

CARTER DAY

Sizing & Separating Equipment



UNIFLOW LENGTH GRADERS

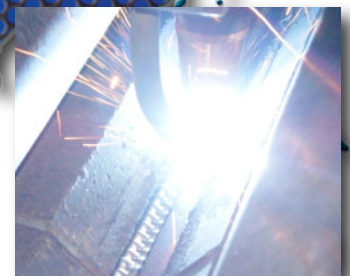
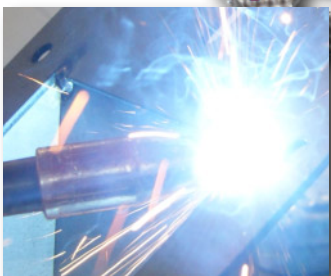
17" MODULAR UNIFLOW

23" MODULAR UNIFLOW

NO 3SI UNIFLOW

PHAT BOY UNIFLOW

COMBO SIZER UNIFLOW



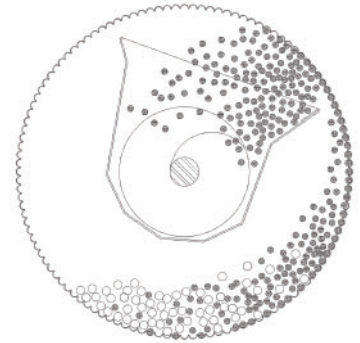
WORLDWIDE REPRESENTATION

CARTER DAY

UNIFLOW LENGTH GRADER

For more than 140 years Carter Day has been manufacturing quality processing equipment. We continue this tradition with all of our Uni-Flow Length Separators. Carter Day Uniflows are the original and preferred length graders in agribusiness worldwide. Carter Day offers four different model Uniflows each offering a different advantage for the user.

The UniFlow Length Grader indented cylinder separator relies upon centrifugal force, the shorter material is lifted by indent pockets that line the inside surface of the cylinder. The operator controls the separation by adjusting the position of the separating edge of the trough, into which the product falls. The trough control makes possible a selection of the exact degree of separation desired. The operator also controls the speed of the cylinder which holds the particle in the indent, lifting it out of the mass until the indent is inverted to the point where gravity causes the particle to fall out of the indent. The Patented Tapered Trough arrangement allows for limited restriction of incoming flow and minimal pinching of grain at the point of separation. A screw conveyor then discharges the short lifted material separate from the tailed long material. The amount of product which can be length separated depends on the number of pockets coming in contact with the product and lifting edge. The optional adjustable retarder system found on the Modular Uniflow and No. 3SI may also be used to control the amount of product maintained in the cylinder. The adjustable retarder can be positioned out of the product flow when it is not required.



All four Uniflows offer specific advantages to certain length grading applications. The Modular Uniflow is traditionally used for 24 hour high capacity precision length grading application where independent speed control is not required. The No 3SI is used for standard length grading applications where independent cylinder speed control is required. The Phat Boy Uniflow is used for 24 hour Super high capacity non-precision length grading.

The Modular Uniflow and No 3SI (17") diameter cylinder offers more efficiency from a given length (ours 2286 mm or 90") than our larger diameter Phat Boy cylinder. This is because a cylinder's efficiency is related to the number of lifting pockets that pass the edge of the lifting trough in a given period of time. As the cylinder diameter gets larger the speed of the cylinder must be reduced to control the effect of centrifugal acceleration on the product. When considering our new 23" diameter cylinder you may see an increase in capacity if you can keep the same speed as the traditional 17" without altering the factors of centrifugal force. In any length grading indent if speed is not considered you will create a false length grading situation if you over speed the cylinder per the application.

The Phat Boy Cylinder (36") is traditionally used for higher capacity application where 60 to 80% efficiency in length separation is required or when the length separation is extreme.

The Uniflow Length Graders can be configured in many different flow arrangement in order to provide the highest efficiency and capacity.

CARTER DAY

17" UNIFLOW MODULAR DRIVE SYSTEM

The Modular 17 inch diameter Uniflow providing high efficiency length separation using a Universal Drive. The Modular Uniflow offers a wide number of cylinder arrangements using our patented modular drive system. The Modular Uniflow can use both segmented and solid cylinders.

