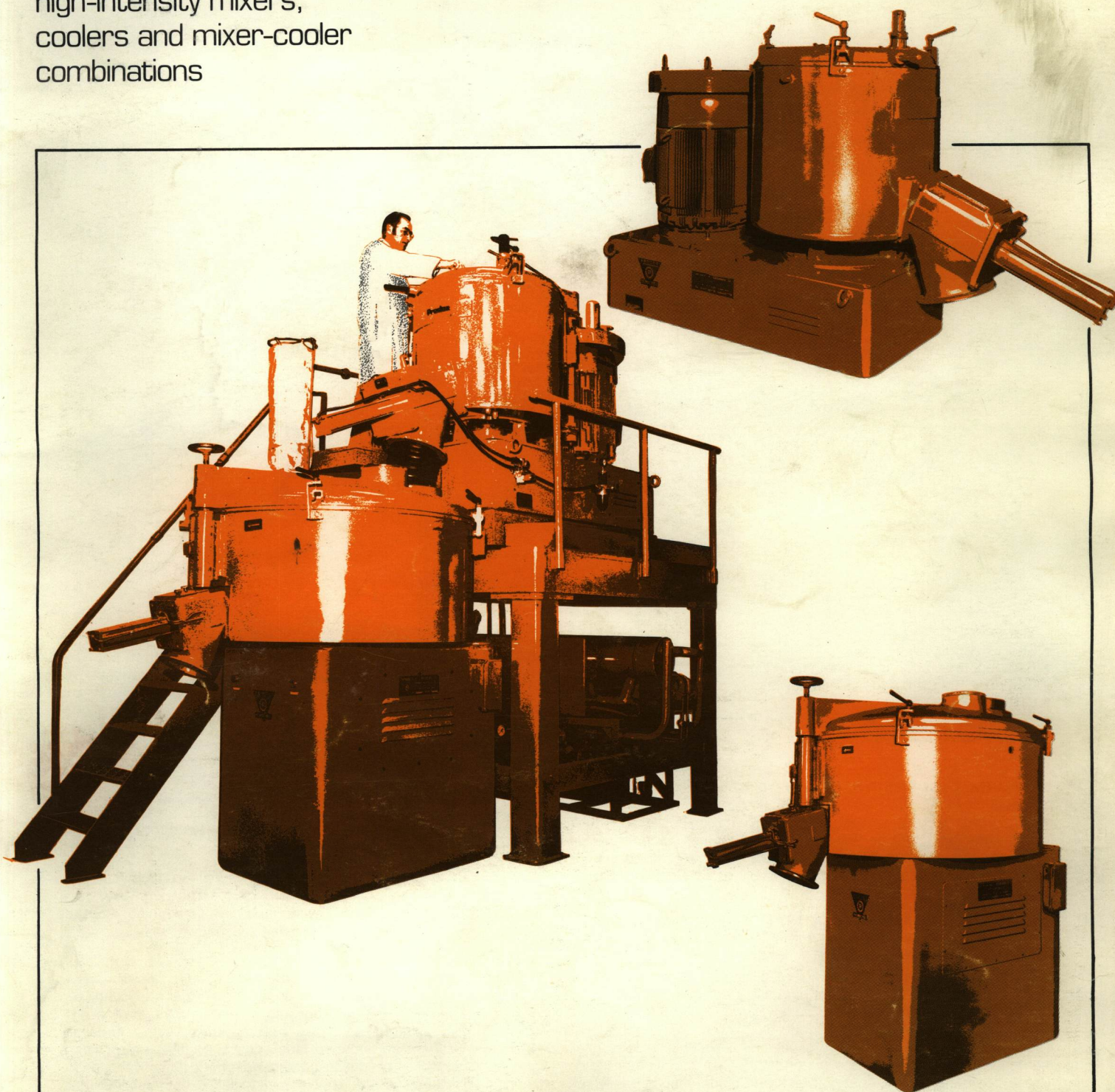


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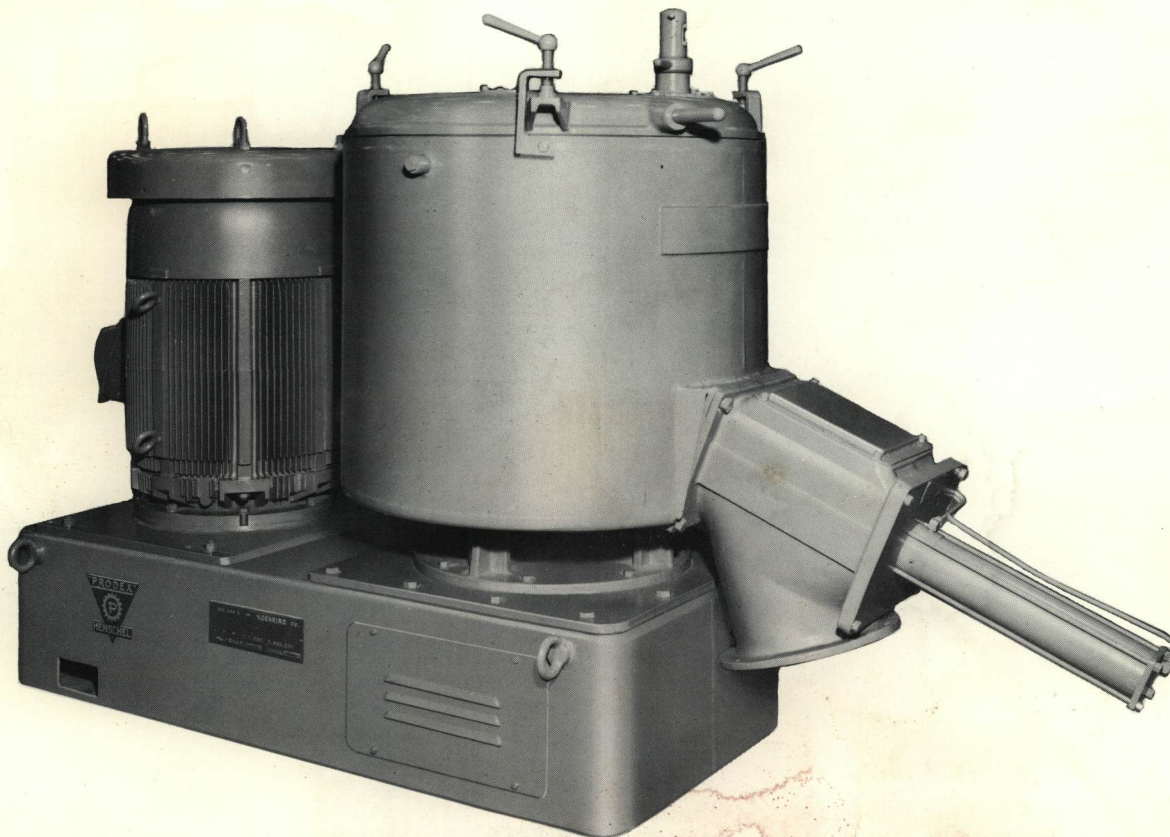
PRODEX / HENSCHEL® MIXING SYSTEMS

