

Tomato Paste Rework Line İÇİ½ Drum Unloading, Mixing, Pasteurization & Filling

Target application: tomato paste rework line

Reference configuration: 3,000 kg/h finished product

This is the configuration MCF Technology quotes most often for rework projects: aseptic bulk paste in, retail cans and glass out, running 250İÇİ½300 days a year. Use it as the baseline and scale it to 500, 1,000, 2,000 or 5,000 kg/h.

SCOPE OF SUPPLY

- Aseptic bag-in-drum and IBC emptying station with piston or hydraulic press discharge, hot-water jacket for high-viscosity paste
- Ingredient preparation: sugar, salt, vinegar, starch, spices İÇİ½ weighing, hydration and powder-into-liquid mixing under vacuum
- Buffer and pre-mix tanks with side-scraping agitators and load cells
- Continuous in-line standardization: dilution water, mass-flow and refractometer control to the target İÇİ½Brix (İÇİ½ 0.2)
- Deaeration and homogenization for ketchup and smooth sauces
- Tubular or scraped-surface pasteurizer with validated holding section (92İÇİ½98 İÇİ½C)
- Filling in glass jars, tinplate cans, sachets, doypacks or bottles, with capping / seaming and steam-vacuum control
- Pasteurization tunnel or cooling tunnel, labelling and end-of-line packing
- Automatic CIP, utilities skid, SCADA recipe management and traceability per batch

TYPICAL OUTPUTS

Standardized tomato paste 22İÇİ½28 İÇİ½Brix in glass or cans İÇİ½ Passata and pizza sauce in bottles and jars İÇİ½ Ketchup and seasoned sauces in bottles, sachets and doypacks İÇİ½ Tomato paste sachets 50İÇİ½400 g for retail and food service İÇİ½ Re-packed aseptic bulk (bag-in-box) for industrial clients

CUSTOMER REQUIREMENT

- Convert aseptic tomato paste at 36İÇİ½38 İÇİ½Brix, stored in bags, drums or IBCs, into finished retail product all year round.
- Fill 400 g and 830 g cans, 2İÇİ½5 kg catering cans and glass jars on the same line, with recipe change and CIP in between.
- Guarantee a stable finished specification (İÇİ½Brix, colour, viscosity) independently of the inbound bulk batch.
- Full traceability per batch and a documentation package suitable for financing and food-safety audits.

TECHNICAL DATA

Capacity	3,000 kg/h finished product (500 / 1,000 / 2,000 / 5,000 kg/h also available)
Product	Tomato paste, passata, pizza sauce, ketchup and seasoned sauces
Input	Aseptic drums 220 L, IBC 1,000 L, bag-in-box İÇİ½ 36İÇİ½38 İÇİ½Brix
Output	400 g / 830 g / 2İÇİ½5 kg cans + glass jars (sachets and doypacks optional)
Standardisation	Continuous, mass-flow loop with inline refractometer, İÇİ½ 0.2 İÇİ½Brix at steady state
Thermal treatment	Tubular or scraped-surface pasteurizer, 92İÇİ½98 İÇİ½C, validated holding section
Automation	PLC + SCADA with recipe management, batch traceability and remote assistance
CIP	Automatic, dedicated skid with caustic and acid circuits and conductivity control

Operating days	250ȧȧ300 days/year ȧȧȧ bulk concentrate, not a seasonal campaign
Installation	Worldwide: erection, commissioning, FAT/SAT and operator training included

PROCESS, STEP BY STEP

1. Bulk reception and drum / IBC emptying ȧȧȧ 220 L bag-in-drum or 1 000 L IBC ȧȧȧ 2ȧȧ4 min per drum

The aseptic bag is opened in a hygienic enclosure and emptied by hydraulic press or piston pump into a jacketed hopper. Above 3 000 kg/h two stations alternate so the line never waits for a drum change.

2. Ingredient preparation ȧȧȧ Sugar, salt, vinegar, starch, spices ȧȧȧ vacuum powder induction

Powders are weighed and hydrated under vacuum to avoid lumps; liquids are dosed by load cells or mass flow. This is the step that separates a passata line from a ketchup line.

3. Continuous standardization ȧȧȧ 36ȧȧ38 -> 22ȧȧ28 ȧȧȧBrix ȧȧȧ inline refractometer ȧȧȧ 0.2 ȧȧȧBrix

Treated dilution water and concentrate are mixed in a mass-flow controlled loop; the refractometer closes the loop on the recipe set point, so the finished specification does not depend on the inbound batch.

4. Deaeration and homogenization ȧȧȧ Vacuum deaerator ȧȧȧ 100ȧȧ200 bar homogenizer (ketchup, smooth sauces)

Air removal protects colour and shelf life, homogenization sets viscosity and prevents serum separation in the jar. For rustic passata this stage is bypassed.

5. Pasteurization ȧȧȧ Tubular or scraped-surface ȧȧȧ 92ȧȧ98 ȧȧȧC ȧȧȧ validated holding

The product is heated in a wide-gap tubular or scraped-surface exchanger, held for the validated time, then delivered hot to the filler for hot filling, or cooled when the format requires it.

