	haddock	molasses	prunes	tea
artichokes	cashew nuts	dates	hake	mushrooms	puddings	teflon
ascorbic acid	cat food	detergent	halibut	mustard	pumpkins	tobacco
asparagus	catsup	dill	ham	mustard green	quince	tomato paste
aspirin	cauliflower	dog food	hamburger	mutton	rabbit	tomato pulp
avocados	caviar	duck	herbs	nectarines	raisins	tomato sauce
baby food	celery	eggplants	herring	newsprint	raspberries	tomatoes
bacon	cereal	eggs	hide	noodles	ravioli	tripe
bagasse	cheese	endive	hominy	nut meats	relish	tuna
bagels	cherries	evaporated milk	horseradish	nuts	rhubarb	turkey
bamboo shoots	chicken	farina	huckleberries	ointments	rice	turnips
bananas	chicory	figs	ice cream	okra	rubber	turtle
bank notes	chili	filberts	insulin	olives	rutabagas	vanilla
barbecue sauce	chives	fish	jams	onions	rye	veal
barley	chocolate	flaked and	jellies	orange peel	sage	vegetable protein
bean sprouts	chop suey	flax seed	juices	oranges	salads	vegetables
beans	chub	formed meats	kale	ossein	salami	vermicelli
beef	cinnamon	flour	kelp	oysters	salmon	vinegar
beef jerky	citron	fowl	kohlrabi	pancreas	salt	vitamins
beef tissue	citrus peel	frankfurters	lamb	papayas	sausages	walnuts
beets	clams	fruit cocktail	leeks	parsley	sausage	water chestnuts
benzoyl	clay	fruits	lemon grass	pastry	scallops	wax beans
peroxide	cocoa-butter	galangal	lemon peel	peaches	seaweed	wheat
berries	coconuts	garlic	lemons	peanut butter	semolina	wheat germ
biscuits	cod	gelatin	lettuce	peanuts	sesame seeds	whey
black-eyed peas	coffee	gherkins	lima beans	pears	sherberts	yams
bologna	cole slaw	giblets	lime peel	pecans	shrimp	yeast
bone meal	collagen	ginger	limes	penicillin	soups	yogurt
bran	collard	gooseberries	lingonberries	pepperoni	soy beans	zucca melons
brazil nuts	condensed milk	graham crackers	liver	peppers	spaghetti	zucchini
bread	cookies	grain	liverwurst	petfood	spices	

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§ The Comitrol Processor may contain parts protected by U.S. Patent No. 9033268.

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