high-intensity mixers,
coolers and mixer-cooler
combinations



Prodex / Henschel High-Intensity Mixers

a better beginning for your plastic products



- Short mixing cycles
- Fast, uniform mechanical resin heat-up
- Complete, uniform additive dispersion
- Quick discharge
- Virtual elimination of particle hang-up in mixing bowl
- Vacuum drying with fast cycles

UNIFORM DISPERSION—Prodex/Henschel mixers uniformly mix and disperse even the smallest amounts of additives with plastic powders and granules. The intensive mixing action shortens cycles down to 10% or less of the cycle times of some low-intensity mixer equipment. Various ingredients are mixed with a degree of intimacy and uniformity difficult to achieve with other type mixers.

VORTICAL MIXING ACTION—The Prodex/Henschel mixer operates on our own vortical mixing principle which provides extremely high shear rates. By fluidizing powders and providing intense shearing action, these mixers deliver a quality mix at very short cycles. The charge is continuously and rapidly circulated by the centrifugal action between closely spaced rotating and stationary surfaces. The bottom pitched-blade rotor has a peripheral speed of approximately 130 ft./sec. and develops velocity gradients up to 20,000 reciprocal seconds (16,000 ft./sec. per inch). The accompanying high shear stress and blade impact easily reduce agglomerates and cause intimate dispersion of all ingredients.

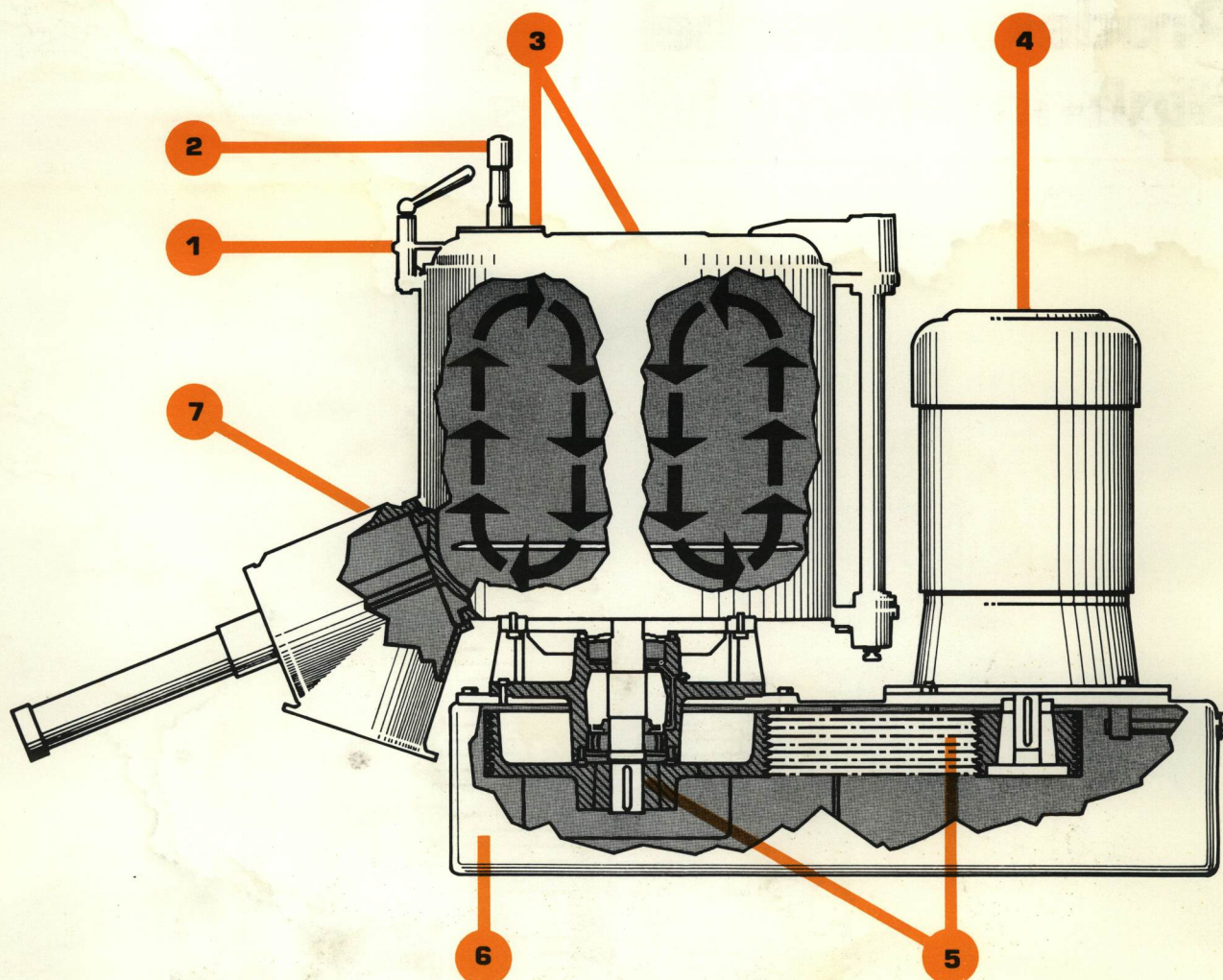
Prodex/Henschel mixers are used for blending simple physical mixtures such as pulverant and liquid and pasty components, as well as for pre-foaming expandable polystyrene. Utilizing frictional heat, the mixer can sinter, agglomerate, dry, slightly gel or color a variety of materials.

