

UHT milk processing plant $\frac{1}{2}$ pasteurizer, homogenizer & aseptic filling machine

Target application: uht milk processing plant

Reference configuration: 10,000 l/h UHT milk with aseptic filling

MCF Technology engineers UHT milk processing plants for cow milk, plant-based drinks (almond, rice, oat, soy) and cheese production lines, with worldwide delivery, installation and after-sales service.

SCOPE OF SUPPLY

- Raw milk reception, deaeration and standardization
- Industrial pasteurizer (plate or tubular heat exchanger)
- Industrial homogenizer up to 1000 bar
- Direct or indirect UHT sterilizer (up to 140 $\frac{1}{2}$ C)
- Aseptic buffer tank and aseptic filling machine (PET / brik / pouch)
- CIP / SIP, refrigeration and utilities skid

TYPICAL OUTPUTS

UHT cow milk $\frac{1}{2}$ Plant-based drinks (almond, rice, oat, soy) $\frac{1}{2}$ Cream $\frac{1}{2}$ Fresh & aged cheese

TECHNICAL DATA

Throughput	3,000 $\frac{1}{2}$ 24,000 L/h UHT milk
Process	Direct steam injection $\frac{1}{2}$ Indirect tubular
Homogenisation	200 $\frac{1}{2}$ 250 bar, two-stage
Aseptic filler formats	125 $\frac{1}{2}$ 1000 ml carton $\frac{1}{2}$ PET $\frac{1}{2}$ stand-up pouch
Sterile run time	>= 20 h continuous between CIPs

PROCESS FLOW

1. Raw milk reception, deaeration and centrifugal clarification.
2. Standardisation of fat and protein, pre-heating to 75 $\frac{1}{2}$ C.
3. High-pressure homogenisation at 200 $\frac{1}{2}$ 250 bar (two-stage).
4. UHT treatment 138 $\frac{1}{2}$ 145 $\frac{1}{2}$ C for 2 $\frac{1}{2}$ 6 s (direct or indirect).
5. Flash cooling, aseptic surge tank and sterile air blanket.
6. Aseptic filling machine into carton, PET or pouch formats.
7. End-of-line: straw applicator, tray packer, shrink wrapper and palletiser.

ENGINEERING HIGHLIGHTS

- Complete UHT food processing equipment matched to an aseptic filling machine for cartons, PET and pouches.
- Direct steam injection or indirect tubular UHT to preserve organoleptic quality up to 12 months shelf life.
- Aseptic tank + aseptic filler train sized for continuous 20-hour production between CIP cycles.
- Homogenizer at 200 $\frac{1}{2}$ 250 bar for uniform fat globule distribution across white and flavoured milk.
- SCADA batch traceability, remote diagnostics and ISO 22000 / FSSC 22000-ready documentation.

DIMENSIONS AND BUILDING ENVELOPE

Process building footprint	900½1,400 m½ for treatment, aseptic tanks and filling
Clear height	7½8 m under beam over the UHT skid and aseptic tanks
UHT skid	14 ½ 5 m module, 6.5 m height including holding tube and steam infusion vessel
Aseptic filling room	160½260 m½, controlled area with airlock and gowning room
Raw milk silo area	Outdoor, 200½400 m½ for 2 ½ 50,000 l insulated silos
Finished goods store	600½1,200 m½ including quarantine area for incubation tests

LAYOUT ½ FUNCTIONAL ZONES IN FLOW ORDER

1 ½ Raw milk reception	Tanker unloading, deaeration, metering, chilling to 4 ½C and silo storage
2 ½ Standardisation	Separator, fat standardisation loop and blending for flavoured products
3 ½ Homogenization	Two-stage homogenizer at 200½250 bar, aseptic or upstream execution
4 ½ UHT treatment	Direct steam injection or indirect tubular at 137½142 ½C, 4½6 s holding
5 ½ Aseptic buffer	Aseptic tanks with sterile air overlay for 20-hour continuous runs
6 ½ Aseptic filling	Carton, PET or pouch aseptic filler with sterile zone and H2O2 or e-beam sterilisation
7 ½ Utilities & CIP	Steam, chilled water at 2 ½C, ice water bank, CIP/SIP with 4 circuits

UTILITIES AND CONSUMPTION

Installed power	600½900 kW for a 10,000 l/h line
Steam	2.5½4 t/h at 10½12 bar, culinary steam for direct injection
Chilled water	2 ½C ice water, 350½600 kW refrigeration duty
Compressed air	400½700 Nm½/h at 7 bar, sterile filtered on the aseptic zone
Water	12½20 m½/h process, CIP and sterile water generation
Manning	8½12 operators per shift including QC laboratory

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

What is the difference between direct and indirect UHT sterilization?

Direct UHT injects saturated steam into the milk (or vice-versa), reaching 142½145 ½C in less than a second, with the best sensory retention. Indirect UHT uses a tubular or plate heat exchanger ½ lower operating cost, slightly higher cooked-flavour footprint. MCF supplies both.

Can the same line process cow milk and plant-based drinks?

Yes, provided the CIP is designed for full allergen changeover and the homogenizer / valves are certified for both product

families. MCF sizes plants for mixed campaigns.

What homogenization pressure is typical for UHT milk?

150  250 bar in two stages is standard for whole UHT milk. Plant-based drinks generally require 200  300 bar to stabilize the emulsion.

Which aseptic packaging formats are supported?

PET bottles (up to 2 L), brik cartons (200 mL, 500 mL, 1 L), aseptic pouch and bag-in-box for foodservice.

Does the plant include cheese production equipment?

Yes. MCF integrates cheese vats, moulding and brining lines with the milk processing plant when the customer requires a full dairy factory.

NEXT STEPS

- Full technical page: <https://mcftechnology.group/en/uht-milk-processing-plant>
- 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 (3  10 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.