Industrial mixing system ï¿½ blending, dissolving and syrup rooms

Target application: industrial mixing system

Reference configuration: Industrial mixing and blending system, 2,000ï¿½10,000 L batch

MCF Technology engineers industrial mixing systems as complete rooms: agitated tanks with the right impeller geometry, high-shear units for powders and stabilisers, sugar dissolving, in-line blending with mass-flow dosing and automatic CIP. Mixing is where recipe repeatability is won or lost, so every unit is sized on viscosity, solid content and batch time ï¿½ not on tank volume alone.

SCOPE OF SUPPLY

- Agitated mixing and storage tanks from 500 to 30 000 l, insulated or jacketed
- Impeller selection per duty: propeller, anchor with scraper, turbine, magnetic
- High-shear dissolver / powder inductor for pectin, stabilisers, proteins and cocoa
- Sugar dissolving with continuous syrup room and filtration
- In-line blending with mass-flow meters, deaeration and carbonation
- Recipe management on PLC/SCADA with batch traceability and automatic CIP

TYPICAL OUTPUTS

Soft drinks and flavoured water syrups ï¿½ Nectars and blended juices ï¿½ Sauces, ketchup and mayonnaise bases ï¿½ Dairy and plant-based mixes ï¿½ Jam, filling and cream preparations

PROCESS, STEP BY STEP

1. **Ingredient reception and weighing ï¿½ Load cells ï¿½0.2% ï¿½ bag tip stations**
   Powders, sugar and concentrates are weighed on the tank or on a dedicated station, so every batch starts from a recorded quantity, not from an operator estimate.
2. **Sugar dissolving ï¿½ Cold or hot dissolving ï¿½ 55ï¿½65ï¿½ Brix syrup**
   Sugar is dissolved in continuous or batch mode, filtered and stored as simple syrup; hot dissolving is used when microbiological stability of the syrup room matters.
3. **Powder induction and high shear ï¿½ Rotor/stator 3 000ï¿½3 600 rpm ï¿½ vacuum inductor**
   Pectin, gums, stabilisers and proteins are wetted inside the liquid stream: this is what removes lumps and fish-eyes that no downstream step can fix.
4. **Batch mixing ï¿½ 500ï¿½30 000 l ï¿½ anchor, turbine or propeller**
   Impeller and speed are chosen on viscosity; jacketed tanks control temperature during hydration, dissolving or acidification.
5. **Recipe blending and dosing ï¿½ Mass-flow dosing ï¿½0.5% ï¿½ in-line up to 60 000 l/h**
   Finished syrup, water and additives are blended in line or in batch with mass-flow control, then deaerated and, if required, carbonated.
6. **Buffer, transfer and traceability ï¿½ Buffered tanks ï¿½ PLC/SCADA batch report**
   The blended product is buffered ahead of thermal treatment and filling; each batch carries its recipe, quantities and operator in the report.
7. **CIP and changeover ï¿½ Automatic CIP recipes ï¿½ conductivity control**
   Spray devices sized on tank geometry, recorded CIP cycles and short changeover sequences so recipe switches do not eat production hours.

DIMENSIONS AND BUILDING ENVELOPE

Tank diameter	1.6 m for 2,000 L, 2.4 m for 6,000 L, 2.9 m for 10,000 L
Tank height	3.2ï¿½4.6 m including agitator drive and load cells
Skid footprint	45ï¿½120 mï¿½ for a two-tank blending station with dosing platform

Clear height	6ï¿½7 m under beam over the tanks and powder induction hopper
Powder handling	20ï¿½45 mï¿½ for big-bag station, sack tip or silo interface

LAYOUT ï¿½ FUNCTIONAL ZONES IN FLOW ORDER

1 ï¿½ Liquid dosing	Metered water, oil and concentrate dosing with mass-flow meters
2 ï¿½ Powder induction	Vacuum or venturi powder induction with lump breaker
3 ï¿½ Mixing	Agitated tanks with anchor, turbine or high-shear rotor-stator head
4 ï¿½ Homogenizing / deaeration	Inline homogenizer or vacuum deaeration where the recipe requires it
5 ï¿½ Buffer & transfer	Buffer tank, transfer pump and inline quality check before filling
6 ï¿½ Control & CIP	Recipe management with gravimetric control, batch report, automatic CIP

UTILITIES AND CONSUMPTION

Installed power	55ï¿½180 kW depending on batch size and shear duty
Steam	0.3ï¿½1.2 t/h at 6 bar for heated recipes
Water	5ï¿½15 mï¿½/h treated process water
Compressed air	120ï¿½300 Nmï¿½/h at 7 bar
Performance	Batch accuracy ï¿½ 0.2% on gravimetric dosing, batch cycle 25ï¿½55 minutes
Manning	1ï¿½2 operators per shift

INSTALLATION, SITE CONDITIONS AND SCOPE BOUNDARIES

- Scope of supply: process equipment, automation, mechanical and electrical erection, commissioning, FAT/SAT, HACCP validation and operator training.
- Excluded from the ranges: land, civil works, building steelwork, external utility generation and import duties.
- Installation, commissioning and after-sales service are delivered worldwide by MCF crews, with remote diagnostics on the SCADA.

TECHNICAL FAQ

Which agitator suits a viscous product?

Above roughly 5 000 cP a propeller no longer moves the whole mass: MCF uses an anchor agitator with wall scrapers, often combined with a counter-rotating turbine or a recirculation loop through a high-shear head.

How are powders added without lumps?

Through a powder inductor under vacuum plus a high-shear rotor/stator: the powder is wetted in the liquid stream instead of on the surface, which removes fish-eyes on pectin, gums and proteins.

Batch mixing or in-line blending?

Batch mixing is the right choice for many recipes, frequent changeovers and small volumes. In-line blending with mass-flow dosing is more efficient above about 20 000 l/h of a stable recipe and removes intermediate storage.

Do you supply the syrup room too?

Yes: sugar dissolving (cold or hot), filtration, simple and finished syrup tanks, dosing loop toward the filler, all with the same automation as the process line.

How is CIP handled on mixing tanks?

Rotary spray balls or jets sized on tank geometry, with return pump, conductivity control and recorded recipes ï¿½ the same CIP station serves the mixing room and the downstream line.

NEXT STEPS

- Full technical page: https://mcftechnology.group/en/industrial-mixing-system
- Configure the line and request the feasibility study: https://mcftechnology.group/en/configurator
- Run the ROI simulator: https://mcftechnology.group/en/roi-simulator
- Build the bankable financial plan (3ï¿½10 years): https://mcftechnology.group/en/financial-plan
- Request a quotation: https://mcftechnology.group/en/contact

DISCLAIMER

All figures in this datasheet are indicative engineering ranges used by MCF Technology for budget screening and layout discussion of the reference configuration. They are not a quotation, not a performance guarantee and not the audited result of a specific plant. Final specification, dimensions, utilities and CAPEX are fixed in the feasibility study on your product, packaging formats, utilities cost and site conditions.