



case study

Innovative design and attention to detail deliver a compact, flexible and efficient Tea Blending Plant

Leading industrial process and mixing specialists JR Boone Ltd have designed, installed and commissioned a comprehensive tea blending and mechanical handling system for a leading UK specialist tea manufacturer.

The customer set challenging technical specifications for the overall project and the new system replaces a smaller manually-intensive system, which had limited blending capacity up to 100 litres. The scope of supply includes a 1500 litre capacity stainless steel horizontal rotary drum blender, compact belt and bucket elevator, vibratory feeder, bespoke liquid flavour spray coating system, integrated valve control system and six special mobile tote bins for transporting product to and from the blender.

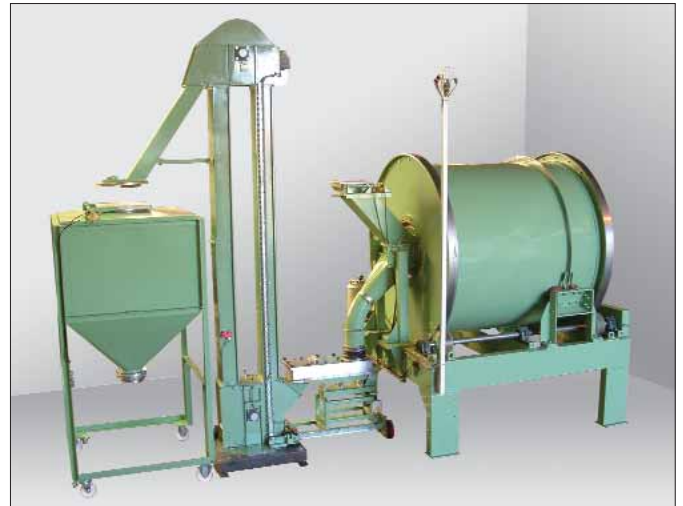
The new system is designed to blend batches up to 500 kg, made up from a wide range of black and green base leaf teas with average bulk densities ranging from 330 to 400 kgm⁻³. An essential part of the blending process requires the addition of very small quantities of liquid or dry flavourings in powdered, flaked or granular formats. Once the blend has been completed the finished product is then discharged into wheeled tote bins for off line QC checking, before being moved onto the packing lines.

A critical parameter for the new installation was the 'time to blend'. The existing system had long blend times which coupled with the small batch size gave a much lower capacity and difficulty in achieving blend consistency over time. The new system produces an optimum blend in 1 to 5 minutes depending on the amount of liquid added and with a quick and continuous discharge the delicate leaves and granules are protected.

A second important factor in the project related to the mechanical handling of the leaves, both before and after blending. Again delicate handling of the leaves and flavourings is essential to minimise any damage and the customer stipulated that the system should also take up minimum floor space.

To meet the operational requirements, a compact design was generated in close co-operation with the customer's plant operators and project engineers. This allows a single elevator to feed tea leaves and a variety of dry flavourings into the blender directly from tote bins and then discharge finished tea blends back into the tote bins without damage. If the specific recipe calls for liquid flavourings, these can be sprayed from a 30 litre 316 SS pressurised container mounted on the side of the blender then via an adjustable lance inside the blender positioned to optimise spray patterns. The blender design also incorporates a special ease of cleaning access door feature to facilitate rapid and hygienic change over from one flavoured tea to another.

JR Boone have extensive experience in achieving optimum blending results in challenging applications ranging from smaller laboratory blenders up to large scale commercial units. Following comprehensive in-house trials, Boone engineers confirmed that the larger blender could achieve a shorter time



to blend, whilst maintaining the tight quality control on the finished product.

The unique non-shear mixing action within JR Boone blenders is produced by a series of blades welded to the inside of the rotating drum. The rotation lifts and cascades the product off the blades to form a highly fluidised curtain of material, which then folds into the product stream coming from the opposite end. A short drum length to diameter ratio, together with the low-shear fluidised curtain, makes this process ideal for coating and mixing of sensitive materials. Product inlet and outlet can be located at the same end or at opposite ends of the blender to suit the plant layout. Drum blending is also highly effective for blending in tiny amounts of additives in ratios as low as 1:150,000 without the need for a pre-mix. The minimum number of mixing elements ensures minimum product contact area and ease of total cleaning.

The overall control system, which includes discharge valves and level sensors, has a number of comprehensive failsafe features. These not only ensure operator safety at all times, but also ensure blending and flavouring processes can only take place in prescribed ways.

JR Boone's MD Chris Boone says the Client is very pleased with the finished plant and he concludes: "The whole plant was installed and commissioned by our engineers on time and within budget. Bringing product to and from mixers and blenders can be as important as the mixing process itself and requires in depth understanding of the of product behaviour in each part of the process. By taking full responsibility for the complete system our engineers working in close co operation with the Clients team delivers optimised control of the mix process whilst ensuring the highest product integrity is maintained."

John R Boone Ltd

18 Silk St, Congleton, Cheshire CW12 4DH, England

Tel: +44 (0)1260 272894 Fax: +44(0)1260281128 e-mail: sales@jrboone.com www.jrboone.com