

MALTA DAIRY PRODUCTS Ltd.
Mile End Street, Il-Hamrun HMR 1712, Malta

**TENDER FOR THE SUPPLY, INSTALLATION, TESTING
AND COMMISSIONING OF CHILLING SYSTEM FOR
MILK AND RELATED AUTOMATION, ELECTRICAL
POWER SUPPLY AND SUPPORTING STRUCTURE**

Contents

1 INTRODUCTION	4
1.1 Scope of Works.....	4
1.2 Definitions.....	4
1.3 General Principles and Regulatory Framework.....	4
2 GENERAL CONDITIONS	5
2.1 Contractors' responsibilities	5
2.2 Extent of works	5
2.3 Inclusion of everything necessary	5
2.4 Request for clarifications.....	5
2.5 Variations	5
2.6 Drawings	6
2.8 Subcontracting.....	6
2.9 Materials	6
2.10 Tenderers to visit the Site.....	6
2.11 Program of Works	6
2.12 Completion date.....	6
2.13 Extension of period of completion	7
2.14 Penalty for Delay.....	7
2.15 Payment beyond contract sum	7
2.16 Arbitration	7
3 INSTRUCTIONS TO TENDERERS	7
3.1 General	7
3.2 Qualification of Tenderer	8
3.3 Technical offer	8
3.4 Preparation of Tenders	8
3.5 Tendered Rates to be Inclusive.....	9
3.6 Tendered Rates to be Fixed	9
3.7 Tenders to be sealed prior to Deposition	9
3.8 Tenders Validity.....	9
3.9 Discrepancies	9
3.10 Clarifications and addenda	9
3.11 Contractor's Obligation for Discrepancy.....	10
3.12 State of Use and Taking Over	10
3.13 Publicity of the Procedure.....	11
3.13 Operational Continuity Guarantee and Compensatory Measures.....	12
4 TENDER EVALUATION AND AWARD	12
4.1 Evaluation of Tenders	12
4.2 Criteria.....	12
4.3 Evaluation Committee and Impartiality.....	13
4.4 Clarification of Tender Items	13
4.5 Confidentiality.....	13
4.6 Letter of Acceptance.....	13
4.7 Insurance Policy	13
5 SAFETY AND STANDARDS	14
5.1 Occupational Health and Safety	14
5.2 Compliance with Law.....	14

5.3 Standard Technical Regulation.....	14
5.4 Standards	14
5.5 Care of Existing Buildings	14
5.6 Accidents and Risks.....	14
6 QUALITY CONTROL	14
6.1 Material quantities	14
6.2 Access to Site and/or Workshops.....	15
6.3 Cleaning of Site on Completion.....	15
6.4 Quality Controller	15
6.5 Inspections and Testing.....	15
6.6 Samples.....	15
6.7 Bad Workmanship	15
7 OTHER GENERAL CRITERIA.....	15
Ethics and Conflict of Interest	15
Protection (GDPR).....	16
FOI.....	16
Gender Equality and Non-Discrimination	16
8 COMMISSIONING, TESTING AND DOCUMENTATION	16
8.1 Commissioning and testing	16
8.2 Take-Over Inspection	16
8.3 Operating and maintenance instructions.....	16
TECHNICAL SPECIFICATIONS	17
1) CIVIL WORKS	17
2) ELECTRICAL WORKS	19
3) PLUMBING WORKS.....	20
4) AUTOMATION WORKS.....	34
ANNEX.....	37

1 INTRODUCTION

1.1 Scope of Works

The scope of work includes installing and positioning two existing chillers on the dairy plant's roof, subject to verification of the roof load capacity and the construction of the required supporting steel framework. The works further comprise the installation of the new piping network, heat exchangers complete with their automation, control and monitoring systems, and the corresponding electrical power supply.

All systems shall be fully integrated into the existing factory infrastructure to achieve and maintain milk temperature at packaging of +2°C with a tolerance of ±0.5°C.

Moreover, all works shall be carried out without affecting the plant's production throughout the execution period.

1.2 Definitions

The Tenderer or Tendering Company shall refer to all those participants who have manifested an interest in participating in this offer.

