

# **ROTARY BATCH MIXERS**

Blend dry bulk solids with or without liquid additions quickly, uniformly and gently, with total discharge and no cross-contamination

- 1 to 3 minute cycle times
- Uniform dry blends and liquid additions
- Gentle mixing
- Total discharge with no segregation
- Ultra-fast cleaning and sanitizing
- Full interior access
- Low energy costs
- Stationary inlet and outlet
- Wide range of flexible capacities
- Dust-tight operation
- Long life with minimal maintenance



This 90 cu-ft (2.5 cu m) abrasion-resistant Rotary Batch Mixer blends dry cement mixes in less than three minutes, gently and efficiently with total uniformity.

The Munson Rotary Batch Mixer delivers uniform particle distribution, uniform liquid additions, cycle times under 3 minutes, gentle product handling, the lowest energy consumption, and complete discharge with no segregation. It also cleans and sanitizes quickly and easily preventing cross-contamination.

Munson's unique, four-way mixing action gently folds, tumbles, cuts and turns the material, producing a thorough blend in only 1 to 3 minutes, while imparting minimal energy and intensity to the product.

The same blending action prevents segregation regardless of particle sizes, shapes or bulk densities, and provides an ideal fluid bed for liquid additions.

Unlike stationary mixers with agitators, Munson Rotary Batch Mixers produce homogeneous blends with no shear, discharge completely with no stratification and have no internal shafts or shaft seals to contact material.

Internal mixing flights direct material towards and through a stationary discharge gate which, together with multiple clean-out doors and unrestricted access to all internal surfaces, allows thorough cleaning and sanitizing in minutes.

Capacities range from 5 to 600 cu ft (142 liters to 17 cu m), with equal mixing efficiency at 100% down to 10% of rated capacity, providing unsurpassed flexibility.

This superior combination of attributes makes the Munson Rotary Batch Mixer ideal for a broad range of applications, from pharmaceutical, nutraceutical and food applications requiring absolute cleanliness, to minerals, glass and concrete blending requiring extraordinary durability.

MUNSON

Rotary Batch Mixers are available in useable capacities to 600 cu ft (17 cu m). Shown is a 40 cu ft (1.13 cu m) sanitary stainless steel model with retractable inlet, for blending of spices.

Munson also offers small production lab/pilot Mini-Mixers with capacities from 0.25 to 15 cu ft (7 to 425 liters), and Rotary Continuous Mixers with capacities from 25 to 5000 cu ft/h (708 liters to 142 cu m/h).

# HIGH PERFORMANCE UNAVAILABLE FROM ANY OTHER BULK SOLIDS MIXER

Munson Rotary Batch Mixers provide a superior combination of standard features that improve quality and cut cycle times while reducing maintenance and operating cost



# 1 to 3 Minute Mixing Times

A Munson Rotary Batch Mixer requires only 1 to 3 minutes to blend a batch, boosting output while eliminating or minimizing any effect on the integrity, temperature, moisture and density of your material. Short cycle times also allow smaller Rotary Batch Mixers to equal the production of larger, slower mixers, saving floor space.

## **Uniform Dry Blends**

Munson Rotary Batch Mixers are efficient, distributing particles throughout the batch with uniformity to one-tenth of one percent typical—even when blending particles of widely disparate sizes, shapes and bulk densities—maintaining consistent product quality.

## **Gentle Mixing**

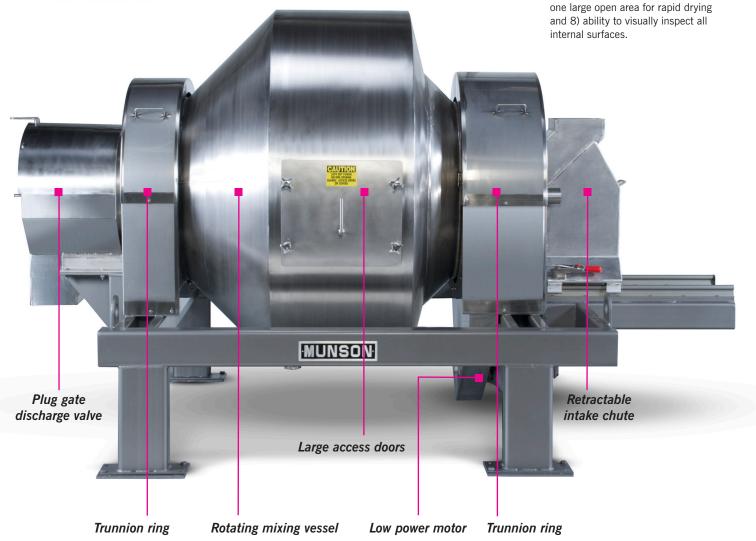
The Munson Rotary Mixer folds, cuts and turns material as it tumbles, achieving batch uniformity gently as well as quickly—with no free-fall of material that can damage particles. Light and fluffy materials remain in that condition during mixing and upon discharge, with no densification. Similarly, materials that are dense under ideal circumstances remain dense during mixing and discharge—an added benefit when packaging blended material by weight or volume.