Prodex/Henschel mixers serve such diverse fields as plastics processing, food processing, the pharmaceutical and cosmetics industries, and the paint, varnish and lacquer industry as well.

RAPID HEATING ACTION—High horsepower input per unit volume (8+ hp/cu. ft.) results in rapid and uniform heating of the mass. This heating not only speeds removal of volatiles in the vacuum-equipped models, but can also substantially increase the output of the processing equipment when fed directly from the mixer. The rapid rate and uniformity of heat input simply cannot be approached by conventional heat-transfer methods. In those cases where heating is not desirable, complete dispersion can also be obtained in cycles so short that heating is negligible. All Prodex/Henschel mixers are jacketed for cooling or additional heating. A stock temperature indicator is provided for continuous observation of the batch temperature.

DUSTFREE OPERATION—Prodex/Henschel mixers can provide dustless operation and are extremely simple to clean. Mixers are easily loaded and can be fully discharged while running. Contact surfaces are smooth and rounded and are made of stainless steel.

AUTOMATION—Prodex/Henschel mixers can be completely automated with ingredients automatically measured into the mixer at appropriate points during the mixing cycle. High and low speed mixing and dumping can be programmed either through timers or temperature-actuated controls. Automated systems generally offer advantages like reduced labor costs, elimination of waste and contamination, precision compounding and improved house-keeping. Systems can be specially engineered to meet individual requirements.



1 QUICK-ACTION LID LOCK—for rapid opening of lid for cleaning or charging of mixer. Lid is gasketed around entire periphery. Hinges upward on smaller models; swings aside with effortless cam-lift and spring assist on larger models. When lid is opened, a safety switch shuts off power to the motor.

2 ADJUSTABLE DEFLECTOR—this movable baffle is vital part of the Prodex design. Makes possible the adjustment of vortex to optimum action. Temperature-sensing, armored thermocouple protrudes from bottom of deflector and may be connected to an indicating pyrometer.

3 CHARGING HATCHES—lid provided with several openings featuring removable plates to permit installation of charging system. Mixer need never be opened to introduce solids or liquids.

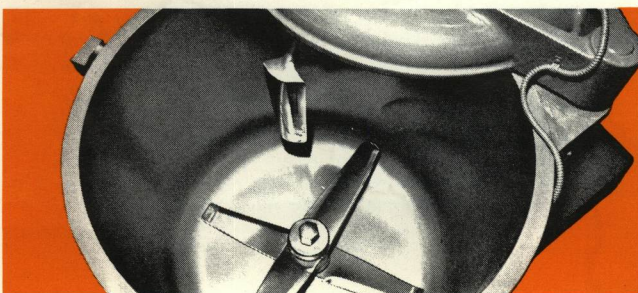
4 TOTALLY ENCLOSED MOTOR—two-speed, American-made motor provides flexibility of operation. High horse-

power is converted to high shear rate in mixer charge. Special explosion-proof electrical gear is available.

5 HEAVY-DUTY TRANSMISSION AND BEARING ASSEMBLY—rugged V-belts and sheaves efficiently transmit motor power to the mixer impeller. Belts completely protected by mixer base. Long-life bearings protected from mixer charge by special seals and a slinger on the impeller shaft.

6 HEAVY FABRICATED BASE—supports mixer and motor in a single, easily-installed, compact unit. Removable covers provide access to belt drive for inspection and maintenance.

