PulseFlow® and Conventional CBW® Batch Washers


On very rare occasions
an evolution takes place that
makes everyone stop and notice.
Revolutionizing Laundry Processing Technology.
Again.
PulseFlow®
TECHNOLOGY

CBW® PulseFlow® Batch Washers

The History

Since their introduction in the 1960s, tunnel washers have saved water, energy, and labor. In 1979, Milnor introduced its True Top Transfer CBW batch washer and has been a worldwide leader in tunnel washing since. With other innovations such as Solid Welded Partitions, Double Drum Construction, and High Mechanical Action, our productive and efficient equipment is unrivaled.

In our continuing efforts as an industry leader, we introduced our latest CBW washer innovation in 2009…

Pellerin Milnor

Introducing Milnor

PulseFlow Technology Benefits

Pellerin Milnor Corporation has developed a revolutionary, patent-pending system—PulseFlow Technology — which has been successfully implemented in health care, hospitality, and linen supply applications worldwide. The superior soil removal and rinsing performance of PulseFlow Technology has been verified by independent testing laboratories and has earned a Hohenstein Certificate. PulseFlow Technology in a new Milnor CBW washer offers:

- Lowest Water Consumption
- Enhanced Chemical Performance
- Low Energy Usage
- Faster Washing

's Proven CBW® PulseFlow® Technology.

PulseFlow®

TECHNOLOGY

PulseFlow Technology

Milnor's PulseFlow Technology CBW washer (patents pending) retains all the proven features that have made the Milnor CBW washer a market leader for over 30 years. The PulseFlow concept now improves upon that technology with increased productivity, reduced utilities, more efficient use of chemical energy and the lowest possible amount of water.

PulseFlow Technology combines traditional True Top Transfer with a standing bath and controlled intermittent counterflow in every process module. For the greatest part of each cycle, processing without counterflow creates standing baths so that chemicals are allowed to do their job without being diluted. Then, for a very short portion of each cycle, high-velocity counterflow is applied—PulseFlow—thus providing the first part of the required dilution effect. The second stage of dilution, True Top Transfer, ensures the goods move into far cleaner water every time. Dedicated rinse modules are not required, meaning more production from fewer modules.

05: PulseFlow Technology

A: The Innovation

B: Lowest Water Consumption

C: Enhanced Chemical Performance

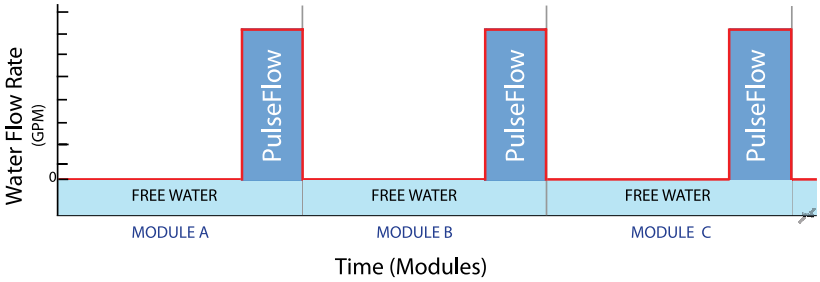
D: Low Energy Usage

E: Faster Washing

PulseFlow® TECHNOLOGY

A. The Innovation

Milnor's PulseFlow Technology is a unique but simple solution for faster and more water-efficient washing in a Continuous Batch Washer.

