RIBBON, PADDLE AND PLOW BLENDERS

Blend dry solids, pastes and slurries in 5 to 10 minutes.
Versatile, economical and effective when low-energy agitation is required.

This MUNSON® Model 6.5-15 HD Carbon Steel Ribbon Blender measures 6.5 ft (198.1 cm) wide x 15 ft (457.2 cm) long, and has a useable batch capacity of 500 cu ft (14.16 m³)

MUNSON® Ribbon, Paddle and Plow Blenders feature stationary U-shaped vessels with flat cover sections on top and a discharge valve on the bottom, and a single, horizontally-oriented shaft rotating on external bearings, with radial arms supporting ribbon, paddle or plow agitator elements, each of which offers distinct benefits across a diverse range of applications.

These blenders force agitators through stationary material, which accelerates the dispersion of individual particles into liquids. As a result, they can blend solids with solids, as well as solids with low or high percentages of liquids to produce smooth pastes or slurries.

From sanitary blenders for pharmaceutical and food products on a laboratory, pilot plant or production scale, to robust, super-duty machines for soil reclamation, building materials and oil sludge treatment, MUNSON custom-engineers each Ribbon, Paddle and Plow Blender to deliver maximum performance for your specific application.

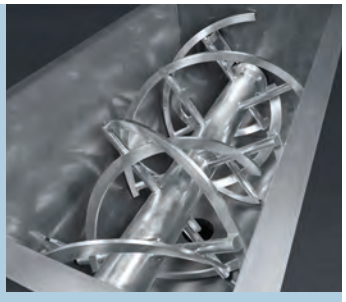
Design and Construction

Mixing capacity is approximately 70 to 80% of total vessel volume, providing: 1) ample space for material flow on the upswing side of the agitator, 2) complete agitator contact with batch materials and 3) proper distancing of an optional spray manifold for introducing liquid additions on the downswing side of the agitator, resulting in uniform solids/liquids distribution.

One-piece welded construction, together with heavy-gauge walls and fully reinforced end panels, make these vessels extremely rigid, allowing for exceptionally tight agitator-to-vessel wall tolerances. This, in turn, minimizes residual product in the trough following discharge, reducing material waste and cleaning time.

MUNSON blenders are available constructed of a variety of materials, including but not limited to carbon steel, #304/304L and #316/316L stainless steel, abrasion-resistant steel (AR-200/235), duplex stainless, Hastelloy, titanium and other exotics.

Interior finishes range from a standard clean mill finish to ultra-high sanitary finishes, including 2B, #4, and #7 mirror pharmaceutical finishes to sanitary USDA Dairy finishes with electroplating and chemical passivation. Interior weld polishes range from standard 80 grit clean welds to 240 grit radiused and polished welds.



MUNSON Horizontal Agitated Blenders are offered with ribbon (shown), paddle and plow agitators in many specialized designs to suit each application with top efficiency.

This MUNSON Model 2.5-5SS Stainless Steel Ribbon Blender measures 2.5 ft (76.2 cm) wide x 5 ft (152.4 cm) long, and has a useable batch capacity of 25 cu ft (0.7 ³).