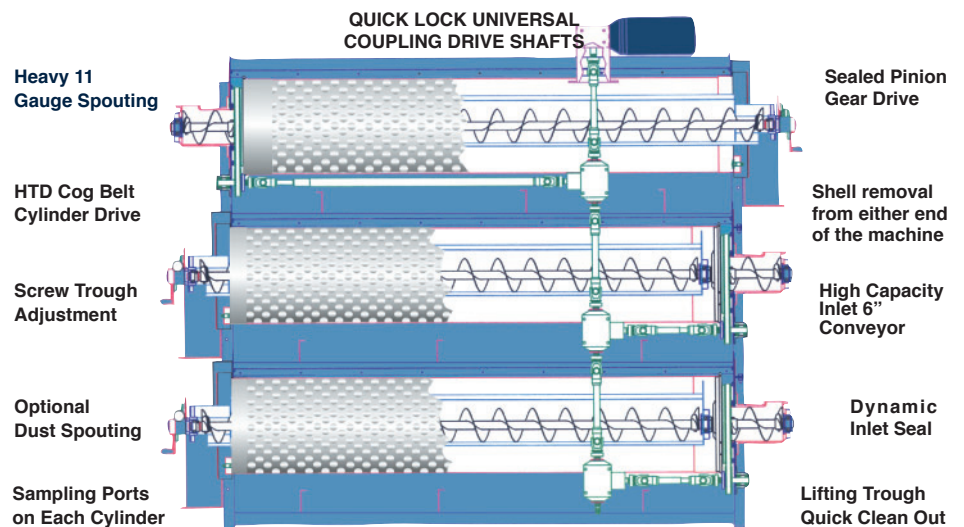
Modular Design allows for greater overall flexibility to meet most application demands. Self contained vertical modules can be broken down for shipment and easily re-assembled on job site. Modular design allows re-configuration in the field if processing needs change.

Because of the modular design, each vertical stack will have identical components and few of those are subject to replacement at overhaul time.

The Modular Drive System uses a motor mounted right angle reducer which connects to a PTO shaft. The PTO shaft then connects to a 3 way transfer box which directs power to the end of the cylinder.



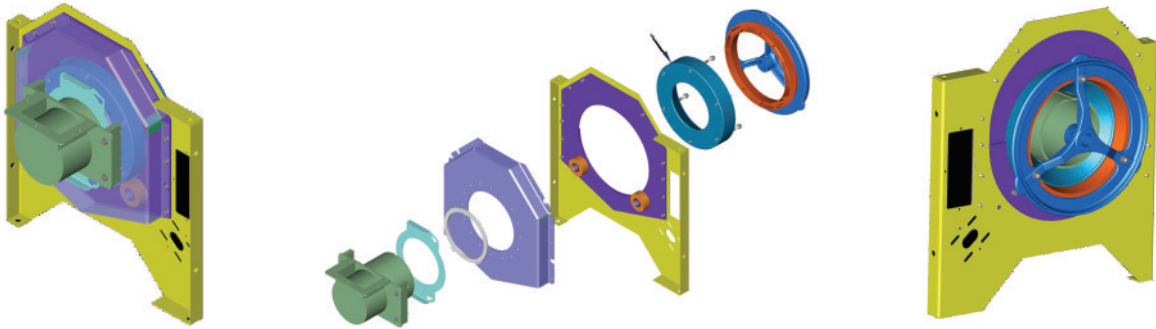
MODULAR UNIFLOW 3 HIGH



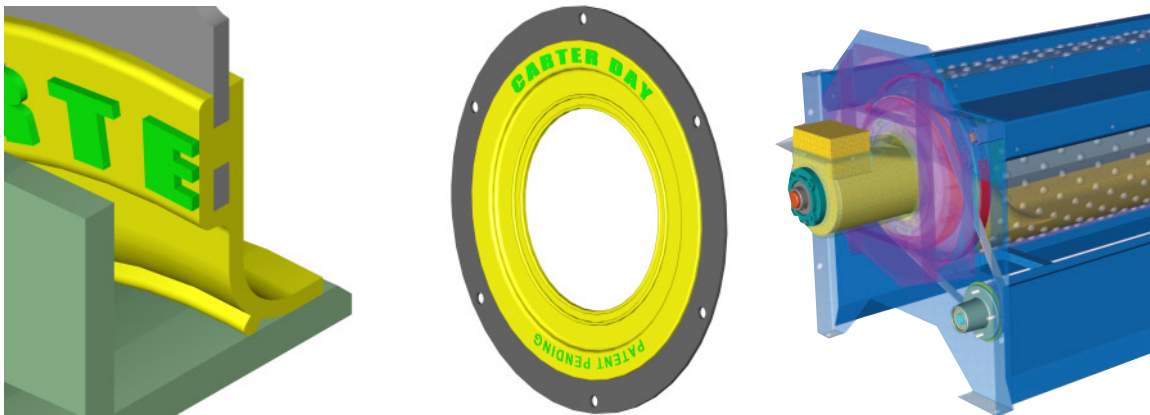
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UNIFLOW SALES AND TAPERED TROUGH