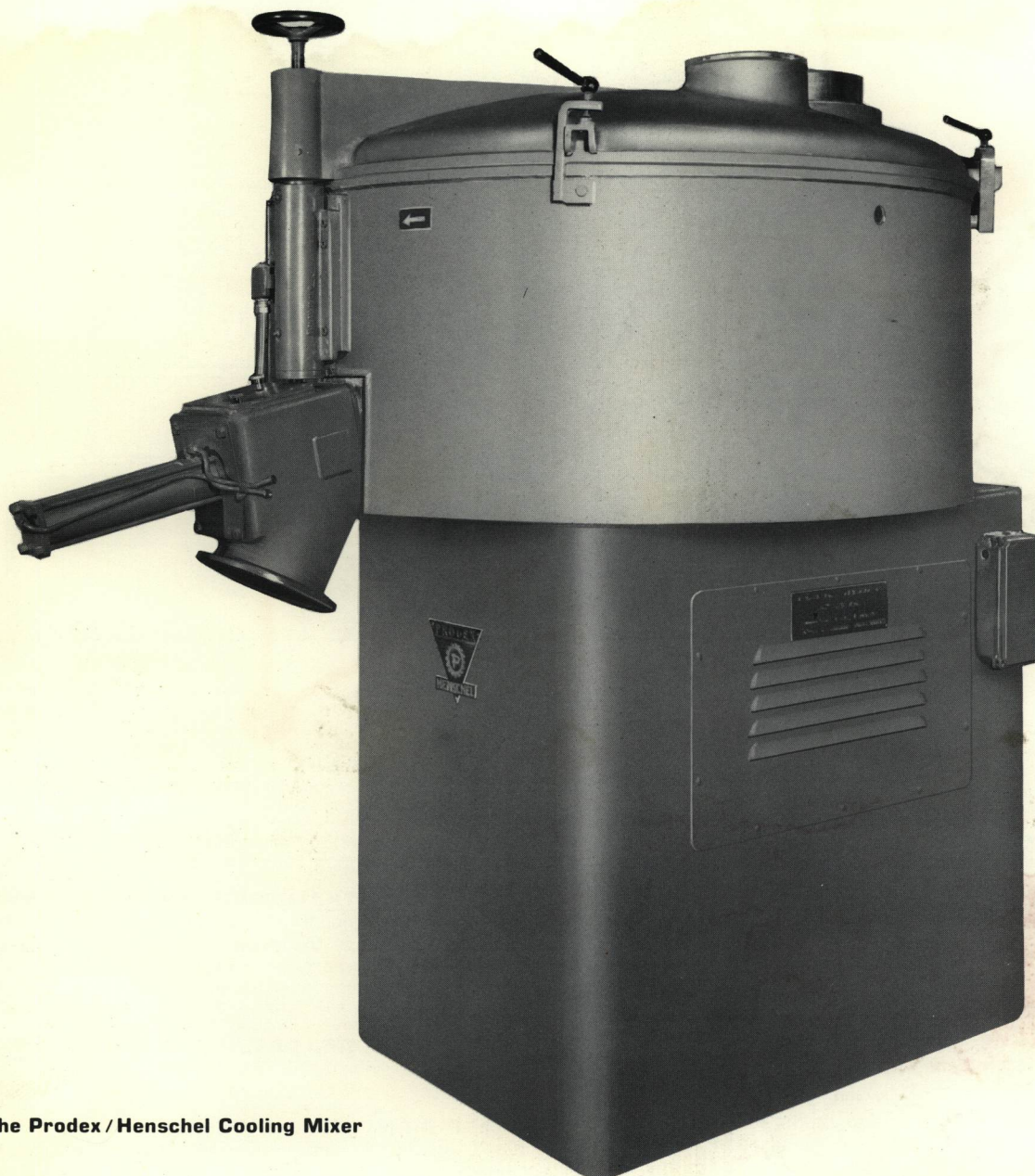
7 LARGE-DIAMETER, AIR-OPERATED DISCHARGE GATE—for rapid emptying of mixer. Gasketed to prevent leakage during cycle. Discharge sleeve is provided with a drilled flange for dustfree connection to secondary systems. Gate may be automatically actuated.



MIXING IMPELLER • Stainless steel, stellite lead edges • Blades adjustable to one another for improved process control • Blades manually removable • Easy to clean • Simplicity of blade design permits accurate scale-up from test runs to production-size runs

MIXING VESSEL—the mixing container is made of stainless steel with an industrial mirror finish. Jacketed construction of the vessel provides versatility in temperature control.