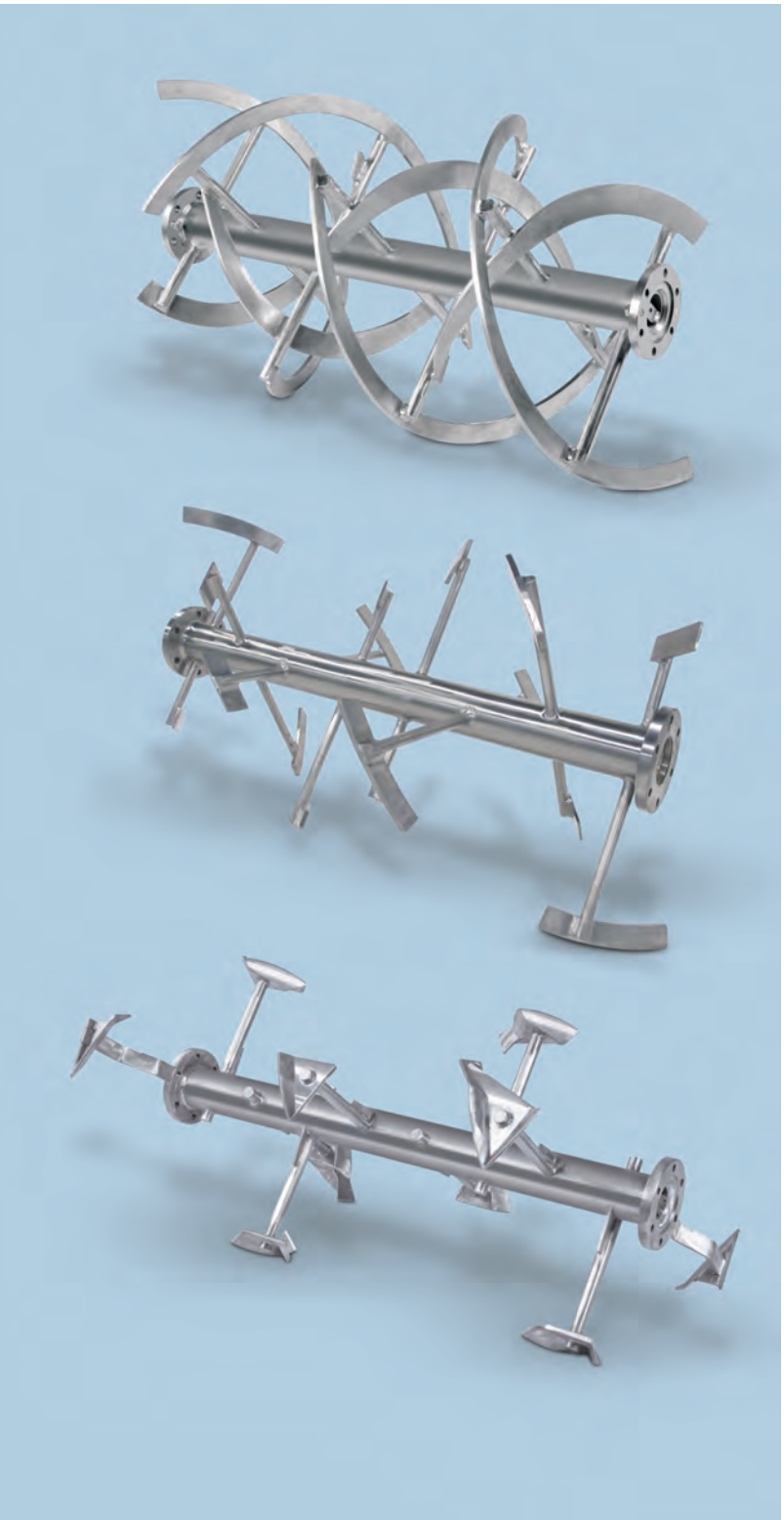
FEATURES

- Capacities from 1 to 1000 cu ft (.028 to 28 m^3)
- Designs from heavy duty to extreme heavy duty
- Extensive selection of drives, seals, agitators and discharge gate designs
- Low or high pressure ASME-code jackets for steam, hot water, oil or coolant
- Tight-tolerance construction, minimizing residual material following discharge
- Flanged agitator shafts for vertical removal, conserving floor space
- Batch or continuous configurations
- Wide range of options (see next page)

HIGH STRENGTH AGITATORS

MUNSON® agitators are equipped as standard with a flange-mounted shaft that can be lifted vertically for easy removal and servicing. The design also eliminates the need for gasketing in the material path, and the need to reserve floor space for removal of the agitator horizontally through an end panel. (Single-piece agitators with integral journals also available.)

Heavy-wall, wide diameter, hollow agitator shafts are stronger and more rigid than solid shafts. Precision-machined, solid journals are supported by heavy pillow-block bearings for ultra-high strength and rigidity. Thick, one-piece, solid support arms extend fully through the main shaft and are fully seal-welded, adding to the extremely rigid construction of these blenders, allowing unsurpassed agitator-to-vessel wall tolerances.



Double Helix Split-Ribbon Agitators

Split-ribbon agitators are equipped with radial arms that support sections of ribbon-shaped agitator blades mounted in a semi-helical arrangement. Blades extending to the vessel wall are pitched to move material on one direction, while inboard blades are pitched to move material in the opposite direction. Originated by MUNSON, this split-ribbon design blends more rapidly and thoroughly than continuous ribbon elements. It also provides greater surface area than paddle or plow elements, while blending a wider range of free-flowing materials including low-viscosity slurries, typically in 5 to 10 minutes, making this the most popular element for horizontal agitated blender applications.