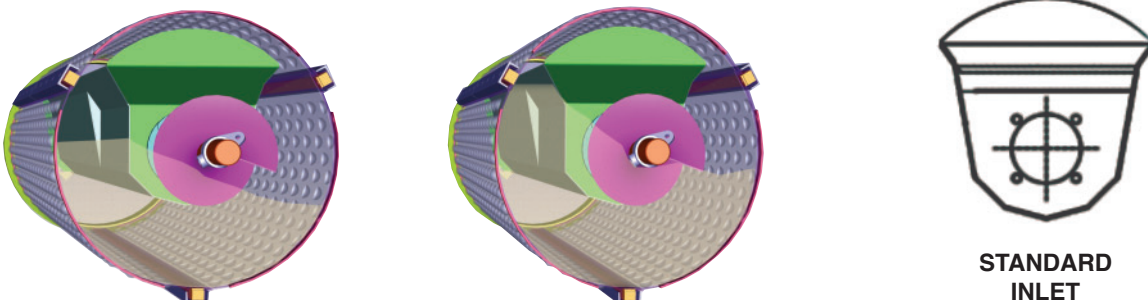
The Modular Uni-Flow provides optional inlet seal packages to meet your needs. The Patent Pending Trunnion Inlet with Split or Bushing Seal is just one of the packages. The High Capacity Machined inlet provides a tight seal contact area offering better inlet sealing. The Patented Pending Trunnion Inlet Split Seal and Standard Inlet Split Seal is yet another option Allowing seal removal without cylinder removal.



Patent Pending Carter Day Urethane Seal offers a unique shaft sealing system stopping grain from flowing back to the inlet which stops leakage. This seal has been critical working with canola and small seed applications.



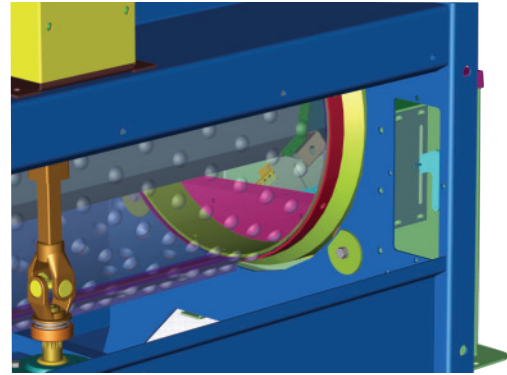
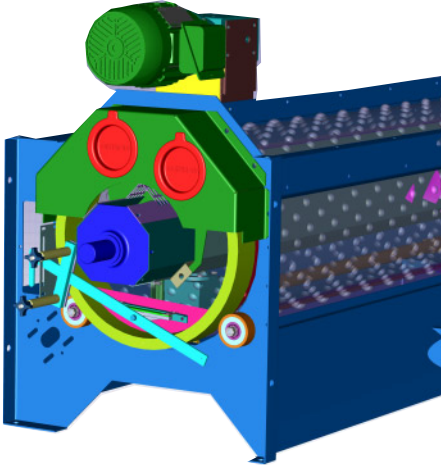
The Patent Pending Tapered Trough Assembly allows increased product flow at the inlet and in the kidney. Also reducing lifted product pinching at the lifting edge and length grading errors. It also moves



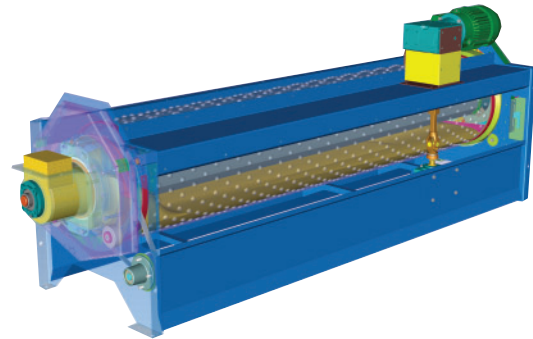
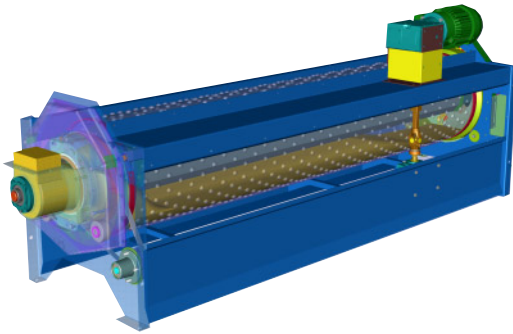
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INTERNAL PRODUCT FLOW CONTROL