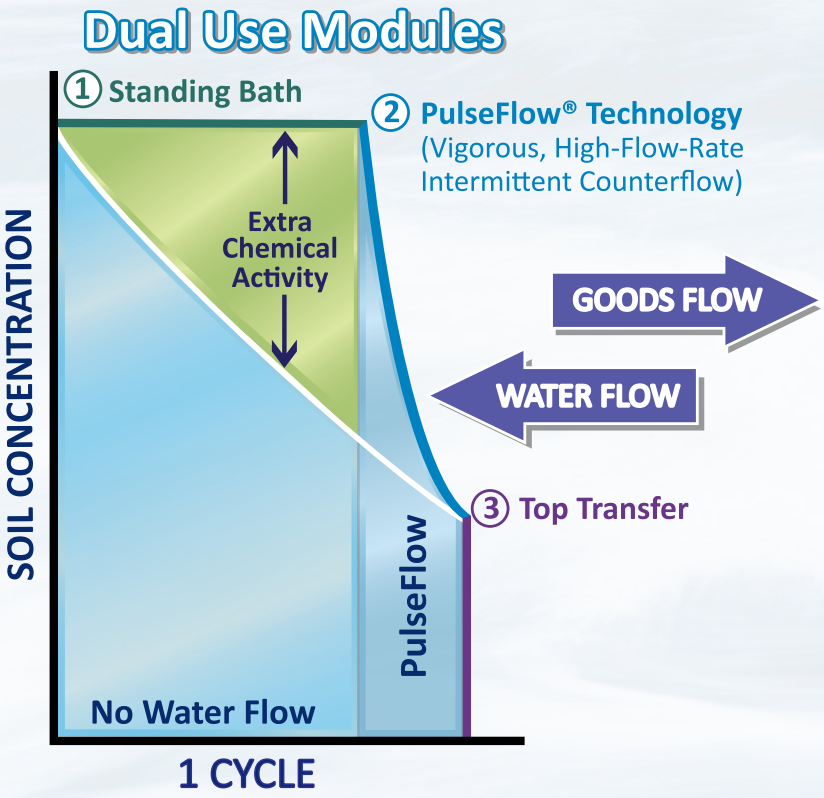


Proven Milnor Top Transfer (TT) design still leaves the dirty free water behind for immediate dilution upon each transfer.

Now, with Milnor's PulseFlow Technology, we simply stop the counterflow completely for the first 65-75% of each transfer cycle and then pump the entire amount of counterflow water at a very fast rate in the final 25-35% of the time remaining (see diagram above). The pumps are high-volume, variable speed inverter-driven so that both flow rate and duration of the counter-flowing water can be fully varied based on goods being processed. The high-speed flow gives better rinsing action and uses far less water.

06: PulseFlow Technology

PulseFlow® TECHNOLOGY



How Does it Work?

This chart represents the concentration of dirt and chemicals in successive modules.

At the start of processing in the first module, soil concentration is at its highest level. With traditional counterflow (descending white line) the dirt is removed immediately and quickly.

1 With PulseFlow technology, the counterflow is delayed for approximately 70% of the cycle time, allowing for extra chemical time at full strength (green line).

2 Then for the remainder of the cycle time, the PulseFlow pumps are activated to provide a vigorous high-volume counterflow (blue line).

3 Then transfer occurs using top transfer (purple line).

The sequence is repeated in successive modules for the programmed process time.

B. Lowest Water Consumption

Milnor PBW™ washers achieve very low fresh water consumption—less than any other tunnel washer. For light soil linen, the expected water consumption is 0.3 gal/lb (2.5 L/kg) of linen processed. For most heavy soil linen, the expected water consumption is 0.5 gal/lb (4 L/kg).

PulseFlow Technology saves water with these features:

- **Interrupted Counterflow:** Water only flows for rinsing which is about the last 25-35% of each cycle.
- **Controlled Flow:** Water is delivered by high-volume inverter pumps with vigorous flow that removes suspended soil and used chemistry faster, with less water.
- **Dual-Use Modules:** Each module is used for both standing bath washing AND counterflow rinsing.
- **Full Water Availability:** Fresh water and recycled press water are collected in a single tank mounted within the washer frame (under the load scoop). No external tanks are required.

PulseFlow® TECHNOLOGY

Lint Removal Screen

The 430 micron wedgewire screen removes lint and other solids from the process water.

C. Enhanced Chemical Performance

The PulseFlow system is able to achieve maximum chemical performance with standing bath washing and high-velocity counterflow rinsing.

- **Recirc*ONE*® Pump Arrangement:** High-speed water recirculation within the first module allows fast sluicing and wet-down, causing the chemistry to instantly penetrate the soiled linen.
- **Standing Bath:** After the transfer of the goods, the counterflow is interrupted, creating a standing bath with no water flow—chemistry is not diluted.
- **Controlled Time:** Chemicals work at full concentration from the start of each bath. And, chemicals work faster because of the large cylinder volume and fast intermixing with the goods.
- **Better Rinsing:** Programmable high-volume PulseFlow system pumps create a vigorous flow to remove exhausted chemistry and suspended soil effectively.
- **Solid Welded Partitions:** Fixed partitions between each module prevent chemical mixing and leakage. No seals required between modules.

PulseFlow® TECHNOLOGY

Single Tank

The PulseFlow tank is the single distribution point for all water to the PBW. It recovers water from the extraction device and premixes it with fresh replenishment water using a level control.

D. Low Energy Usage

PulseFlow Technology reduces energy considerably, saving the user money and having a positive impact on the environment. These energy savings support our customers' environmental stewardship and sustainability programs. A key value in today's marketplace.

- **Less Water to Heat:** Lower water usage (and recycling water) means less water to heat to wash temperatures. Energy to heat water is reduced significantly.
- **Lower Wash Temperatures:** New, low-temperature chemical formulations work very well in Milnor PulseFlow CBW washers, lowering energy use even more.
- **Steamless Washing:** Optional external systems can eliminate inherent losses in the boiler and steam distribution system, potentially saving in water heating costs.

Significant electrical savings are also possible:

- **Inverters on all Drive Motors and Volumetric Pumps:** Reduced in-rush current at start-up saves electricity use and demand charges.
- **Faster Washing:** With features of the Milnor CBW washer like high-rotational speed, large cylinder volume in every module, 100% double drums and True Top Transfer with a perforated scoop, the Milnor CBW system does wash better in less time. PulseFlow technology wash times can reduce process duration even further.