6. Filling and closing ȧȧȧ Cans 400 gȧȧ2.2 kg ȧȧȧ jars ȧȧȧ sachets 50ȧȧ400 g ȧȧȧ doypack

Volumetric or weight filling with steam-vacuum control, then seaming or capping. Format changeover is managed by recipe on the SCADA, with tooling kits per container size.

7. Cooling, coding, packing ȧȧȧ Cooling tunnel ȧȧȧ lot and expiry coding ȧȧȧ case packing

Containers are cooled to storage temperature, coded with lot and expiry data (Arabic or Latin script as required) and packed in cases or shrink packs.

8. CIP and recipe traceability ȧȧȧ Automatic CIP ȧȧȧ batch records per recipe

Caustic and acid circuits clean the whole path between recipes; every batch keeps the inbound bulk lot, ȧȧȧBrix, pasteurization curve and filled quantity for audits and customer complaints.

DIMENSIONS AND BUILDING ENVELOPE

Process and filling footprint	700ȧȧ900 mȧȧȧ at 3,000 kg/h (250ȧȧ350 mȧȧȧ at 500 kg/h, 1,100ȧȧ1,300 mȧȧȧ at 5,000 kg/h)
Clear height	6ȧȧ7 m under beam over mixing and thermal section, 4.5 m over filling
Drum unloading station	60ȧȧ110 mȧȧȧ, two alternating stations above 3,000 kg/h
Mixing bay	2 ȧȧȧ 6,000 L tanks, 120ȧȧ180 mȧȧȧ including gravimetric dosing platform
Thermal section	90ȧȧ140 mȧȧȧ for pasteurizer, hold cell, buffer tank and CIP interface
Filling and packing	260ȧȧ380 mȧȧȧ including seamer, pasteurization tunnel, coding and case packing
Bulk and finished storage	500ȧȧ900 mȧȧȧ for inbound drums / IBCs and finished pallets

LAYOUT ȧȧȧ FUNCTIONAL ZONES IN FLOW ORDER

1 ȧȧȧ Bulk intake	Drum, IBC and bag-in-box reception, sampling and traceability scanning
2 ȧȧȧ Unloading	Heated drum emptying stations, filtering, transfer pumps
3 ȧȧȧ Mixing & recipe	Mixing tanks with agitator, gravimetric dosing of water, salt, sugar and spices

4 $\frac{1}{2}$ Standardisation	Continuous mass-flow loop with inline refractometer, $\frac{1}{2}$ 0.2 $\frac{1}{2}$ Brix at steady state
5 $\frac{1}{2}$ Thermal treatment	Tubular or scraped-surface pasteurizer 92 $\frac{1}{2}$ 98 $\frac{1}{2}$ C with validated holding section
6 $\frac{1}{2}$ Filling & closing	Cans, glass jars, sachets or doypacks with seaming / capping and vacuum control
7 $\frac{1}{2}$ Pasteurization tunnel	Tunnel or retort, cooling section and dryer before labelling
8 $\frac{1}{2}$ End of line	Coding, labelling, case packing, palletizing and finished-goods staging
9 $\frac{1}{2}$ Utilities & CIP	Steam skid, chilled water, compressed air, water treatment, CIP skid

UTILITIES AND CONSUMPTION

Installed power	350 $\frac{1}{2}$ 450 kW at 3,000 kg/h (90 $\frac{1}{2}$ 140 kW at 500 kg/h, 550 $\frac{1}{2}$ 700 kW at 5,000 kg/h)
Steam	1.5 $\frac{1}{2}$ 2.5 t/h saturated at 6 $\frac{1}{2}$ 8 bar at 3,000 kg/h
Process and cooling water	8 $\frac{1}{2}$ 12 m $\frac{1}{2}$ /h at 3,000 kg/h, treated and softened before dilution
Compressed air	300 $\frac{1}{2}$ 500 Nm $\frac{1}{2}$ /h at 7 bar
Effluent	3 $\frac{1}{2}$ 7 m $\frac{1}{2}$ /h to treatment, mainly CIP and tunnel blowdown
Manning	6 $\frac{1}{2}$ 9 operators per shift including QC and end-of-line
Operating calendar	250 $\frac{1}{2}$ 300 days/year, 16 $\frac{1}{2}$ 20 productive hours/day $\frac{1}{2}$ not a seasonal campaign

CAPEX, OUTPUT AND PAYBACK

Rework line $\frac{1}{2}$ capacity, CAPEX, payback

A rework line is sized in kg/h of finished product, not tonnes of fresh tomato. The grid below is what MCF uses to screen a project before any quotation.

