

Paddle Blenders Mix Powders on a Bulk Scale

By Erin Dillon, Charles Ross & Son Co.

In these unprecedented times, the growing need for companies in the manufacturing space to have the ability to produce products in the US and have greater control of the supply chain has never been more important. When Intermountain Blending & Filling (IBF), a full-service contract manufacturer based in Idaho's Treasure Valley, was looking for new processing equipment to compound a complex product, they turned to NY-based Charles Ross and Son Co., a leader in mixing and blending technology.

IBF's proprietary oil-scented plastic beads were previously being manufactured overseas, on a tumble blender process under full vacuum. The product was a consumer hit and through word-of-mouth, business increased exponentially. This success steered the company to a new goal: Move manufacturing to its Idaho facility and employ a safer, non-tumble design blending system that would mirror the overseas process and also be used to mix various other formulations. Versatility is key as IBF makes a gamut of intermediates and products for body, skin, and hair care; home care, cleaning, and laundry; and pet care.

In business since 2016, IBF consists of two facilities totaling 208,000 sq ft that formulate, blend, and package a variety of powder and liquid products. The full-service facilities include a shipping/receiving warehouse, compounding plant, filling area, R&D formulation lab (complete with stability chambers for accelerated aging shelf-life experiments), an analytical chemistry lab, and a microbiology lab. For liquid product processing, as well as washing and sanitizing of mixers, tanks, and ancillary equipment, a high-purity water system is used. The water system includes softening,

reverse osmosis (RO), and microbiological filtering, as well as UV sanitization and electronic demineralization (EDI).

While primarily manufacturing cosmetic products, IBF was designed with a quality management system (QMS) to meet the OTC drug standards and Current Good Manufacturing Practices (cGMPs), with an emphasis on training, product traceability, validated SOPs, and robust 5S and continual

improvement programs. The quality department routinely conducts internal audits to ISO 9001:2015, ISO 22716:2007, and 21 CFR pt. 211 in addition to hosting regular mock recalls and Gemba walks.

When director of engineering and technical services Anthony Grimaldi and his team began sourcing blenders for the oil-scented beads, their main considerations included:

- Manufacturer reputation for quality and competence in designing and building mixers
- Superior quality materials of construction compatible with bulk ingredients
- Vacuum capability
- Ease of use and cleaning
- New equipment, preferably made in the US



This portable Ross 1-cu-ft paddle blender is used for R&D testing and making pilot scale batches.



IBF compounds and fills various types of personal care and home care products in tubes, bottles, jars, vials, and packettes.

IBF's search promptly led them to Ross, an employee-owned and operated 180-year-old company with five manufacturing plants in the US serving North America, Latin America, and Europe. Ross also has state-of-the-art facilities in China and India that service customers in Asia, Australia, and the Middle East. Its long history and extensive experience have earned Ross a reputation for innovative engineering, heavy-duty construction, superior workmanship, and a knack for customization.

The Ross corporate headquarters on Long Island, NY includes a well-equipped 8,000-sq-ft test and development center. Process line simulations are an extremely useful part of development, allowing manufacturers to determine optimal blending strategy or try out multiple features and options before making a purchase. Through proof-of-concept equipment demonstrations utilizing actual raw materials in a formulation, mixing experts at Ross share best practices know-how and help perfect the mixing process for highly repeatable results.



IBF's scented beads undergo a unique and complex manufacturing process that requires appropriately timed oil inclusion and continuous deep vacuum in the Ross 36-cu-ft paddle blender.



Made from US steel, the Ross 10-cu-ft paddle blender features precisely designed paddle agitators, a 10-gal liquid fragrance delivery spraying system, and multiple automated valves operated from a main touchscreen control panel.

Grimaldi visited the test & development center and worked alongside Ross vice president of sales (then technical director) Ken Langhorn to get the bead blending process just right. After being cautioned by other manufacturers that infusing plastic beads with fragrance oil would be extremely difficult, IBF and Ross - through trial and error - were able to identify a successful and reliable process over the course of three days.

Blending in a horizontal trough equipped with a paddle agitator, appropriately timed oil inclusion, and continuous deep vacuum proved to be the most viable solution. The results determined during testing gave a comparable end product to what IBF was getting with its overseas process. The new blending and oil spraying procedure also successfully accommodated a change in raw material.

Another Mixing Challenge

Pleased with the outcome of the testing, IBF tasked Ross with another mixing challenge to make their oil-scented salts. The product consists of a medium-grade salt that is coarse in appearance, microcrystalline cellulose powder and a fragrance oil. The main processing concerns were dusting and clumping. Another round of testing for this application confirmed that the paddle blender is appropriate for delivering the oil and creating a lump-free batch within a short blend time.

After in-depth consultations with the Ross technical sales and engineering departments, IBF purchased paddle blenders in multiple sizes. Both teams also collaborated to develop a fully customized liquid fragrance delivery spraying system that automated the oil and fluid additions, as well as the spraying of CIP liquids, hot water, and cold water during the cleaning/washdown cycle.



IBF currently has seven Ross paddle blenders in various sizes in configurations currently used to manufacture air fresheners, bath salts, laundry enhancers, and a range of other products.



This atmospheric design Ross 100-cu-ft paddle blender is equipped with a pneumatically-actuated three-piece cover with custom ports, as well as spray nozzles for cold and hot water supply.

IBF's manufacturing line includes seven Ross paddle blenders in 100-, 36-, 10-, and 1-cu-ft (test or pilot batch size) capacities, built in 2019 and 2021. The stainless steel used to fabricate each blender was produced in the US. Precisely designed paddle agitators, accurate tolerances between blade and trough, smooth 150-grit finish on interior surfaces and radiused welds, FDA-compliant elastomers, pneumatic covers and sanitary discharge valves, custom legs providing 6-ft clearance from valve to floor, safety grates, triple-action pressure relief valves, easy-to-adjust stuffing boxes, OSHA-compliant safety guards, built-in vacuum pumps, high-efficiency garmotors, and touchscreen recipe controls, no details were spared in the manufacture of each blender.

Prior to purchasing the blenders from Ross, IBF lacked the capability to mix powders on a bulk scale. The blenders are now used to mix a salt-based laundry fragrance booster and a bath soak (sodium bicarbonate, Himalayan pink salt, Epsom salt, olive oil, shea butter, fragrance), among other products.

"We have found the process to be efficient. Considerations for this type of work included the manner of weighing materials, pneumatically conveying chemicals to the Ross paddle blenders, and dust collection," explained Robert Reeder, IBF president and chief operating officer. "In-house manufacturing allows IBF to control costs and quality of the products."

In the advent of an American manufacturing renaissance, IBF is equipped to assist startup and established brands alike in their compounding needs and meet those needs to the highest standards.

For more information, contact Charles Ross & Son Co. at mail@mixers.com or 631-234-0500, or visit www.mixers.com.