## **Total Discharge**

In addition to blending, proprietary mixing flights also serve to move all material to and through the plug gate discharge valve until the vessel is completely empty, eliminating residual that would otherwise be wasted or require manual removal prior to cleaning.

# Ultra-Fast Cleaning and Sanitizing

Cleaning and sanitizing are fast and easy for several reasons exclusive to the Munson Rotary Batch Mixer: 1) complete discharge with only minimal residual dust on interior surfaces. 2) Unlike other rotary designs, no shaft seals and no dead spots or deep recesses to harbor contamination, 3) multiple drum clean-out doors, 4) unrestricted access for spraying with air, cleaning solutions or steam, 5) available wash/rinse-inplace spray nozzles, 6) convenient drain plug, 7) cross ventilation of one large open area for rapid drying



# Uniform Liquid Additions, Coatings, Flavorings, Impregnations

Munson offers all Rotary Batch Mixers with single or multiple internal spray lines for liquid coatings, flavorings and impregnations. Unlike mixers that spray liquid additions onto a thin waterfall of material (as well as through the material and onto inaccessible internal surfaces), Munson Rotary Batch Mixers spray liquid additions onto a wide expanse of moving material, rapidly achieving batch uniformity to one-tenth of one percent at ratios down to 1 part per million of liquid to solids.

The internal spray line (left) is removable and accessible from outside of the machine. The internal vent (right) allows displaced air and dust to exit the mixing drum during filling.



## Wide Range of Flexible Capacities

Useable capacities range from 5 to 600 cu ft (142 liters to 17 cu m), with equal mixing efficiency at 100% down to 5% of rated capacity, providing unsurpassed flexibility.

#### No Segregation on Discharge

The constant motion of a Rotary Batch Mixer during loading, blending and discharging cuts cycle times significantly, and prevents the segregation of ingredients during discharge.



Rotary Batch Mixer shown discharging one of 200 blends of tea with no cross contamination.

#### **Full Interior Access**

Unlike competitive designs, the Munson Rotary Batch Mixer has no recesses, hidden chutes, scoops or buckets that make cleaning, inspection and maintenance difficult or impossible. Instead, it is equipped with large doors allowing unrestricted access to every surface of the unobstructed mixing vessel interior.



Large doors provide unrestricted access to the wide-open vessel interior for cleaning and inspection.

#### Low Energy Costs

Due to the high efficiency of gently tumbling the entire batch, Munson Rotary Batch Mixers are extraordinarily energy efficient per amount of material mixed, reducing energy costs significantly. Compare the power requirement of a Munson Rotary Batch Mixer to that of any other mixer based on batch weight, batch volume and/or weight/volume of output per minute (specifications page 8). See MunsonMachinery.com for energy saving calculations.

#### No Internal Shaft or Shaft Seals

The vessel of a Munson Rotary Batch Mixer is supported by two oversized trunnion rings that ride on heavy-duty alloy roller assemblies, providing superior load capacity and exceptional life. This arrangement also eliminates the need for an internal shaft with seals contacting material. To contain dust, the machine has only one seal at the inlet which is mounted externally, and is fast, easy and inexpensive to replace.

#### **Dust-Tight Operation**

The Munson Rotary Mixer is particularly suitable for enclosed, automated systems where dust-tight connections link it to other equipment. Equipped with a single radial seal that prevents dust leakage from the drum, it allows materials ranging from pharmaceuticals to toxic substances to be mixed safely, with no contamination of the material or of the plant environment.

# No Reversing or Tilting for Loading, Discharging

Internal flights within the rotating vessel move the material toward and through the discharge gate (when open), eliminating the need to tilt the machine for emptying, while minimizing floor space. Stationary inlets and outlets also allow hard piping into upstream and downstream equipment, and permit the drum to rotate continuously during loading and discharge, cutting cycle times.