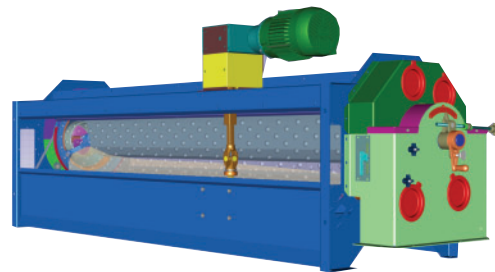
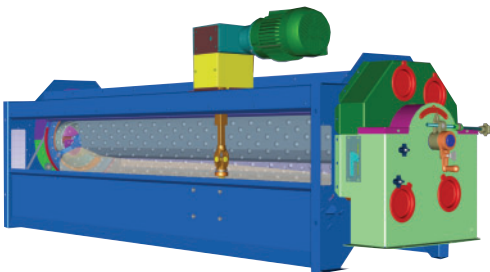
Optional Uniflow Adjustable Retarder for 17 and 23 Uniflows which can be used to create a kidney of product when the application requires it.



Below drawings show without retarded (left) and with a retarder (right). Notice that the kidney as increased by 50%. If ran at high capacities the retarder will eventually reduce the efficiency of separation.



Below drawings show without retarder (left) and with a retarder (right). Notice that the kidney as increased by 50%. If ran at high capacities the retarder will eventually cause back up to the inlet seal and in some cases false lifting separation and inlet leaking may occur.



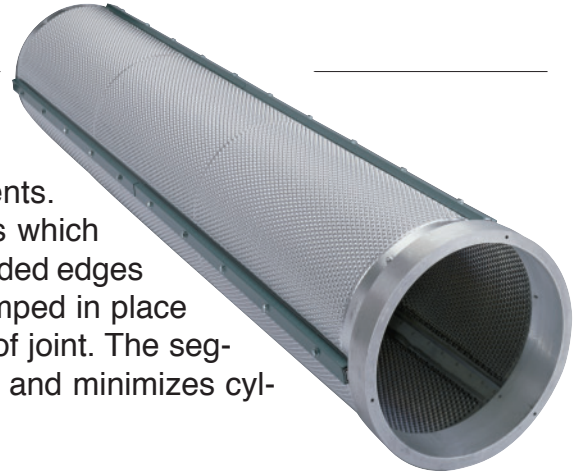
PRECISION SIZER CYLINDER

DESIGN AND CONSTRUCTION

CARTER DAY UNIFLOW cylinders are the most wear resistant and highest number of pockets persquare inch in the industry. Our hardening process provides you with the most wear resistant cylinders in almost any application. Along with our superior dies we can provide you with the best length grading sizing cylinder in the industry today. We offer nickel plating chroming or wear bands if the application

CARTER DAY PATENTED SEGMENTED CYLINDERS

The Segmented Cylinder consist of three equal segments. These segments are joined together by three solid bars which are attached to the ends of the cylinder assembly. The folded edges of the shell segments nest over these bars and are clamped in place with a clamping channel which provides secure leakproof joint. The segmented cylinder design increases clean-out capabilities and minimizes cylinder removal downtime and maintenance.



CARTER DAY SOLID CYLINDERS

The Carter Day solid cylinder has the highest degree of pockets per square inch.