Prodex / Henschel Cooling Mixers

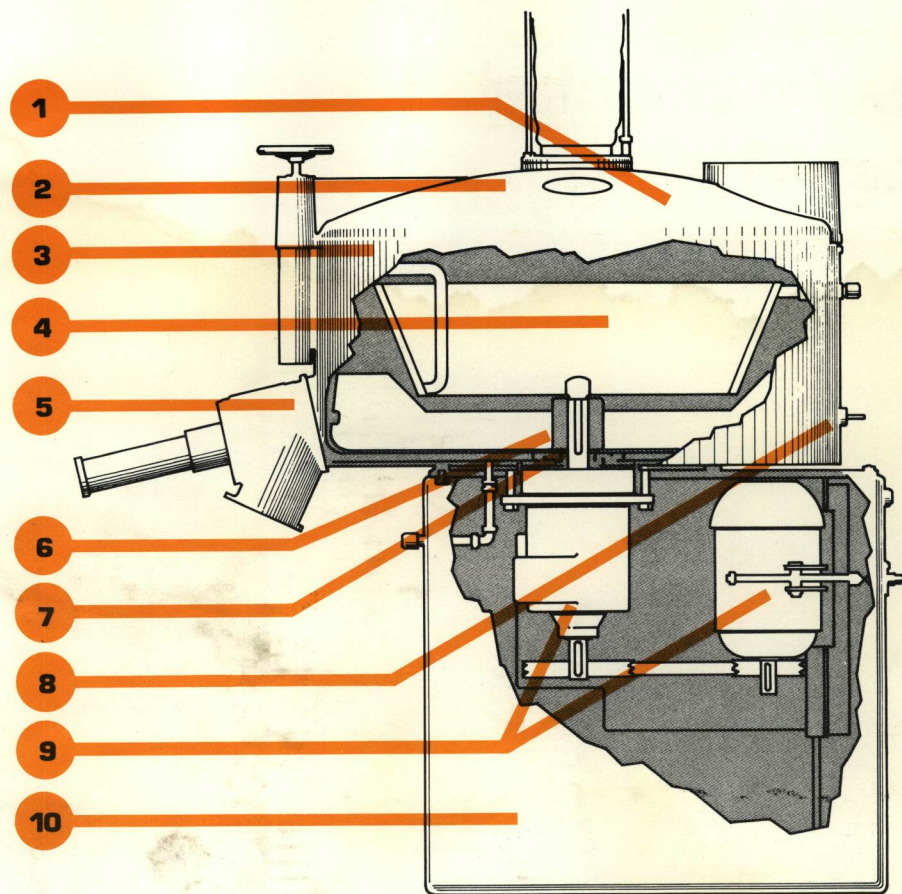


The Prodex / Henschel Cooling Mixer

Material compounded in a Prodex/Henschel mixer may require subsequent cooling in order to keep the mix fluidized for storage, transport or treatment. For such cooling, Prodex supplies a line of jacketed cooling mixers to cool a volume of batch material corresponding with the volume of our high-intensity mixers. This cooling mixer replaces the jacketed ribbon-blender and was created to provide a system capable of rapidly dissipating the heat generated during mixing cycles. The high heat transfer rate of a Prodex/Henschel cooling mixer is made possible by an expanded cooling surface area. This high heat transfer rate shortens the cooling cycle, thus reducing total heat history and prolonging the stability of the compound during final processing.

A conically-formed, internal cooling ring increases the entire cooling surface. The cooling medium can be admitted to the cooling ring separately or in conjunction with the cooling of the container vessel. The cooling ring is easily removable for cleaning or may be removed for less critical applications where increased cooling is not required. These coolers are designed for use with either an in-plant chilling system or a portable chiller.

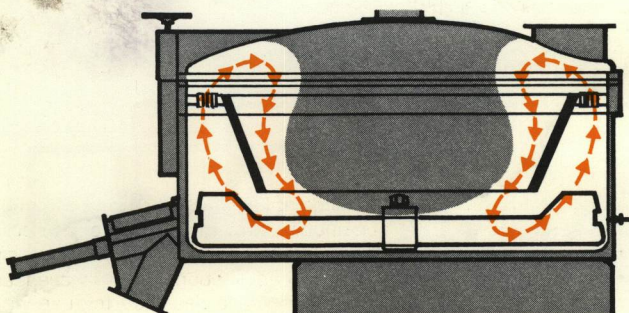
The Prodex/Henschel cooling mixer can be used in conjunction with a Prodex/Henschel high-intensity mixer to provide a fully integrated mixer-cooler system. (See page six for additional information.)



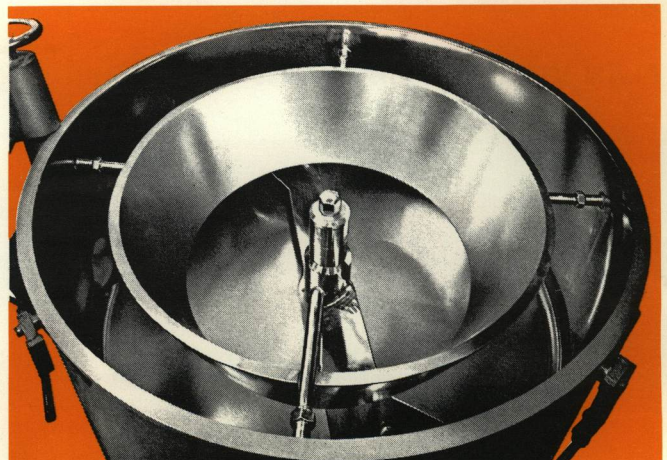
- 1 CLEANING**—when mixer lid is raised a safety switch disconnects the control circuit to prevent accidental start-up of cooler. Vessel easily brushed or vacuum cleaned. Cone and blades are readily removable should intensive cleaning be required.
- 2 LID**—non-corrosive, swivel lid with hand operated lid locks is provided with a feed opening to which the connection pipe from the heater mixer can be attached. Gasketed, dustproof lid also includes an inspection glass for observing material flow.
- 3 MIXING CONTAINER**—polished stainless steel contact surfaces permit easy cleaning, prevent material contamination. Container is provided with a cooling jacket of boiler plate, baffled on bottom and sides. Cooling medium is normally water.
- 4 COOLING CONE**—increases total cooling surface. Easily removed for cleaning.
- 5 DISCHARGE**—large diameter, pneumatically operated discharge opening is fitted with a plug-type gate which can be automatically activated. Discharge sleeve provided with drilled flange for dustfree connection to subsequent material handling system.

- 6 ROTOR ASSEMBLY**—a full diameter stainless steel impeller keeps the compound constantly in motion and prevents caking.
- 7 SHAFT SEALS**—shaft provided with teflon seals for dustproofing. Bearing assembly is further protected by a slinger.
- 8 TEMPERATURE INDICATOR**—standard temperature indicator is supplied for the thermocouple mounted on the sidewall of the vessel.
- 9 MOTOR AND DRIVE SYSTEM**—TEFC 3-phase, single-speed continuous-duty motor, complete with ammeter, motor starter and push-button station. Drive train consists of multiple V-belts driving gear reducer directly connected to impeller shaft.
- 10 BASE**—heavy fabricated steel base supports vessel and motor drive.