#### Long Life with Minimal Maintenance

With periodic monitoring and minimal maintenance, even minor downtime can be eliminated. Seals can be replaced in minutes—
10- to 20-times faster and more economically than with other rotary designs.

### **FEATURES OVERVIEW**

- Uniform mixing in 1 to 3 minutes
- Ultra-fast cleaning and sanitizing
- Capacities from 5 to 600 cu ft (142 liters to 17 cu m)
- Gentle tumbling action plus short cycles eliminate or minimize degradation
- No stratification, segregation or densification
- Equally efficient mixing from 100% down to 10% of rated capacity
- Handles dry powder and granular products
- Totally dust tight

- Loads, mixes, unloads at the same floor level—no need for multi-level structures
- Ideal for uniform liquid additions, coatings, flavorings and impregnations
- Low horsepower, high mechanical efficiency
- Exhaust vent for air and dust displaced during loading
- Quick opening access door in the mixer drum section
- Internal lifter and baffle design variations to meet the mixing requirements of unusually difficult and/or fibrous material
- Rotating vessel supported by two oversized trunnion rings for superior load capacity and exceptional life
- Completely self-emptying except for possible dust on interior drum surface
- Completely welded frame and drum assemblies
- No need to stop or reverse mixer for loading or discharging
- Constant motion ensures uniform distribution of batch ingredients during loading and mixing as well as discharging
- loading and mixing as well as discharging

  Manual or solenoid-operated discharge

valve

# SPECIALIZED MODELS AND OPTIONS TO EXCEED YOUR REQUIREMENT

#### Sanitary Models



Sanitary Rotary Batch Mixers offer numerous features that prevent material contamination and allow rapid, thorough wash down required for pharmaceutical, nutraceutical and food applications:

- Internal mixing flights spaced for easy access are continuously welded to the drum wall, and are configured for complete material discharge as well as complete drainage following wash down
- All internal welds have minimum 0.25 in. (6.35 mm) radius, and are polished to 80 grit as standard. Available with polishes up to 240 grit

- CIP (Clean-In-Place) spray lines with multi-directional nozzles for convenient cleaning and sanitizing
- All product contact surfaces constructed of #304 or #316 stainless steel, in #2B Mill Finish standard with options available for #4 or #7 polish. USDA Dairy suitable upon request
- External inlet seal resides outside of the mixing drum and is easily removed and replaced
- Support structure and guards available in #304 stainless steel construction

#### Industrial and Abrasion-Resistant Models



Munson offers Rotary Batch Mixers for demanding industrial applications such as concrete premix, ceramics, powdered metal, fertilizers, plastics and catalysts. Also offered are "GB" models for glass batching, refractories and other poor-flowing, highly abrasive materials. These extreme-duty machines produce uniform blends containing numerous ingredients in 1 to 3 minutes, discharge completely in minimum time with no residual, and operate quietly and vibration-free.

Like all Munson Rotary Batch Mixers, these machines allow rapid cleaning while minimizing power requirements, even when mixing exceptionally heavy materials with bulk densities exceeding 200 lbs/cu ft (3.2 gm/cc).

Ideal for basic batch mixing systems as well as integrated, automated operation, these units can be equipped with flexible connections and radial seals to assure dust-tight operation, and hardened, easy-to-replace wear plates to protect areas prone to abrasion.

## **Heating or Cooling Applications**







Munson offers Rotary Batch Mixers with jackets for connection to liquid heaters or chillers (top), or with ports (bottom) for introducing heated, cooled or moisturized air directly into the batch, allowing the temperature and moisture levels of materials to be altered or maintained during loading, mixing and discharging cycles.

# Intensifier De-Agglomerates, Homogenizes

The optional Intensifier promotes uniform dispersion of non-free-flowing and other difficult-to-blend materials, imparting shear into the batch to break apart agglomerates and separate non-free-flowing materials into discreet particles. It is also fully accessible and removable for cleaning and sanitizing.

#### **Sliding Intake Chute**



The sliding intake chute of the Rotary Batch Mixer shown in the open position, allows rapid access to the drum interior as well as the intake spout and seal area for cleaning and inspection.

#### **CIP Sanitizing**

This Clean-In-Place spray line with multi-directional nozzle assists with rapid, thorough sanitizing between batches or production runs.





# Internal Spraylines

All Munson Rotary Batch Mixers are available with optional spray lines in single or multiple (shown) configurations.