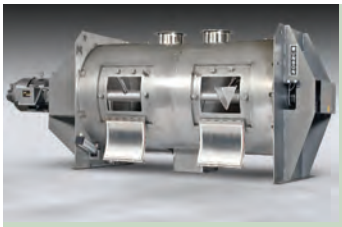
Enhanced Paddle Agitators

Paddle agitators consist of shafts with radial arms that support numerous, short paddles that move the material in smaller zones over shorter distances with greater cutting action than ribbon blades, preventing the entire batch from being turned on its axis. While this increases cycle times marginally, paddle agitators can handle materials that interlock, flow poorly, or tend to “log roll” when using ribbon agitators. In addition, paddle agitators can handle certain high-viscosity slurries and abrasive materials more effectively than ribbon agitators. Replaceable hardened-steel wear plates can be bolted to paddle faces for increased abrasion resistance.

Plow Agitators

When used in U-shaped vessels at standard or low speeds, a plow element will “fold” material in short zones, moving it away from the vessel wall in the process. While it will effectively blend over time, a plow element is primarily utilized to keep blended material in motion gently while it is undergoing a chemical reaction or being heated, cooled, moisturized, pasteurized, dried, wetted, or otherwise conditioned—while maintaining blend uniformity.

(Note that standard, slow-speed plow blenders are radically different in form and function from high-speed cylindrical plow blenders shown at right.)



Cylindrical Plow Blenders

Plow agitators are also employed in cylindrical mixing vessels, and rotated at high speed to fill the entire vessel with airborne material, imparting high energy required to combine some solids with other solids and/or liquid additions. Cylindrical plow agitators rotate 3- to 5-times faster than trough-style plow blenders and consume a greater amount of energy. (Please consult factory for Cylindrical Plow Blender specifications.)

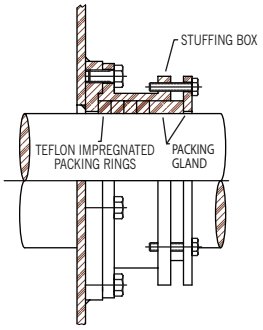
TWO BLENDER TYPES

HD Series

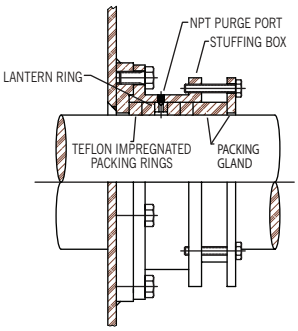
The HD Series is Munson's standard design for blending of low- to medium-density, free-flowing materials and other moderately demanding applications. Solid, robust construction of these machines exceeds the so-called "extra heavy duty" designs of many competitive units.

XHD Series

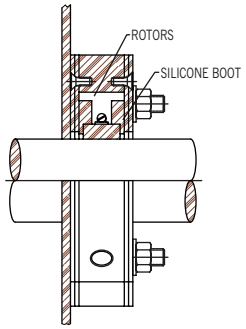
Munson's XHD Series machines are custom designed and constructed for the most demanding applications including poor-flowing, abrasive, heavy or difficult-to-mix materials having high bulk densities.



STANDARD AND SPLIT SANITARY SEAL ASSEMBLY



AIR PURGE SEAL ASSEMBLY



ADJUSTABLE MECHANICAL SEAL

MUNSON blenders are supplied as standard with reliable, time-proven Teflon® packing gland seals. Optional seal designs include double lip, lantern ring, gas/liquid purged and sanitary types.

DISCHARGE GATES

MUNSON® blenders are offered with the following discharge gates:

Paddle Gates

Integral to the blending vessel, Paddle Gates consist of a metal plate sliding across a metal opening with no gasketing. Although Paddle Gates are ineffective at preventing the leakage of fine powders and have a medium-size dead spot, they are the most economical option for less demanding applications, and offer quick action.

Knife Gate (and Slide Gates)

Flange-mounted Knife Gates and Slide Gates and have a small dead spot, provide positive opening and closing against material flow, offer gasketing to seal against leakage, and are available in sanitary take-apart designs for easy cleaning.

Plug Gate

Mounted directly to the vessel's U-shaped bottom, Plug Gates precisely match the interior contour of the vessel wall, eliminating the dead spot common to other valve designs. However, since it cannot normally be closed against the flow of material, plug gates are not intended for metering or uninterrupted flow.

Butterfly Valve

Butterfly Valves are flange-mounted with a pronounced dead spot, but are also versatile, economical and available in take-apart, easy-to-clean designs.

Spherical Discharge Valve

Spherical Discharge Valves (also known as "Dome Valves") have a smaller dead spot than other flange-mounted designs, and offer positive opening and closing against material flow.

Universal Flanges

In lieu of discharge gates, MUNSON blenders are also offered with universal flanges for connection of customer-supplied flow control devices.