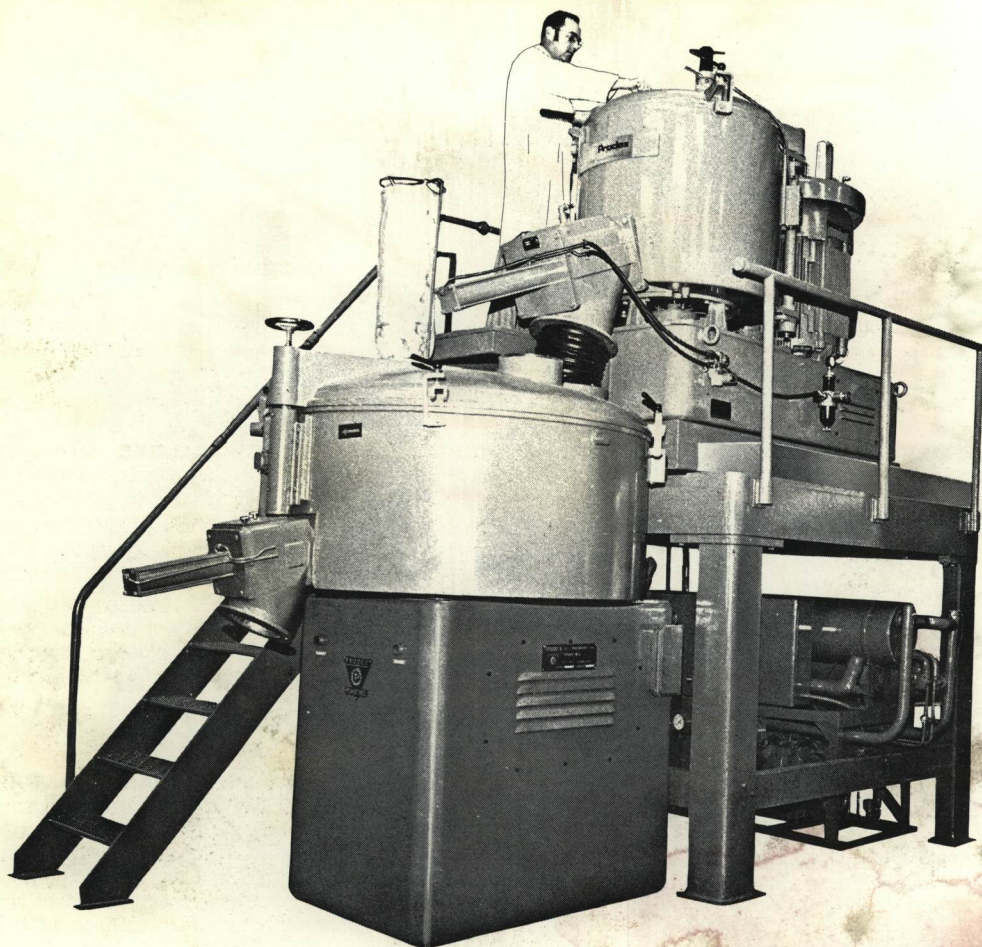
REFRIGERATED COOLING—in order to maximize cooling efficiency and minimize the cooling cycle, many applications require refrigerated water for passage through the cooling jacket. Stationary or portable units available.



BATCH COOLING PATTERN—Vessel's highly polished stainless steel interior and simplified impeller design permit easy cleaning.



Prodex / Henschel Mixer-Cooler Systems

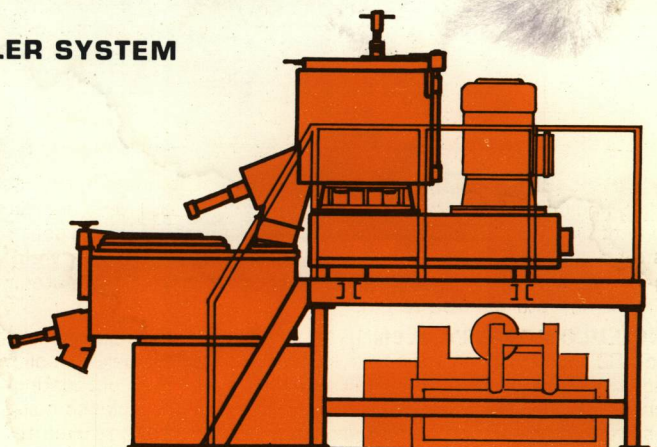
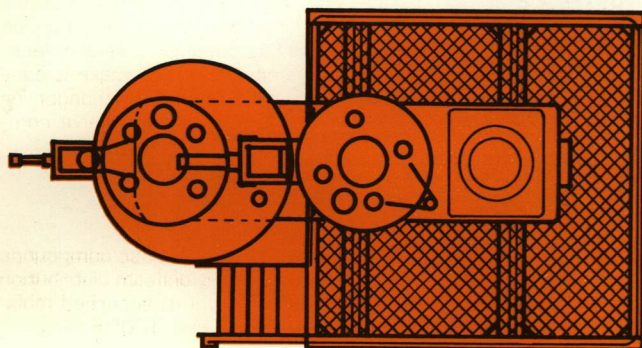


The logical extension of a Prodex/Henschel high-intensity mixer and a cooling mixer unit is a combination mixer-cooler unit. Fully integrated mixer-cooler systems can be supplied to process a wide variety of thermoplastic materials. The heating and cooling mixers for combination units are taken from the standard model series [see page eight for combination specifications]. A sturdy

steel frame supporting the Prodex/Henschel high-intensity mixer over the cooling mixer fully integrates both units into a compact assembly.

Prodex/Henschel mixer-cooler systems may be completely automated. Systems can be programmed for highest output at the lowest possible production cost.