## **OPTIONS OVERVIEW**

- Polished construction and sanitary finishes to meet USDA, FDA and pharmaceutical requirements
- Stainless steel guards and bedframe
- Intensifier for dispersion of difficultto-blend materials
- Locking casters for mixer mobility
- Single or multiple internal spray lines for the introduction of liquids for coating, flavoring, coloring or impregnation
- Special ports for trace ingredient additions, or sampling
- #304 or #316 stainless steel, exotic alloys, carbon steel and abrasionresistant steel construction
- Abrasion-resistant steel, or UHMW PE or Nylon liners for special applications

- Flexible spout connections, and/or any inlet/discharge modifications or transitions to connect Rotary Mixer to other equipment
- Solenoid or mechanical gear motor actuated discharge gate
- Easily incorporated into automated PLC systems
- Variable speed controllers and electrical soft starts
- Multiple quick-opening doors for easy access to interior of drum
- Pressure pot with scale for liquid additions
- Load cells for precise control of batch ingredients
- Discharge gate position sensing switches to indicate discharge gate position (for use in automated systems)

- Extra-heavy-duty construction for materials of high bulk densities and/ or extreme abrasiveness
- Variations in the design of internal lifters and baffles to satisfy the characteristics of unusually difficultto-mix and fibrous materials
- Retractable inlet for ease of cleaning
- Piping for heated, cooled or dehumidified air
- Low pressure and ASME-code jackets for heating or cooling with water, steam or oil
- Drain plug for complete discharge of water or cleaning solutions following wash down or sanitizing
- Position-sensing air cylinder for control of discharge gate

# UNIQUE PRINCIPLE OF OPERATION

Munson Rotary Batch Mixers feature a stationary inlet, an opposing stationary discharge, and a rotating drum in between. Material is charged via the inlet chute while the drum is rotating.

Internal mixing flights tumble, fold, cut and turn batch materials, while directing material toward the plug gate valve when closed, and through it when opened.

Unlike mixers that spray liquid

additions onto a narrow "waterfall"

of moving material with the hope it

Rotary Batch Mixers spray liquid

additions onto a wide, deep bed of

moving material, rapidly achieving

batch uniformity to one-tenth of one

percent at ratios down to 1 part per

million of liquid to solids.

will transfer to dry material, Munson

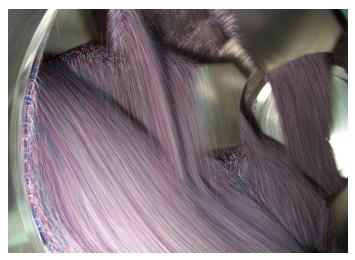


Internal mixing flights create a gentle, four-way mixing action that tumbles, folds, cuts and turns the material.

This provides free space between particles, and causes them to recombine 288 times per minute—without the free fall that can damage material.

The efficient, dynamic flow pattern also creates ideal conditions for spraying liquid coatings, flavors, colors and impregnations onto a large area of moving material, achieving batch uniformity rapidly.

When the blend is complete, typically from 1 to 3 minutes, the discharge gate pivots into the machine and allows the material to exit through the discharge spout.



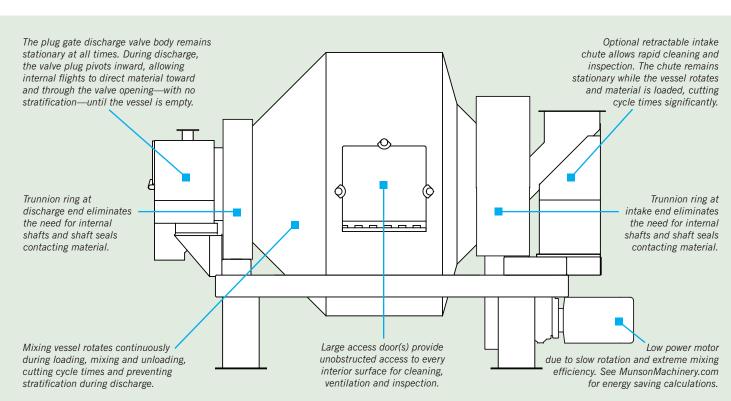
Four-way mixing action—fold/tumble/cut/turn—achieves batch uniformity in 1 to 3 minutes. Note the large, deep bed of moving material that makes an ideal target when spraying liquid additions.



Exterior view of plug gate discharge valve in open position.



Interior view of rotating stainless steel mixing drum showing plug gate discharge valve pivoted to the open position, and mixing flights that blend and elevate bulk material.



# **TYPICAL APPLICATIONS**



Munson's smallest inline Rotary Batch Mixer with stationary inlet and outlet gently blends batches from 5.0 cu ft (142 liters) down to 0.25 cu ft (7.1 liters).