PulseFlow® TECHNOLOGY

Inverters on Pumps

PulseFlow pumps are specially-engineered for lint-laden water and flow rates are precisely controlled by inverters.

E. Faster Washing

For over 30 years, Milnor CBW batch washers with "Top-Transfer" have washed about 30-40% faster than batch washers using "Bottom-Transfer" designs. Milnor CBW washers with PulseFlow Technology wash even faster—reducing the number of modules needed to process a given capacity, reducing capital investment costs AND saving floor space! This is all possible with:

- **Standing Baths:** Flow is paused at start of each cycle to create standing baths without dilution so chemicals work faster. Shorter process time means less wear on linen—and longer linen life.
- **PulseFlow Counterflow:** Counterflow water is pumped at high volume for the very last portion of the cycle. Vigorous flow removes contaminants much more quickly, thus reducing overall time.
- **Dual-Use in Each Module:** All wash modules are used for two functions, standing bath and high-speed counterflow for faster, better rinsing. Dual-use needs fewer modules.
- **No Separate Rinse Modules:** Rinsing occurs immediately after chemical action in each wash module. No separate rinse modules are required.
- **Recirc*ONE*®:** A patent-pending feature recirculates water and chemistry at high-velocity within the first module. Goods are sluiced faster and more completely into the machine. Wet-down is almost instantaneous. Chemistry penetrates the linen instantly which is important for protein stains—Module One is now a working module.

PulseFlow® TECHNOLOGY

Recirc*ONE*® Pump Arrangement

This feature in the first module of each PBW washer is a patent-pending pump arrangement which quickly wets down the goods. Additionally, this recirculated water adds a hydraulic effect which speeds up the cleaning action of the chemistry.

Advantages Offered by Milnor PBW™ and Conventional CBW® Washers:

CBW® Technology

Tunnel washers were developed to save water, energy and labor, and to expedite the flow of goods through the laundry. Since they entered the market in the 1960s, they've all done this to some degree.

Early tunnel washers were bottom transfer machines. To move the goods from one stage of the washing process to the next, they transferred the goods and ALL the water along the bottom. Even the first successful batch tunnels did this and the same is true today.

The Milnor CBW washer took tunnel washing a major step forward in the early 1980s with True Top Transfer technology. It lifts and drains the goods while transferring them into the next processing module. The result is much better rinsing and a higher level of wash quality. Everything from light hospitality to heavily soiled industrial goods can be successfully laundered in a Milnor CBW washer.

There are other features that set a Milnor CBW washer apart from other tunnels, such as modular construction and double drum characteristics throughout.

Milnor CBW washers have always offered the highest level of quality and efficiency designed into a tunnel washer.

Pellerin Milnor

Why Top Transfer is Important

A tunnel washer's transfer method is critical because it's the way the machine introduces each batch of goods into the next part of the process. Other tunnels transfer the goods and all dirty water forward to the next compartment so the goods are exposed to the same dirty water during each step successive of the process.

Milnor CBW washers lift each batch of goods out of the water, drain the free water, then slide the goods into the next compartment, where they are introduced into cleaner water. Only the water trapped in the goods moves forward. Significant dilution occurs during transfer itself.

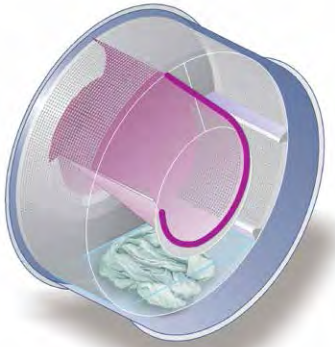
True Top Transfer effectively doubles the amount of dilution in each module—once from counterflow and then from transfer. This significantly reduces the number of modules needed to properly wash in a Milnor CBW washer versus other tunnels.

18: True Top Transfer

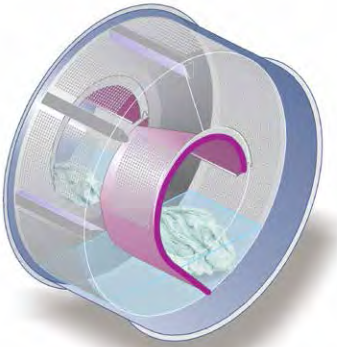
Milnor's top transfer feature assures bath integrity. Baths are truly independent, so the washing formula can work as planned.

Because water is not pumped forward with each transfer, chemicals are better targeted to the proper baths. They don't migrate uncontrollably to subsequent baths. Titrations show that with a Milnor, it is far easier to control pH.