DRIVES

Power requirements and the type of drive are determined by the density and flow characteristics of the blended material. MUNSON uses only premium quality motors, gearboxes, and bearings for reliability and extreme long life under demanding continuous duty. Horsepower is calculated to provide the highest available output torque without sacrificing energy efficiency. Main-shaft-mounted helical gear reducers are standard on MUNSON blenders up to 30 HP, while larger blenders employ a foot-mounted helical gear reducer with chain and sprockets as standard. Other drive configurations are available, such as direct drives, in-line drive arrangements, clutches, and modified drive arrangements to address space limitations.

COVERS

All MUNSON horizontal blenders are equipped as standard with hinged and gasketed cover sections, and removable safety grating with safety interlocks. Custom cover arrangements include but are not limited to inlet ports, vents, hinged sections, safety grates, bag dump stations or dust hoods, filter socks, etc. Structurally reinforced and clamped covers are available for low pressure or low vacuum requirements.

OPTIONS

- Materials of construction: carbon steel, #304/304L and #316/316/L stainless steel, abrasion-resistant steel (AR-200/235), duplex stainless, Hastelloy, titanium and other exotics
- Interior finishes include: standard clean mill finish; sanitary USDA finish; 2B, #4, and #7 mirror pharmaceutical finishes; and electroplated and/or passivated finishes. Interior radiused weld polishes range from standard 80 grit clean welds to 240 grit
- Solid, seamless shafts with integral journals
- Multiple discharges
- Side clean-out access doors
- Hybrid agitator configurations
- Internal spray manifolds for introduction of liquid additions
- High-speed choppers and intensifier bars for additional shear and de-agglomeration
- Integral low-pressure and ASME code high-pressure jackets for water-cooling or steam/oil heating
- Thermowells (thermocouples) for temperature sensing
- Support legs and platforms
- Ancillary equipment such as bag dump stations, hoppers, magnets, etc.
- Rotational speed switches
- Steam injection ports

MUNSON ribbon, paddle and plow blenders range in capacity from 1 to 500 cu ft (.03 to 14 m³). Each is designed and built to deliver top efficiency and longevity for specific applications.

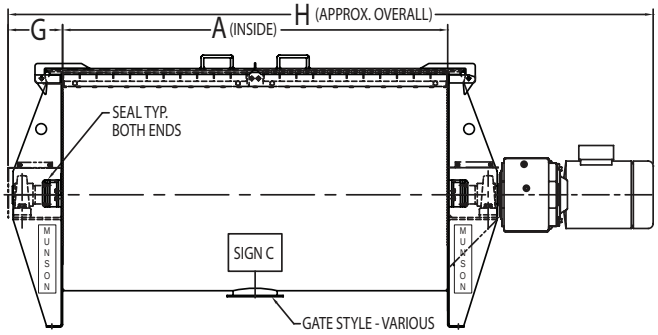
TYPICAL APPLICATIONS

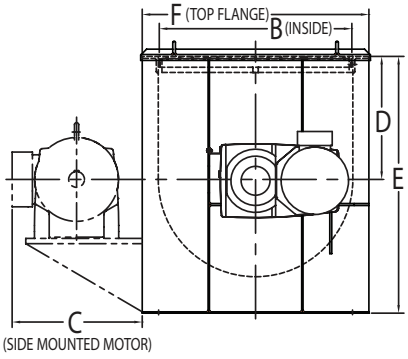
- Pharmaceuticals
- Nutraceuticals
- Food & Bakery
- Cosmetics
- Plastics
- Spices
- Drink Mixes
- Cements, Grouts & Mortar
- Soil Remediation
- Hazardous Waste Stabilization
- Sludge Recovery
- Wood Flour
- Resins
- Coffee and Tea
- Tobacco Products
- Pesticides, Insecticides & Herbicides
- Fertilizer
- Detergents
- Carbon Black & Graphite
- Architectural Coatings
- Roofing Products
- Soap Powder
- Titanium Dioxide Powder