50 cu ft (1.42 cu m) capacity Rotary Batch Mixer at one of the world's largest producers of pesticides ensures uniform distribution of a liquid addition on a carrier.



A food processing plant uses this 140 cu ft (4 cu m) capacity, sanitary Rotary Batch Mixer. Complete evacuation allows fast, thorough cleaning between batches with minimal downtime.



At a major contract manufacturer of nutritional supplements, this Munson 300 cu ft (8.5 cu m) capacity Rotary Batch Mixer handles whey, soy, protein and greens, as well as sugarand fructose-based powders, with no cross-contamination.



25 cu ft (0.7 cu m) Munson stainless steel Rotary Batch Mixer (left) and 50 cu ft (1.4 cu m) carbon steel Rotary Batch Mixer at a leading coffee processor.



This industrial grade, 300 cu ft (8.5 cu m) capacity Rotary Batch Mixer blends recycled PVC films with colorants and other additives for salable products.



This 300 cu ft (8.5 cu m) XHD Series Rotary Batch Mixer blends batches of metal powders ranging from 22.5 tons down to 2.25 tons with equal efficiency.



Over 300 different glass compositions, each containing 5 to 15 ingredients, are blended in this abrasion-resistant Rotary Batch Mixer with no cross contamination.



This Rotary Batch Mixer with #316L stainless steel product contacts operates with equal efficiency loaded with 400 cu ft (11 cu m) of drink mixes down to 20 cu ft (0.6 cu m).

# MINI MIXER SERIES



In addition to Inline Rotary Batch Mixers shown on this page, Munson offers Mini-Mixers for small production and lab/pilot off-line applications from 0.25 to 15 cu ft (7 to 425 liters). 5 cu ft (141 liter) sanitary model shown.

## TYPICAL APPLICATIONS

#### Sanitary

- Agricultural feed/nutrition
- Aquaculture products
- Bacteria, enzymes and other biological products
- Coffee: green, roasted, whole, ground and instant with and without flavorings
- Drink mix/milk powder
- Enzymes
- Frozen meats/vegetables
- Grain, bran, seed, flour, croutons, meal, cereal, soup mix, cheese and other food products
- Nuts
- Nutraceuticals/vitamins/minerals
- Pet/fish foods
- Pharmaceuticals

- Snack foods including trail mix
- Spices
- Sugar and sugar substitutes
- Tea: leaf and cut with and without flavorings
- Tobacco

#### **Non-Sanitary**

- Absorbent materials including polyacrylate, kitty litter, oil absorbents and dessicants
- Agricultural chemicals
- Battery/fuel cell materials
- Catalysts
- Clays
- Compost
- Detergents/soaps
- Fertilizer, herbicide, pesticide, biocide
- Lawn seed and lawn care products

- Metal powder
- Mortar mix and grouts
- Pigments including carbon black and various oxides
- Plastics, resin, regrind, pellets, PVC
- Potpourri
- Toner
- Wood flour, chips
- Bulk chemicals of any kind

#### **Abrasive**

- Cement, concrete, premix
- Ceramics
- Glass, fiberglass
- Minerals, aggregates, sand
- Paint and tile chips
- Refractories
- Titanium, and other abrasive metal powders
- Welding rod materials/flux