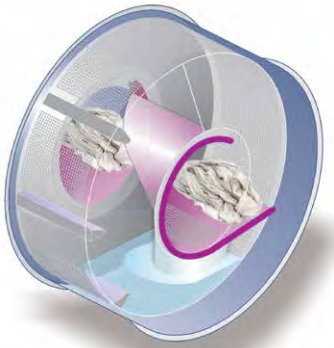
1 Washing



2 Transfer begins

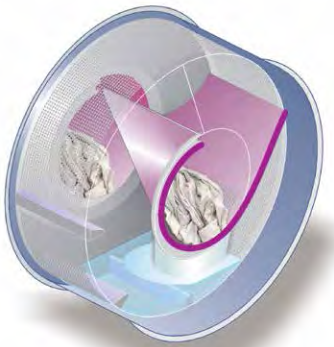


3 Goods lifted out of dirty water

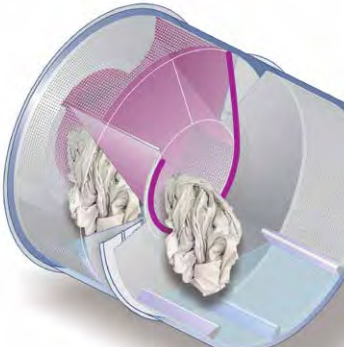


Milnor CBW washers lift the goods out of the bath and leave the free dirty water behind. Other tunnels send dirty water into the next compartment along with the goods. (There's no dilution as the contents of the whole compartment move forward.)

4 Dirty water left behind



5 Goods slide into next module



Baths Stay Separated

Better bath integrity lets chemicals work as intended because baths don't migrate between modules. Concentrations in a Milnor are controllable, predictable, and consistent because the baths remain completely independent during chemical activity.

No Seals Below Waterline

There are no seals beneath the water line which could wear and leak, compromising wash quality. Without such seals, maintenance costs are reduced!

Steam Injection and Steamless Washing

Steam is injected at the bottom of the shell through a venturi device, mixing it with water. This eliminates the exposure of goods to live steam and water is immediately heated as it enters. The location of steam injection also increases water turbulence.

Steamless washing is available through optional external systems which can eliminate inherent losses in the boiler and steam distribution system, potentially saving in water heating costs.

20: Solid Welded Partitions

With a solid partition between each and every wash cylinder, Milnor keeps all baths independent. Water travels over weirs and via external piping from one module to the next so there is absolute water control.

Each module can be used for different baths.

The solid partition between modules is welded to the fixed outer drum giving complete bath separation without sliding seals.

Superior Cylinder Design

All modules are identical in size with a goods to cylinder volume ratio of approximately 1 : 1.4 (lbs : ft^3) or 1 : 40 (kg : L).

Milnor's large cylinder volume allows water and chemicals to penetrate goods completely and quickly.

The use of equivalently large cylinders throughout the CBW creates constant high mechanical action during the washing process. 67% of the cylinder's area is perforated so water and chemicals can intermix fast and suspended soil flows easily out of the cylinder to the drain.

The Dilution Advantage

The dilution with successive baths, each with cleaner water, is a Milnor CBW advantage. Time, temperature, chemicals, and mechanical action are the classic, essential elements of the washing process. These four things loosen soil from the goods and dissolve/suspend soil in the water—but these catalysts can only remove soil if water washes it away with dilution. With the unique combination of True Top Transfer and counterflow, Milnor CBW washers dilute better and faster than any others.