PLAN VIEW AND SIDE VIEW OF A MIXER-COOLER SYSTEM



Prodex / Henschel Mixer Applications

MIXING OF POWDERS IN POWDERS OR BEADS

RIGID PVC DRY-BLENDING—thorough dispersion and uniform absorption into each resin particle of stabilizers, lubricants and colorants. Stabilizers and lubricants are added after the resin has reached a high temperature. Under these conditions the resin absorbs the added ingredients with greatly improved heat stability. Uniform dispersion of high-impact additives. Finished products can be extruded directly from the powder blend. Cycles: 4 to 6 minutes. End temperatures: 160 to 250° F.

POLYOLEFIN RESINS IN POWDER FORM—dispersion of pigments, anti-oxidants, fillers and solid or liquid stabilizers. Carbon black dispersion. Masterbatching of colors. Blending of production lots. Cycles: 2 to 3 minutes. End temperatures: 120 to 140° F.

ACRYLIC OR POLYSTYRENE BEADS—dispersion of pigments, lubricants and fillers. Blending of production lots. Cycles: 2 to 3 minutes. End temperatures: 100 to 140° F.

NYLON POWDERS—dispersion of pigments, fillers, lubricants, stabilizers, carbon black and fillers or extenders. Removal of moisture and solvents. Mechanical heat input promotes adhesion of additives to each resin particle. Cycle: 2 to 3 minutes. End temperatures: 100 to 140° F.

THERMOSETTING MOLDING COMPOUNDS—intimate mixing of reinforcements, fillers, catalysts and promoters with dry resins. Devolatilization. Cycles: 1 to 3 minutes. End temperatures: 100 to 140° F.

PHARMACEUTICAL COMPOUNDS—thorough fine-scale blending of ingredients, under vacuum or special atmospheres if desired. Short blending cycles and cooling water in jacket keep temperature-sensitive ingredients cold. Ease of thorough cleaning makes possible complete elimination of batch-to-batch contamination. Cycles: 1 to 4 minutes.

CAKE, PASTRY, PUDDING MIXES—intimate blending of all ingredients in very short times. Low-speed blending and water-cooled jacket keep materials cool. All-stainless-steel working surfaces, ease of complete cleaning eliminate contamination problems. Cycles: 1 to 3 minutes.

BLENDING OF POLYMER LOTS OR GRADES—rapid mixing to provide a homogeneous blend. Cycles: about 1 minute. End temperature: 100° F.

NITRILE RUBBERS—with the availability of powdered rubbers, a new and more economical way of preparing finished rubber compounds has been developed. For mixing of powdered rubber with various additives, a special mixing procedure and a special mixing tool has been developed. The blend obtained by this procedure is dry. All components are homogeneously mixed and the plasticizer is absorbed. The compound end temperature is about 40° C. The use of our fluidizing mixer for the processing of powdered rubber has permitted the mixing cycle to be reduced by 50%. The automation of the mixing process offers additional benefits for users of rubber in powdered form.

LIQUIDS IN POWDERS

PLASTICIZED PVC DRY-BLENDING—preheats resin mechanically and uniformly from 170 to 210° F for rapid and even absorption of plasticizers added after resin is heated. Thorough dispersion of fillers, stabilizers, pigments and lubricants to yield high-quality blends. Removal of moisture. Cycles: 6 to 8 minutes. End temperatures: 190 to 250° F.

CELLULOSICS DRY-BLENDING—preheats flake mechanically to 160 to 195° F. Densifies flake and thoroughly disperses solid additives and pigments. Plasticizers are added after preheating and are rapidly absorbed to produce free-flowing dry-blends suitable for extrusion to finished products. Moisture is removed to

a large extent. Cycles: 6 to 10 minutes. End temperatures: 160 to 210° F.

CHEMICAL SOLUTIONS—a wide range of crystalline and amorphous solubles can be quickly dissolved in appropriate solvents. Entire unit can be explosion-proofed. Stainless steel working surfaces are inactive in all but acid, reducing media. Jacket provides heating and/or cooling as needed. Baffled, high-intensity vortex action provides high mass-transfer coefficients, insures fast dissolving.

DENSIFICATION

POLYOLEFINS—reduction of crumb, "popcorn" or spongy materials to fine powders with greater bulk density, improved flow. Reduction of chopped film scrap to crinkly, dense particles for improved extrusion. Combined densification and masterbatching with pigments. Simultaneous removal of moisture or solvents, if desired. Cycles: 2.5 to 5 minutes. End temperatures: 100 to 300° F.

CELLULOSICS—reduction of crumb to fine powders of higher bulk density. Simultaneous moisture removal and/or color masterbatching. Cycles: 0.5 to 2 minutes or more, depending on degree of drying desired. End temperatures: 100 to 190° F.

FILM SCRAP—regeneration of film scrap to granular material with greater bulk and improved flow characteristics. A newly developed device can be fitted without great cost to the lid of mixing container to aid in the reprocessing of film scrap. This new process permits the cost of film scrap regeneration to be substantially reduced. Cycles: 8 to 10 minutes.

POWDER-METALLURGY ALLOYS—thorough and intimate blending of various metal powders and additives insure uniformity of properties in finished piece. Rugged hard-surfacing insures long rotor life with abrasive materials. Mechanical heating drives off adsorbed moisture. Cycles: 2 to 5 minutes. End temperatures: 120 to 220° F.

CERAMICS—complete and intimate blending of ceramic powders and additives assures uniformity of properties and color in final products. Hard-surfaced rotor holds up in service. Mechanical heating drives off adsorbed water. Cycles: 1 to 5 minutes.