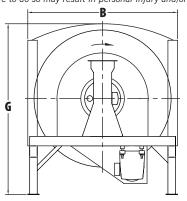
## **SPECIFICATIONS**

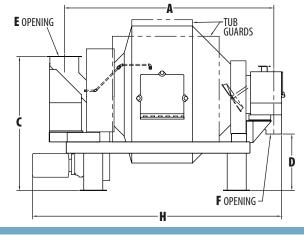
MODELS AVAILABLE IN TS, TH AND THC DESIGNS BASED ON BULK DENSITY	BATCH VOLUME CU FT / CU M	TOTAL VOLUME CU FT / CU M	POWER REQUIREMENTS		DIMENSIONS (INCHES/CENTIMETERS)							
			TYPICAL MIN. POWER FOR LIGHTER MATERIALS (HP/KW)	TYPICAL MAX. POWER FOR HEAVIER MATERIALS (HP/KW)	А	В	С	D	E (INLET)	F (DIS- CHARGE)	G	н
700-5	5 / 0.14	10 / 0.28	2 / 1.47	2 / 1.47	39.25 / 99.7	44 / 111.8	58 / 147.3	13.5 / 34.3	4 / 10.2 DIA	6 / 15.2 X 6 / 15.2	60 / 152.4	58 / 147.3
700-10	10 / 0.28	20 / 0.57	5 / 3.73	5 / 3.73	77 / 195.6	45 / 114.3	53 / 134.6	12 / 30.5	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	56 / 142.2	102 / 259.1
700-15 AND GB-10*	15 / 0.42	29 / 0.82	5 / 3.73	5 / 3.73	84 / 213.4	55 / 139.7	46 / 116.8	12 / 30.5	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	67 / 170.2	99/ 251.5
700-20	20 / 0.57	48 / 1.36	5 / 3.73	5 / 3.73	86 / 218.4	65 / 165.1	53 / 134.6	12 / 30.5	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	72 / 182.9	104 / 264.2
700-40 AND GB-20*	40 / 1.13	76 / 2.15	7.5 / 5.59	10 / 7.46	102 / 259.1	73 / 185.4	63 / 160.0	21 / 53.3	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	80 / 223.5	114 / 289.6
700-50 AND GB-35*	50 / 1.42	105 / 2.97	7.5 / 5.59	10 / 7.46	111 / 281.9	79 / 200.7	63 / 160.0	21 / 53.3	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	90 / 228.6	138 / 350.5
700-75 AND GB-50*	75 / 2.12	152 / 4.30	10 / 7.46	15 / 11.19	118 / 299.7	91 / 231.1	67 / 170.2	25 / 63.5	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	93 / 236.2	140 / 355.6
700-90 AND GB-60*	90 / 2.55	174 / 4.93	10 / 7.46	15 / 11.19	123 / 312.4	98 / 248.9	75 / 190.1	21 / 53.3	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	104 / 264.2	146 / 370.8
700-110 AND GB-75*	110 / 3.11	218 / 6.17	15 / 11.2	20 / 14.91	135 / 342.9	98 / 248.9	75 / 190.1	21 / 53.3	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	104 / 264.2	155 / 393.7
700-140 AND GB-90*	140 / 3.96	271 / 7.67	20 / 14.9	25 / 18.6	137 / 348.0	116 / 294.6	85 / 215.9	30 / 76.2	12 / 30.5 X 15 / 38.1	8 / 20.3 X 13 / 33.0	120 / 304.8	159 / 403.9
700-180 AND GB-120*	180 / 5.10	357 / 10.11	30 / 22.4	40 / 29.8	153 / 388.6	116 / 294.6	88 / 223.5	35 / 88.9	12 / 30.5 X 12 / 30.5	16.5 / 42.0 X 18 / 45.7	118 / 299.7	171 / 434.3
700-250**	250 / 7.08	500 / 14.16	40 / 29.8	50 / 37.3	180 / 457.2	116 / 294.6	87.5 / 222.3	35.5 / 90.2	12 / 30.5 X 12 / 30.5	16.5 / 42.0 X 18 / 45.7	121.5 / 308.6	198.5 / 504.2
700-300**	300 / 8.50	581 / 16.45	40 / 29.8	60 / 44.7	174 / 442.0	130 / 330.2	90 / 228.6	37 / 94.0	12 / 30.5 X 12 / 30.5	16.5 / 42.0 X 18 / 45.7	132 / 335.3	182 / 462.3
700-400**	400 / 11.33	800 / 22.65	CONSULT FACTORY	CONSULT FACTORY	208 / 528.3	130 / 330.2	86 / 218.4	45 / 114.3	12 / 30.5 X 12 / 30.5	16.5 / 42.0 X 18 / 45.7	135 / 342.9	227 / 576.6
700-600**	600 / 16.99	1200 / 33.98	CONSULT FACTORY	CONSULT FACTORY	282 / 716.3	142 / 360.7	99 / 251.4	45 / 114.3	12 / 30.5 X 12 / 30.5	16.5 / 42.0 X 18 / 45.7	142 / 360.7	278 / 706.1

<sup>\*</sup>Specialized "GB" models for glass batching, refractories and other poor-flowing, highly abrasive materials.

The above power requirements are generalizations that may not apply to your application. Please consult factory.

WARNING: In order to clearly show details of machines, some covers, shields, doors and guards have either been removed or are shown in the open position in photographs throughout this brochure. All protective devices must be properly installed before operation of equipment. Failure to do so 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 sq m) 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: Ribbon/Paddle/Plow, Fluidized Bed, Vee-Cone, Rotary Continuous, High Intensity

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

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<sup>\*\*</sup>Dual drive units available for ultra-dense materials.