22: Double Drum Throughout

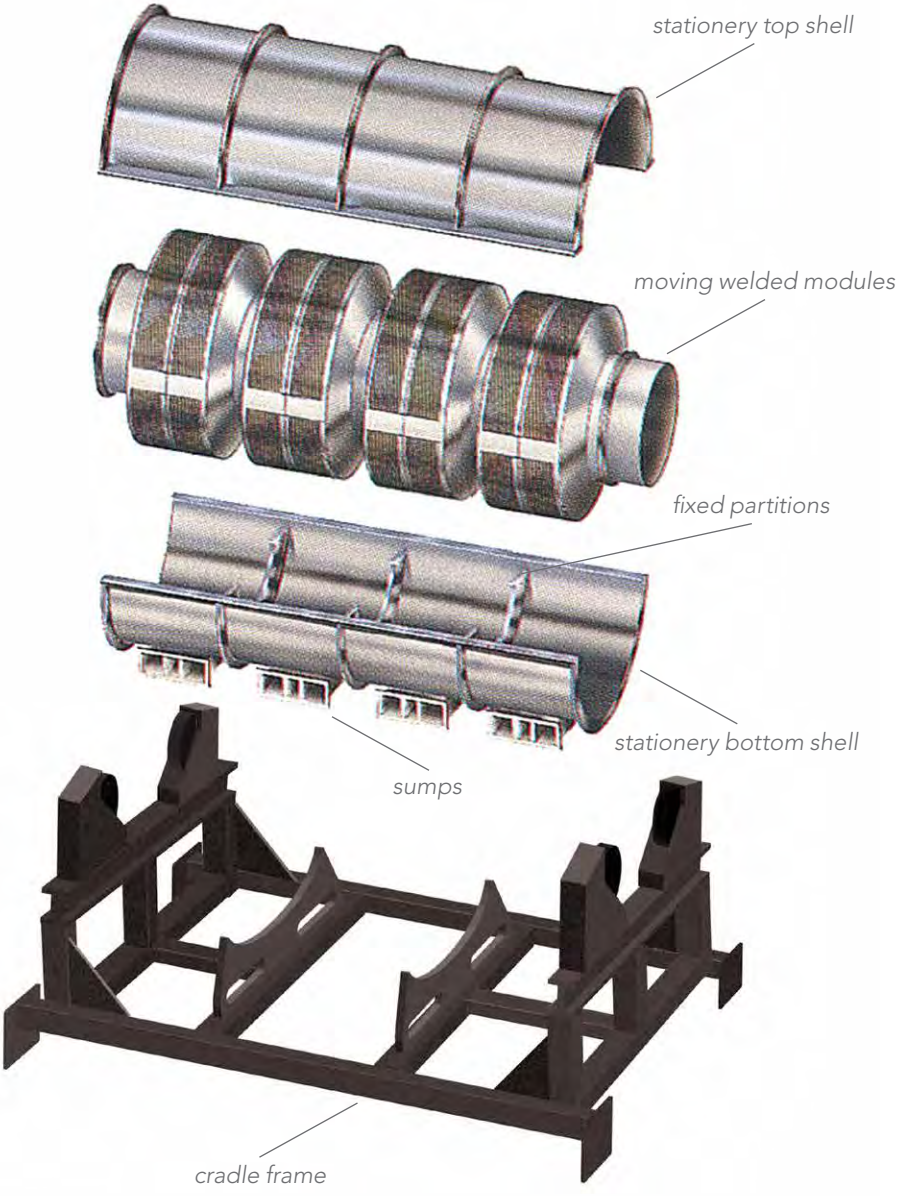
Milnor's double-drum design delivers high washing quality. Each module has a stationary shell to hold the wash bath and a rotating perforated inner cylinder. Baths are kept separate (due to top transfer) so chemical injection is more controllable.

The stationary outer shell simplifies injection of water, supplies, and steam—plus draining and gauging temperature.

Sectional CBW Washer:

models 76028 & 76039

Individual sections consisting of one to five modules allows for easy move in.



Why it's Important

Mechanical action accelerates dilution. Water and chemicals penetrate the load faster and soil is removed more quickly. With no mechanical action at all, some soil gradually exits the goods. That's because with water present, some dilution occurs.

Add mechanical action, and soil can exit much more quickly. Dropping the goods in the cylinder during the wash process squeezes out the water and chemicals inside them. When the goods relax at the bottom of the cylinder, they open up and absorb more wash liquor.