SPECIFICATIONS

Model	Mixing Capacity (Cu Ft) (m^3)	Total Vessel Volume (Cu Ft) (m^3)	A (in.) (cm)	B (in.) (cm)	C (in.) (cm)	D (in.) (cm)	E (in.) (cm)	F (in.) (cm)	G (in.) (cm)	H (in.) (cm)	Element Speed (RPM)	Horse Power (KW)
12	2 0.056	3 0.085	24 60.9	12 30.5	–	10.5 26.7	24 60.9	15.5 39.4	6 15.2	44 111.8	100	1-2 .74-1.47
1.33–3	5 0.14	7 0.19	36 91.4	18 45.7	–	12 30.5	30 76.2	22.25 56.5	7.25 18.4	56 142.2	70	2-5 1.47-3.67
24	12 0.34	17 0.48	48 121.9	24 60.9	–	16 40.6	36 91.4	29.25 74.3	8 20.3	77 195.6	50	3-10 2.21-7.36
2.5-5	25 0.71	33 0.93	60 152.4	30 76.2	–	19.5 49.5	42 106.7	35.25 89.5	10 25.4	104 264.2	40	5-15 3.67-11.03
36	40 1.13	56 1.59	72 182.9	36 91.4	14 35.6	23 58.4	48 121.9	42.25 107.3	10 25.4	102 259.1	33	10-25 7.36-18.39
3.5-7	65 1.84	87 2.46	84 213.4	42 106.7	14 35.6	26 66.0	56 142.2	48.375 122.9	10 25.4	113 287.0	30	15-30 11.03-22.06
3.5-9	85 2.40	112 3.17	108 274.3	42 106.7	19 48.3	26 66.0	56 142.2	48.375 122.9	10 25.4	136 345.4	30	20-40 14.71-29.42
48	100 2.83	129 3.65	96 243.8	48 121.9	19 48.3	29.5 74.9	69 175.3	54.375 138.1	10 25.4	127 322.6	25	20-40 14.71-29.42
4.5-9	150 4.25	183 5.18	108 274.3	54 137.2	20 50.8	33 83.8	68 172.7	60.5 153.7	11 27.94	139 353.1	22	25-50 18.39-36.77
510	200 5.66	248 7.02	120 304.8	60 152.4	20 50.8	36 91.4	84 213.4	68.5 173.9	11 27.94	151 383.5	20	30-60 22.06-44.13
512	250 7.08	297 8.41	144 365.8	60 152.4	24 60.9	36 91.4	84 213.4	68.5 173.9	13 33.0	179 454.7	20	40-75 29.42-55.16
612	350 9.91	445 12.60	144 365.8	72 182.9	30 76.2	46 116.8	102 259.1	–	18 45.7	190 482.6	17	40-100 29.42-73.55
6.5-12	400 11.33	517 14.64	144 365.8	78 198.1	36 91.4	49 124.5	108 274.3	86.5* 219.7	18 45.7	190 482.6	13	40-100 29.42-73.55
6.5-15	500 14.16	647 18.32	180 457.2	78 198.1	36 91.4	49 124.5	108 274.3	86.5* 219.7	18 45.7	220 558.8	13	50-150 36.77-110.30
716	600 16.99	785 22.23	192 487.7	84 213.4	36 91.4	52 132.1	112 284.5	92.5 235	18 45.7	234 594.4	11	Determined by Application
816	800 22.65	1,100 31.15	192 487.7	96 243.8	36 91.4	60 152.4	118 299.7	104.5 265.4	18 45.7	238 604.5	10	Determined by Application
820	1,000 28.32	1,300 36.81	240 609.6	96 243.8	42 106.7	60 152.4	118 299.7	104.5 265.4	18 45.7	286 726.4	10	Determined by Application
918	1,150 32.56	1,466 41.51	216 548.6	108 274.3	42 106.7	66 167.6	119 302.3	116.5 295.1	20 50.8	274 696	9	Determined by Application

WARNING: In order to clearly show details of machines, some covers, shields, doors and guards have either been removed or shown in the open position. Be sure that all protective devices are properly installed before operating equipment. Failure to follow this instruction may result in personal injury and/or damage to the machine components.





FREE LAB TESTING AND EQUIPMENT RENTAL

MUNSON® maintains a 5000 sq ft (465 m^2) laboratory for free testing of customer-supplied materials on eight different types of full-scale mixing machines to ensure the optimum selection of equipment, and document the performance each customer can expect. A variety of equipment is also available for on-site testing or interim production on a rental basis.

RELATED MUNSON® EQUIPMENT:

MIXERS: Rotary Batch, Ribbon/Paddle/Plow, Cylindrical Plow, Vee-Cone, Double-Cone, Rotary Continuous, Variable Intensity, Fluidized Bed

SIZE REDUCTION EQUIPMENT: Knife Cutters, Screen Classifying Cutters, Pin Mills, Attrition Mills, Hammer Mills, Lump Breakers, Shredders

SEPARATORS: Rotating Drum Screens, Centrifugal Sifters

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