PHAT BOY CYLINDER CONSTRUCTION

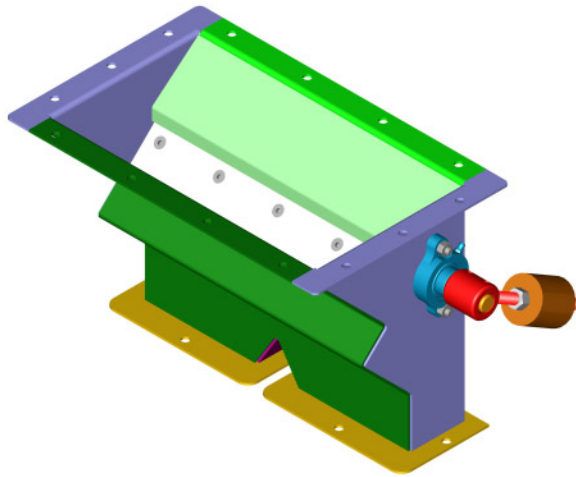
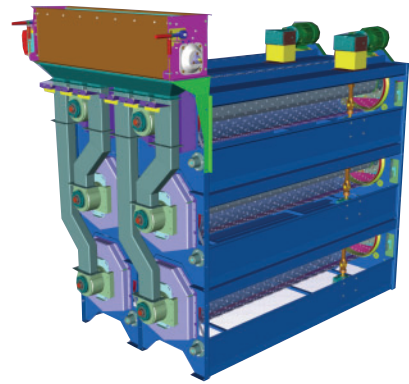
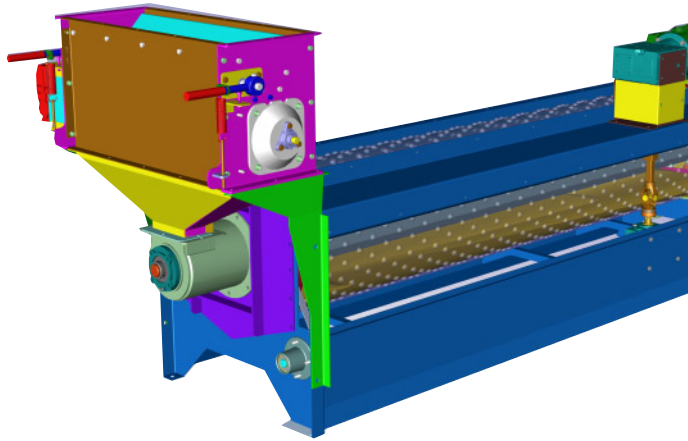
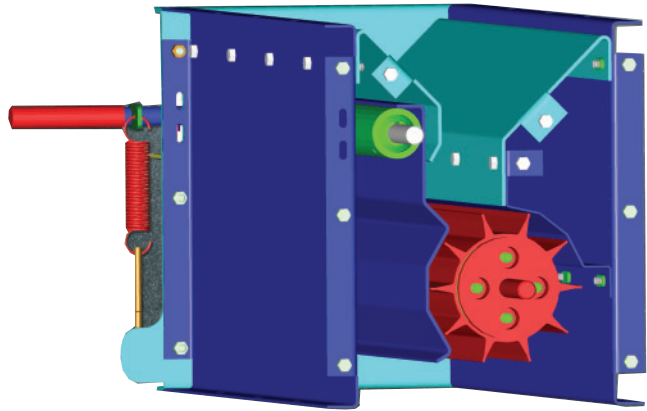
The cylinder is made up of 12 patented segmented cylinders mounting to the end rings and center ring. We use a Trunnion Ring Support System to provide strength and ease of cylinder replacement. There is no discharge spider allowing for un-restricted product flow thru the cylinder discharge. This cylinder design provides a round cylinder that the 4 piece segments just cannot do.



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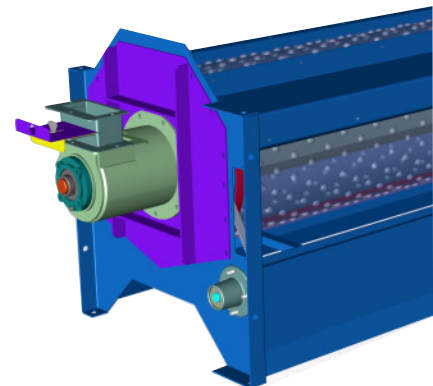
FEED CONTROL OPTIONS

Feedroll Feeder for meter feeding uniflows for best performance. The Feedroll Feeder offers the best controlled feed rate when surge hoppers and volumetric feeders are not available.



The optional **Weighted Gate Feeder** for the Modular Uniflow and No. 3SI for inlet feed control. The weighted gate offers a more controlled length separation and restricts over filling of the cylinder which may cause inlet leaking.

Slide Gate input control is standard at each cylinder. This offers minimal control of feed rates at high or very low capacities.