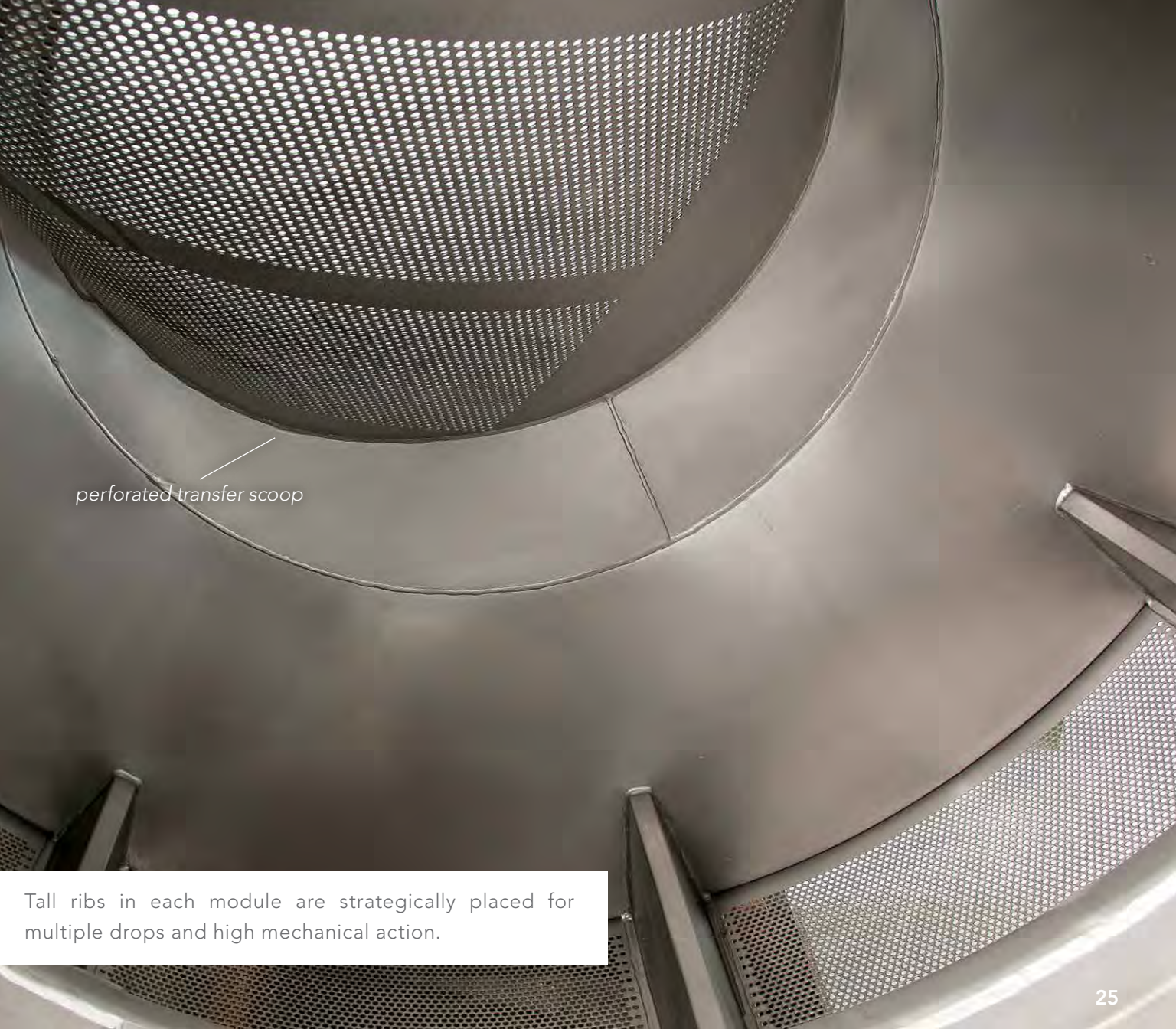
The significance of this: Once goods transfer to a new bath, they must be penetrated by that new bath as quickly as possible. High mechanical action simply aids dilution better than low mechanical action. (And because goods spend less time in the washer, there is less wear.)

Because goods are not packed tightly, the Milnor CBW washer provides the kind of washing action you'd only expect in an industrial washer-extractor—a fact that has been documented by internationally recognized testing companies.

24: High Mechanical Action

Milnor's high mechanical action effectively loosens and removes dirt from fibers. Perforations all around the rotating cylinder allow counterflow water to move through the large open area and better penetrate the goods.

Other factors which contribute to excellent wash action inside the cylinder: More space, high ribs that are strategically positioned, and a rotational speed that uses these features to the best advantage.