POWDERS IN LIQUIDS

VINYL PLASTISOL AND ORGANOSOL PREPARATION—powdered resin and pigments are added to plasticizer or plasticizer-solvent solution and rapidly dispersed. Jacket may be cooled to prevent temperature rise. Operating unit under vacuum keeps product free of air bubbles. Discharge port can be piped directly to pump inlet to facilitate transfer of liquid to storage. Cycle: 2 minutes. End temperatures: 90 to 110° F.

PVC PASTE—high-intensity mixer lends itself to the manufacture of all kinds of paste as used in spread-coating, dip-coating, rotational molding and similar processes. Paste manufacture on the high-intensity mixer is by means of the variant mixing tool. If the viscosity of the paste is below 1000 cp, the double-tiered mixing tool can be used. After plasticizer has been put into the container, pulverant materials are added. Cycles: 3 to 5 minutes.

PAINT AND VARNISH MANUFACTURE—oils and solvents are loaded into mixer, resins, powders and ground pigments added. Jacket may be heated to speed dissolving action. Vacuum can be used to keep mixture free of bubbles. Discharge port can be piped directly to pump or can filler. Cycles: 2 to 5 minutes.

PHARMACEUTICAL SUSPENSIONS—a wide variety of stable suspensions can be rapidly manufactured. Preparation can be conducted under vacuum or special atmosphere. All-stainless-steel working surfaces, one-step removal of rotor make it easy to completely eliminate contamination by metal or changeover residuals, and jacket cooling keeps temperature-sensitive compounds cool. Cycles: 2 to 5 minutes.

GRANULES WITH GRANULES

MASTERBATCH LET-DOWN—rapid mixing of base compounds or polymers with colored masterbatch. Highly uniform distribution of masterbatch throughout mixture. Removal of adsorbed moisture. Cycles: about 1 minute. End temperature: 100° F.

PRODEX/HENSCHEL SPECIFICATIONS

PRODEX/HENSCHEL HIGH-INTENSITY MIXERS

MODEL	Container Capacity (L) (Ft. ³)		Working Capacity (L) (Ft. ³)		Motor HP at High/Low Speed	Mixing Tool Speed RPM	Shipping Weight (Lbs.)
2 J SS	9	0.3	6	0.2	3	3800/1800*	300
18 J SS	75	2.7	50	1.8	20/10	1700/850	1,300
50 J SS	220	7.7	150	5.3	50/25	1300/650	2,600
60 J SS	240	8.5	170	6.0	60/30	1200/600	4,000
115 J SS	500	17.5	330	11.5	100/50	900/450	5,200
250 J SS	1000	31.0	660	24.0	200/100	800/400	12,000
500 J SS	1500	53.0	1000	35.3	400/200	600/300	---

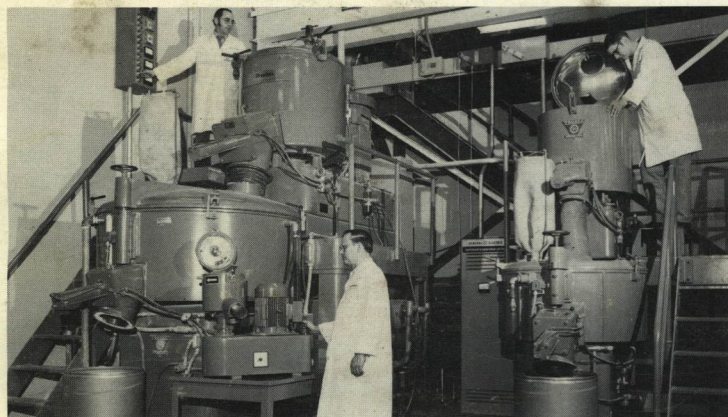
* Infinitely variable

PRODEX/HENSCHEL COOLING MIXERS

MODEL	Container Capacity (L) (Ft. ³)		Working Capacity (L) (Ft. ³)		Motor HP	Mixing Tool Speed RPM	Shipping Weight (Lbs.)
CM 50	350	12.3	150	5.3	10	165	1,800
CM 115	1050	37.0	350	12.3	20	130	4,000
CM 150	1750	61.7	400	14.1	20	130	4,500
CM 250	2150	76.0	660	23.3	40	120	7,700
CM 500	2600	91.8	660	23.3	60	120	---

PRODEX/HENSCHEL MIXER-COOLER SYSTEMS

System Model	18/50	50/50	60/115	115/115	115/150	250/250	500/500
High-Intensity Mixer	18 J SS	50 J SS	60 J SS	115 J SS	115 J SS	250 J SS	500 J SS
Cooler-Mixer	CM 50	CM 50	CM 115	CM 115	CM 150	CM 250	CM 500



We reserve the right to amend these specifications at any time without notice. The only warranty applicable is our standard written warranty. We make no other warranty, expressed or implied.

the PRODEX/HENSCHEL mixer laboratory

Prodex development engineers, with years of engineering experience in the plastics processing industry, are continually evaluating new ideas in equipment design. Equipment in our laboratory is as nearly production-like as we can make it. In addition to our mixers, the lab also contains a variety of plastics processing equipment including injection molding machines and various forms of extrusion equipment. Demonstration of our mixers on your material is the best measure of our performance. So write or telephone us for an appointment to visit our lab.

SPECIAL MIXING TOOLS

The standard mixing tool supplied with every Prodex/Henschel high-intensity mixer consists of two blades adjustable to one another. It is a simple, two-piece tool constructed of stainless steel with stellite lead edges. To solve special processing problems, however, Prodex/Henschel offers seven other mixing tools, including a pelletizing tool, a polyolefin tool and a coloration tool.



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