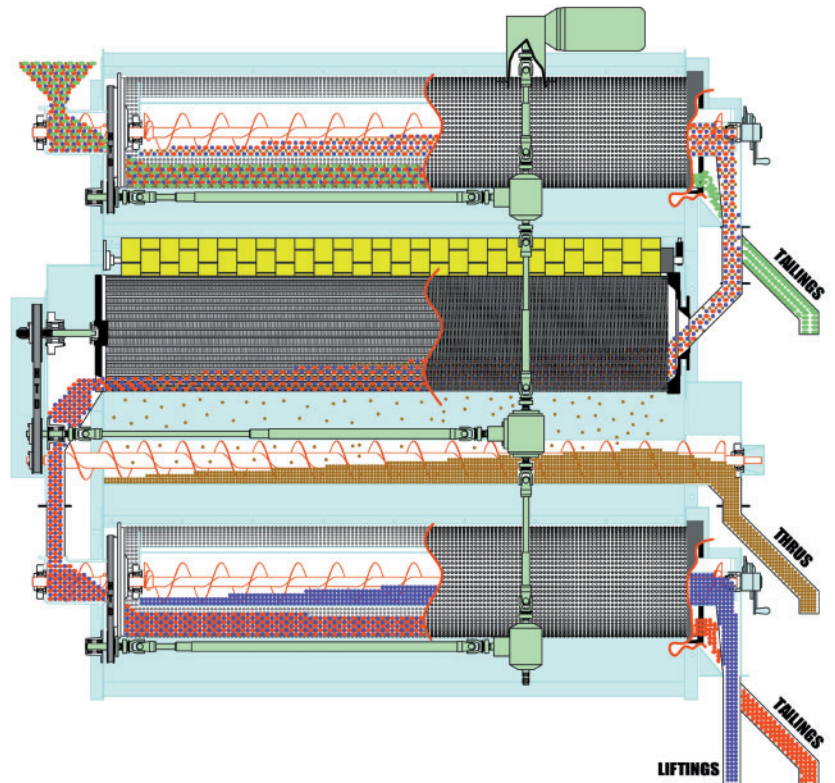


CARTER DAY MODULAR COMBO SIZER

The Combo Machine combines the Modular Uniflow and 18" Sizer providing high efficiency width and length grading or just width separation using our Universal Drive. We use the same patented drive package as the Modular Uniflow allowing many flow configurations. This drive system uses a reducer to PTO drive system and then final HTD Belt running the cylinders and screws.

This configuration combining length grading and width/thickness sizing in one pass which allows for endless cleaning applications. We widely use this machine on reclaim systems for large grain terminals. We also use it as a primary cleaner when length grading and width grading combinations are required.

We can design a combination grading system in order to meet almost any reclaim system requirements. While also being able to make complete cleaning systems for wheat,barley,canola etc. A system can have up to 5 separations in one pass depending on the overall capacity requirements.



CARTER DAY PHAT BOY UNIFLOW

The Phat Boy Uniflow is our large diameter Uniflow providing high capacity length grading when high efficiency separation are not required.



PHAT BOY TAPERED TROUGH AND SCREW AUGER

The patent pending tapered trough allows higher amounts of grain to flow thru the cylinder without the restriction of a tradition trough. This reduces back up to the seal and pinching of product giving you a false length grading. Our screen auger is bolted to the direct drive shaft for ease of replacement.



PHAT BOY DIRECT DRIVE DESIGN AND SPIDER CONNECTION

The shaft mounted direct drive offers reliability and ease of VFD control. The direct drive shaft connects via a Ring Feder bolted connection. The spider design is non-tubular in construction using welded plate and angle to create the spider.



PHAT BOY SEAL CONE INLET ASSEMBLY AND UHMW SEAL

The Seal Cone Inlet is a patent pending design that moves the seal point away from the length grading process. The seal cone is tapered so the seal is moved up 2-4 inches and back 4 inches away from the length grading process. We match the seal cone with a split UHMW seal mounting on the inside of the cylinder around the inlet.

PHAT BOY DISCHARGE TROUGH ASSEMBLY

The discharge assembly is also our standard Uniflow design. We also include a large window for studying the lifting process inside the machine.

PHAT BOY SPOUTING

We have used our standard removable Uniflow spouting arrangements on the Phat Boy. This provides quick replacement and lower cost than spouting found inside the end plates of the machine.



The Phat Boy Uniflow can be stacked 3 high or used in a Pyramid Flow to meet your application needs. It can also allow for Length Grading and Tribar Sizing in one pass such as processing white rice by length grading brokens rice and width sizing thin rice. The Phat Boy Uniflow can also be used in conjunction with the Carter Day Modular Uniflow to meet your processing needs.

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NO 3SI UNIFLOW

The No 3SI Uniflow is our 17 inch diameter Uniflow providing high efficiency length separation with manual individual speed adjustments.

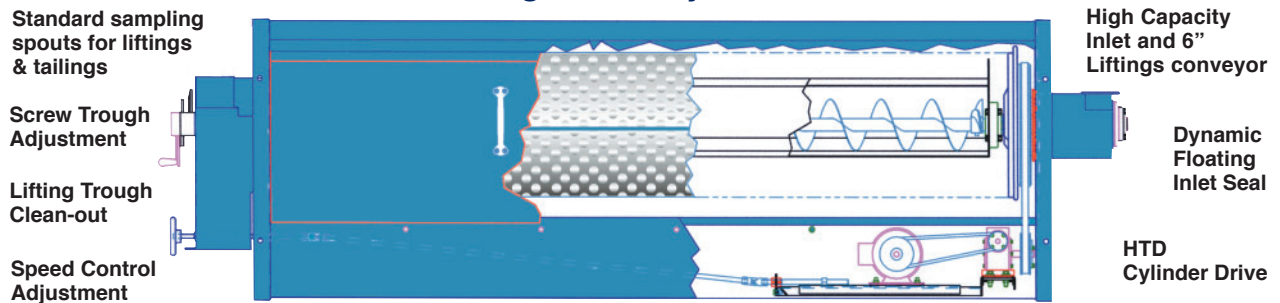


The No. 3SI variable speed HTD drive system consist of a spring loaded V belt sheave on the motor. The rotation speed of the cylinder may be changed by the external cylinder speed adjustment wheel which slides the motor base changing the input speed to the worm gear reducer which changes the speed



The optional adjustable retarder system found on the Modular Uniflow and No. 3SI may improve separation results by controlling the amount of product maintained in the cylinder.