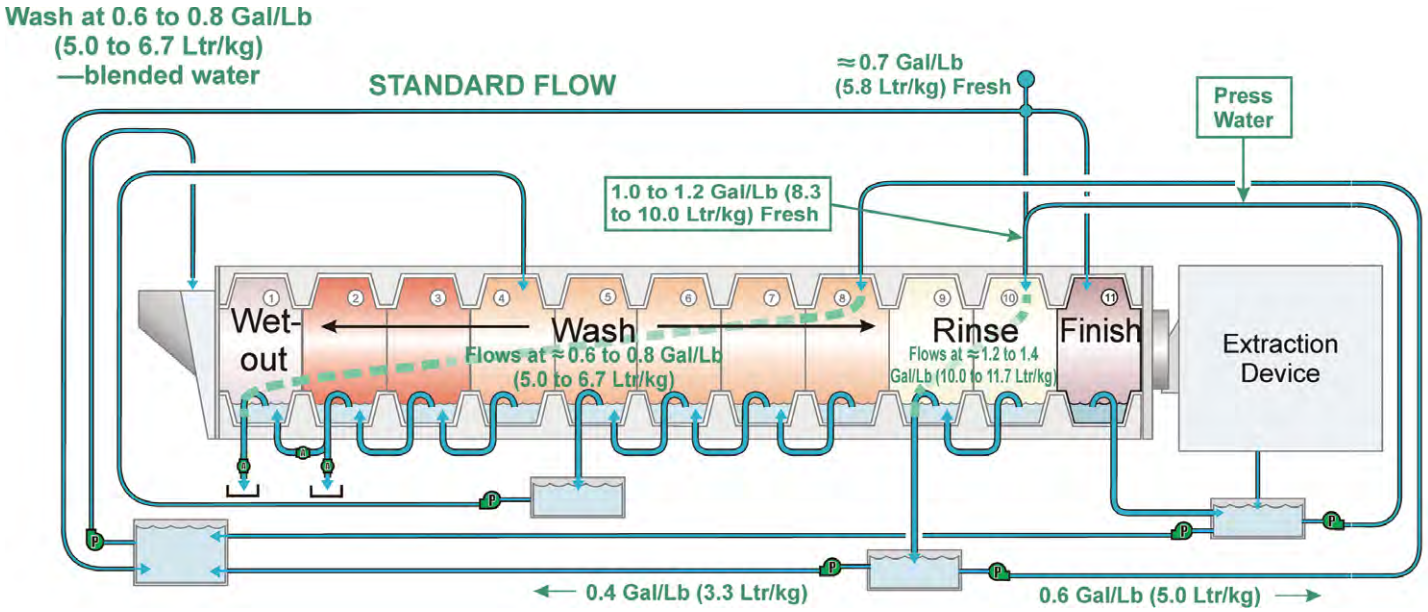


Tall ribs in each module are strategically placed for multiple drops and high mechanical action.

26: Compare

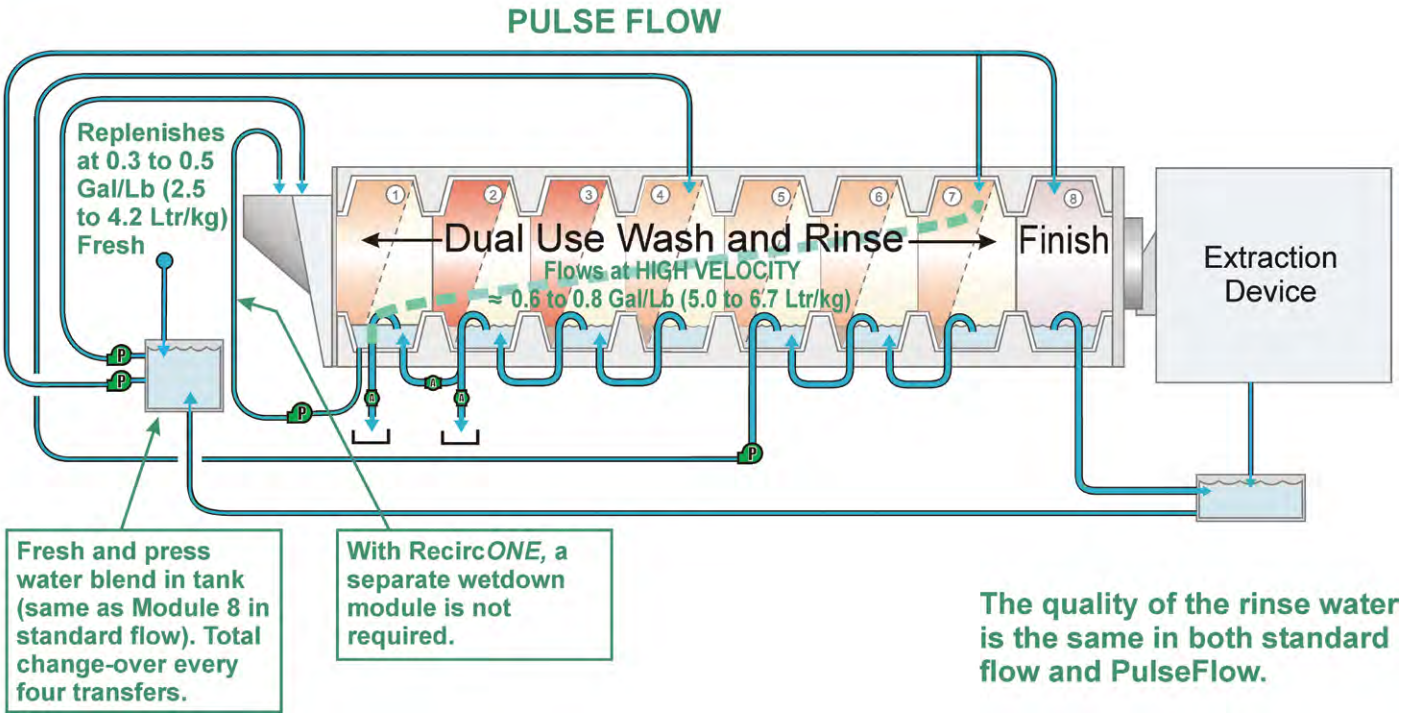
Conventional

The Milnor conventional top transfer CBW washer provides effective and productive processing.



PulseFlow Technology

PulseFlow Technology CBW washers need fewer modules because PulseFlow offers faster rinsing with high-velocity counterflow, more throughput with dual-use modules, and less water usage by recycling water.