500 kg/h finished product	Turnkey CAPEX: $\frac{1}{2}$ 0.6 $\frac{1}{2}$ 0.9 million Annual output: 1 500 $\frac{1}{2}$ 2 200 t/year packed EBITDA: 12 $\frac{1}{2}$ 18% of revenue Payback: 3 $\frac{1}{2}$ 4.5 years Commissioning: 7 $\frac{1}{2}$ 9 months contract-to-commissioning
1 000 kg/h finished product	Turnkey CAPEX: $\frac{1}{2}$ 0.9 $\frac{1}{2}$ 1.4 million Annual output: 3 000 $\frac{1}{2}$ 4 400 t/year packed EBITDA: 14 $\frac{1}{2}$ 19% of revenue Payback: 3 $\frac{1}{2}$ 4 years Commissioning: 8 $\frac{1}{2}$ 10 months contract-to-commissioning
2 000 kg/h finished product	Turnkey CAPEX: $\frac{1}{2}$ 1.5 $\frac{1}{2}$ 2.3 million Annual output: 6 000 $\frac{1}{2}$ 8 800 t/year packed EBITDA: 15 $\frac{1}{2}$ 20% of revenue Payback: 3 $\frac{1}{2}$ 4 years Commissioning: 9 $\frac{1}{2}$ 12 months contract-to-commissioning
3 000 kg/h finished product (reference)	Turnkey CAPEX: $\frac{1}{2}$ 2.2 $\frac{1}{2}$ 3.2 million Annual output: 9 000 $\frac{1}{2}$ 13 000 t/year packed EBITDA: 16 $\frac{1}{2}$ 21% of revenue Payback: 2.5 $\frac{1}{2}$ 4 years Commissioning: 10 $\frac{1}{2}$ 13 months contract-to-commissioning
5 000 kg/h finished product	Turnkey CAPEX: $\frac{1}{2}$ 3.4 $\frac{1}{2}$ 4.8 million Annual output: 15 000 $\frac{1}{2}$ 22 000 t/year packed EBITDA: 17 $\frac{1}{2}$ 23% of revenue Payback: 2.5 $\frac{1}{2}$ 3.5 years Commissioning: 12 $\frac{1}{2}$ 15 months contract-to-commissioning

Assumptions behind the figures

- 250 $\frac{1}{2}$ 300 working days per year, 16 $\frac{1}{2}$ 20 productive hours per day: the feedstock is stored aseptic concentrate, not seasonal fresh tomato.
- Inbound bulk paste at 36 $\frac{1}{2}$ 38 $\frac{1}{2}$ Brix in 220 L bag-in-drum or 1 000 L IBC, standardized in line to 22 $\frac{1}{2}$ 28 $\frac{1}{2}$ Brix.
- Finished product filled in tinplate cans, glass jars or sachets, with pasteurization and end-of-line packing included.

- CAPEX is turnkey scope: emptying station, mixing, standardization, pasteurizer, filler, closing, CIP, automation, installation, commissioning and training; civil works, land and bulk paste stock excluded.
- EBITDA and payback assume retail or food-service pricing of the packed product and no financing cost inside the operating margin.

Indicative engineering ranges used by MCF Technology for budget screening of rework projects, not a quotation and not the audited result of a specific plant. Final figures are fixed in the feasibility study, once inbound ½Brix, packaging formats, utilities cost and working hours are confirmed.

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.

ENGINEERING NOTES

- Two alternating unloading stations are specified above 3,000 kg/h so the line never waits for a drum change.
- Ketchup adds vacuum powder induction, deaeration and a 100½200 bar homogenizer before pasteurization.
- Utilities envelope for this size: steam 8½10 bar, chilled water, compressed air and treated dilution water.

TECHNICAL FAQ

What is a tomato paste rework line?

It is a line that re-processes concentrated tomato paste already produced and stored aseptically (36½38 ½Brix in bags, drums or IBCs) into a finished retail or food-service product: drum emptying, dilution and standardization to the target ½Brix, recipe dosing, pasteurization and filling. No fresh tomato, no evaporation section.

Which capacities does MCF supply?

500, 1000, 2000, 3000 and 5000 kg/h of finished product. Below 1000 kg/h the line is usually semi-automatic with batch mixing; from 2000 kg/h upwards MCF supplies continuous in-line standardization with mass-flow and inline refractometer control.

How is the target ½Brix controlled?

Bulk paste at 36½38 ½Brix is diluted with treated water through a mass-flow controlled loop; an inline refractometer closes the loop on the set point, typically 22½28 ½Brix for retail paste, with a tolerance of about ½ 0.2 ½Brix at steady state.

How does the aseptic drum unloading station work?

The aseptic bag is opened under hygienic conditions and emptied by a hydraulic press or piston pump; jacketed hoppers and heated pipework keep viscous paste flowing. Typical discharge is one 220 L drum in 2½4 minutes, so a 5000 kg/h line needs two stations working alternately.

Can the same line produce ketchup as well as passata?

Yes, with recipe management: ketchup requires vinegar and sugar dosing, powder hydration under vacuum, deaeration and homogenization before pasteurization. MCF specifies the extra units at design stage so both recipes run on the same skid with CIP in between.

NEXT STEPS

- Full technical page: <https://mcftechnology.group/en/tomato-paste-rework-line>
- 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 (310 years): <https://mcftechnology.group/en/financial-plan>
- Request a quotation: <https://mcftechnology.group/en/contact>

DISCLAIMER

Reference configuration for budgeting and layout discussion. Final specification, utilities and performance are confirmed in the feasibility study on your product, packaging formats and site conditions.