Segmented Cylinder



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23" UNIFLOW DIRECT AND MODULAR DRIVE

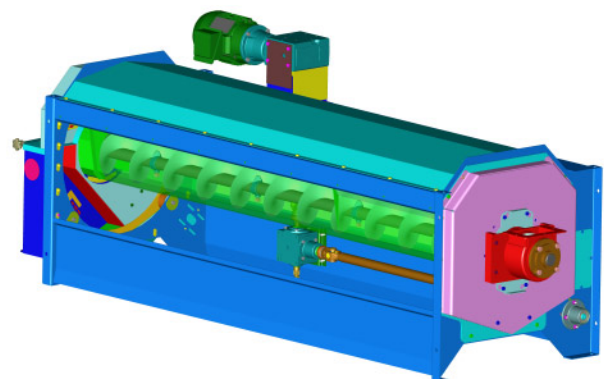
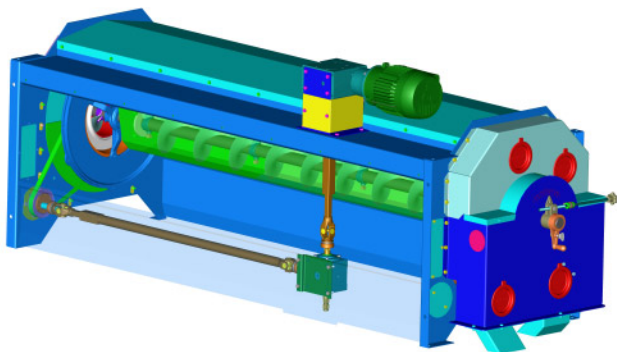
The Modular 23 inch diameter Uniflow providing high efficiency length separation using a Universal Drive or Right Angle Direct Drive. The Modular Uniflow offers a wide number of cylinder arrangements using our patented modular drive system. The Modular Uniflow can use both segmented and solid cylinders.

Modular Design allows for greater overall flexibility to meet most application demands. Self contained vertical modules can be broken down for shipment and easily re-assembled on job site. Modular design allows reconfiguration in the field if processing needs change.

Because of the modular design, each vertical stack will have identical components and few of those are subject to replacement at overhaul time.



The 23" Right Angle Direct Drive system consist of a shaft mounted gear reducer and 1hp motor. The rotation speed of the cylinder may be changed by the external use a customer supplied VFD if required.



The Modular Drive System uses a motor mounted right angle reducer which connects to a PTO shaft. The PTO shaft then connects to a 3 way transfer box which directs power to the end of the cylinder.