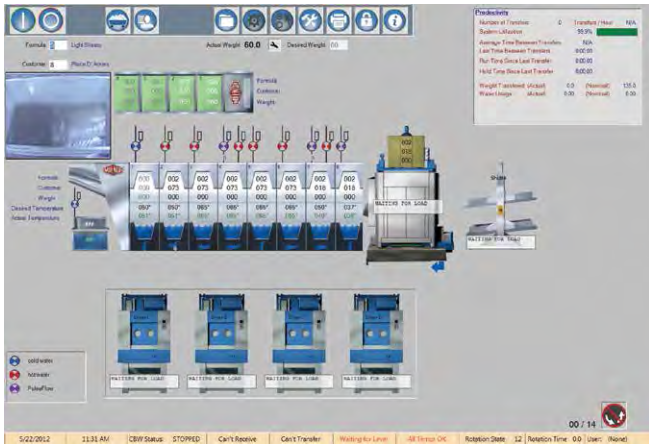
28: Control Systems

Mentor® Control

This CBW controller is a user-friendly means of programming, operating, and troubleshooting the Milnor CBW washer.

Mildata® Computer Network

This software/hardware package is designed to interface a personal computer with Milnor machines to simplify programming and to provide central storage for machine configuration, formulas, and production data.



Mentor® Control: Operational display gives key information for each batch in the loading system and washer.

Mildata® Computer Network: MilMetrix® display allows you to see, at a glance, if you're keeping up with expected performance throughout your laundry or on a machine by machine basis.

29: System Equipment

Various capacity sizes and extraction pressures and speeds are available in the Single Stage Press and Centrifugal Extractor. Other options are available for tight spaces.

A wide range of capacities and fuel choices are available in the dryers. A unique air path means a Milnor dryer gets the most efficient use of hot air.

Extraction Options

A variety of extraction devices are available depending upon goods processed, production quantities, and drying/finishing requirements.

Dryer Options

Milnor dryers are pass-through machines that load at one side and discharge at the other. They form an integral part of an automated batch laundry processing system.

30: Specifications

PulseFlow® CBW® washers

	SECTIONAL				MODULAR	
PulseFlow	**76028**		**76039**		**92048**	
WASHING CYLINDER						
Rated capacity*	110 lbs.	50 kg	150 lbs.	68 kg	Up to 260 lbs.	Up to 120 kg
Diameter	76"	1930mm	76"	1930mm	92"	2337mm
Depth	28"	711mm	39"	990mm	48"	1219mm
APPROX. DIMENSIONS	ft['] ins["]	mm	ft['] ins["]	mm	ft['] ins["]	mm
Overall width	8'4"	2550	8'4"	2550	9'3"	2820
Overall height	9'0"	2760	9'0"	2760	10'9"	3290
Overall length of modules						
3	17'11"	5440	20'3"	6160	24'8"	7520
4	20'6"	6220	23'7"	7180	29'10"	9090
5	23'0"	7000	--	--	36'0"	10670
6	27'5"	8340	32'1"	9770	40'3"	12250
7	29'11"	9120	35'5"	10790	45'5"	13830
8	32'6"	9900	38'9"	11810	50'7"	15400
9	35'1"	10680	43'11"	13380	55'9"	16980
10	37'8"	11460	47'3"	14400	60'11"	18560
11	42'0"	12800	50'7"	15420	66'1"	20130
12	44'7"	13580	53'11"	16440	71'3"	21710
CONNECTIONS	ins	mm	ins	mm	ins	mm
Water manifold+ inlet/tank	3" / 2"	76 / 50	3"/ 2"	76 / 50	3"/ 2"	76 / 50
Quick drain valve	8"	203.2	8"	203.2	8"	203.2
Steam	2"	50.8	2"	50.8	3"	76
Air	1/2"	12.7	1/2"	12.7	1/2"	12.7
WATER						
Approx. consumption++ As low as	.3 gal/lb	2.5 L/kg	.3 gal/lb	2.5 L/kg	.3 gal/lb	2.5 L/kg

Specifications subject to change without notice.
*Depends on several factors including type of goods, soil content, etc.
+Additional 3" for linen supply.
++Depending on wash program.

Conventional CBW® washers

	SECTIONAL				MODULAR	
Conventional	**76028**		**76039**		**92048**	
WASHING CYLINDER						
Rated capacity*	110 lbs.	50 kg	150 lbs.	68 kg	250-260 lbs.	118-120 kg
Diameter	76"	1930mm	76"	1930mm	92"	2337mm
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11	42'0"	12800	50'7"	15420	66'1"	20130
12	44'7"	13580	53'11"	16440	71'3"	21710
13	47'1"	14360	59'1"	18010	76'5"	23290
14	49'8"	15140	62'5"	19030	81'7"	24870
15	52'3"	15920	65'9"	20050	86'9"	26440
16	56'7"	17250	69'1"	21070	91'11"	28020
Steam	2"	50.8	2"	50.8	3"	76
Air	1/2"	12.7	1/2"	12.7	1/2"	12.7
WATER						
Approx. consumption++ As low as	.3 gal/lb	2.5 L/kg	.3 gal/lb	2.5 L/kg	.3 gal/lb	2.5 L/kg

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