UNIFLOW INDENT CYLINDER

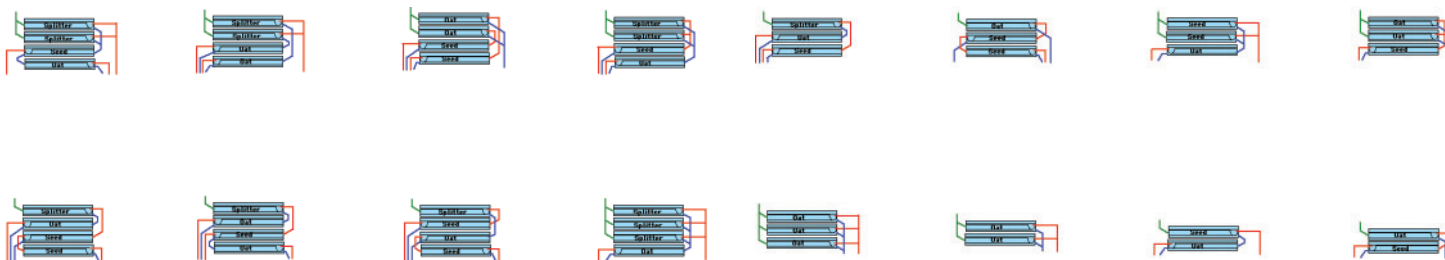
CAPACITIES AND FLOW ARRANGEMENTS

CAPACITIES AND FLOW ARRANGEMENTS

Uniflow Model	Wheat	Barley	White Rice	Oats	Seed Corn
17 Uniflow 1 High	Splitter 8 - 9 mt/hr	Splitter 5.4-6.5 mt/hr	3/4Lift 1.75 - 2 mt/hr	Splitter 2.5 - 5	1.1-2.9 mt/hr
17 Uniflow 1 High	Seed 1.5 - 3.6 mt/hr	Seed 1.75-3 mt/hr	1/4Lift .75 - 1.25 mt/hr	Seed/Wheat .7 - 2	10% Lift 1.5 mt/hr
17 Uniflow 1 High	Oat 5.4 mt/hr	Oat 3.5-4.8 mt/hr		Stick 1.8 - 3 mt/hr	
17 Uniflow 3 High	Series Flow 4 - 9 mt/hr (#19, 13, 22)	Series Flow 6 - 8 mt/hr (#19, 13, 22)	Series Flow 8.5 - 3 mt/hr (#13, 11)	Series Flow 2.5 - 4 mt/hr (#19, 16, 13)	
17 Uniflow 3 High	Parallel Flow 24 mt/hr in a splitter application	Parallel Flow 20 mt/hr in a splitter application	Parallel Flow 5.26 - 6 mt/hr in a splitter application (#13)	Parallel Flow 15 mt/hr in a splitter application	
No 3 SI	2.7 Seed - 5.4 Oat	1.75 Seed - 3.5 Oat	1/4 Lift .75 mt/hr	.7 Seed - 1.8 Oats	
23 Uniflow 1 High	Splitter 8 - 10.8 mt/hr	Splitter 5.4 - 9 mt/hr	3/4 Lift 1.75 - 2.4 mt/hr	Splitter 2.5 - 6	1.1 - 2.9 mt/hr
23 Uniflow 1 High	Seed 1.5 - 4.3 mt/hr	Seed 1.75 - 3.6 mt/hr	1/4 Lift .75 - 1.5 mt/hr	Seed/Wheat .7 - 2.4	10% Lift 1.5 mt/hr
23 Uniflow 1 High	Oat 6.5 mt/hr	Oat 3.5 - 5.75 mt/hr		Stick 1.8 - 3.6 mt/hr	
23 Uniflow 3 High	Series Flow 4 - 10 mt/hr (#19, 13, 22)	Series Flow 6 - 9.6 mt/hr (#19, 13, 22)	Series Flow 8.5 - 3.6 mt/hr (#13, 11, 8.5)	Series Flow 2.5 - 4.8 mt/hr (#19, 16, 13)	
23 Uniflow 3 High	Parallel Flow 29 mt/hr in a splitter application	Parallel Flow 24 mt/hr in a splitter application	Parallel Flow 5.26 - 7.5 mt/hr in a splitter application (#13)	Parallel Flow 18 mt/hr in a splitter application	
Phat Boy 1 High	Splitter 24 mt/hr	Splitter 20 mt/hr	3/4 Lift 6 mt/hr	Splitter 13.75 mt/hr	
Phat Boy 1 High	Seed 10 mt/hr	Seed 8 mt/hr	1/4 Lift 3.5 mt/hr	Seed/Wheat 5.5 mt/hr	
Phat Boy 1 High	Oat 14 mt/hr	Oat 12 mt/hr		Stick 8.25 mt/hr	
Phat Boy Pyramid	Series 19, 8.5, 24 mt/hr	Series 19, 8.5, 22 20mt	Series 13, 11, 8.5 - 6 mt/hr	Series 19, 8.5, 22 mt	

* Above capacities are based on length grading separation required and on incoming product percentage to be length graded. **17" Uniflow Capacities on a 95%+, **23 Uniflow capacities are based on 85-95+ % efficiency and Phat Boy is based on 75 - 90% efficiency. Any questions concerning efficiency please contact Carter Day.

Uniflow Model	Height	Length	Width	Net Weight	Motor
17 Modular 1 High	38" (965 mm)	115" (2921 mm)	28" (711 mm)	700 lbs (318 kgs)	2 hp
17 Modular 3 High	91" (2311 mm)	115" (2921 mm)	28" (711 mm)	1975 lbs (896 kgs)	2 hp
No 3SI	33" (838 mm)	115" (2921 mm)	27" (686 mm)	703 lbs (319 kgs)	.75 hp
23 Mod Drive1 High	42.45" (1078 mm)	115" (2921 mm)	34" (864 mm)	878 lbs (399 kgs)	1 hp
23 Direct Drive 1 High	35.19" (894 mm)	122.91" (3122 mm)	34" (864 mm)	878 lbs (399 kgs)	1 hp
Phat Boy 1 High	50" (1270 mm)	212" (5385 mm)	46" (1168 mm)	5000 lbs (2268 kgs)	7.5 hp



Complete laboratory service is at your disposal. Carter Day's facility enables us to test your unique product sample in laboratory or full size equipment to aid in determining the right machine for your application. We invite you to participate in tests conducted at our facility in Minneapolis, Minnesota, USA.

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