The "Employer" shall refer to MALTA DAIRY PRODUCT Ltd and persons authorised to act on its behalf, which shall be reached by mail at info@benna.com.mt

The "Contractor" shall mean the person or persons or Company or Joint Venture to which the contract is awarded and who shall carry out the works as described in this document and the related annexes.

The "Engineering Team" shall mean the Consulting Engineers acting on behalf of the Employer, represented by Forma S.r.l. – Italy – Milan and its partners, which shall be reached by mail at forma@forma-eng.com.

The "work" shall mean the work as described in the specifications, bill of quantities and drawings included in this document and the related annexes.

The "site" shall mean the site where the works as described in this document shall be executed, and which shall be as stated in the Form of Tender.

"Approval" shall mean the Engineer's written approval.

"Variation" shall mean changes in the quantity of work which may be required for the completion of the works.

"Completion date" shall mean the date on which the services are fully completed, operational, and approved by the Engineering Team.

1.3 General Principles and Regulatory Framework

This procurement procedure is conducted in accordance with the principles of transparency, equal treatment, non-discrimination, proportionality and sound financial management, in line with the general principles of European Union law and recognised good procurement practices, including those applicable to publicly funded and/or co-financed projects.

All economic operators shall be treated fairly and impartially, and tenders shall be evaluated exclusively on the basis of the criteria and conditions set out in the tender documentation.

2 GENERAL CONDITIONS

2.1 Contractors' responsibilities

The Contractor shall be responsible for:

- a) The execution of the works in an informed, competent and diligent manner.
- b) Providing throughout the Contract period such supervision as may be necessary to ensure the proper execution of the work and as requested by the Engineer.
- c) Indemnifying the Employer against all claims at any time on account of patent right or royalties, whether for manufacture or use under this Contract.
- d) Completing the works to the Engineer's satisfaction and demonstrating the satisfactory performance of the services in accordance with the design within the timeframes stipulated and outlined in this tender.

2.2 Extent of works

The works shall include all the labour and supervision required, as well as all materials necessary to carry out a complete installation, together with the tests, adjustments and commissioning specified in the following clauses and, in any case, required to deliver a fully operational and efficient installation to the satisfaction of the Employer or the Engineering Team, and above all, in accordance with standard codes of practice.

The term "complete installation" above shall be understood to refer not only to the main plant items and equipment specified herein, but also to all ancillary and complementary components necessary for the full execution of the works and for the proper operation of the plant and installation, including the related labour costs, regardless of whether such ancillary components are specifically mentioned in detail in the Tender documentation issued in connection with this Contract.

2.3 Inclusion of everything necessary

The Drawings, Specifications and Bills of Quantities detail, as far as possible, the entire estimated requirements for the complete installation of this project. The Tenderer/Contractor, however, must satisfy himself that the Drawings, Specifications and Bills of Quantities do include all necessary materials/ equipment, etc., for the correct and proper operation of the various services, and no extra cost shall be allowed for any omissions in this respect once the Contract is let.

2.4 Request for clarifications

The Specifications, Drawings and Bills of quantities shall be read jointly. The Contractor shall be responsible for drawing the Engineering Team's attention to any discrepancies that may arise between these documents before submission of the tender document. No additional cost will be allowed for omissions in this respect once the Contract is let.

2.5 Variations

The Engineering Team shall reserve the right to order variations in the specifications and/or quantity of any material or equipment as may be necessary.

If the Contractor claims that any variations shall involve extra cost, he shall submit his claim in writing before proceeding with the work, failing which the Contractor shall have no valid claim for compensation and/or extension to the contract period.

Variations that involve extra cost shall be valued at the contract rates.

2.6 Drawings

The Contractor shall provide the full as-built drawings.

2.7 Site management

The Contractor may execute the Works through subcontractors, provided that subcontracting shall not extend beyond the first tier. Notwithstanding the foregoing, the Contractor shall ensure the continuous presence on site of its own direct and duly competent representative, who shall act as the person in charge and coordinator of all site activities.

2.8 Subcontracting

The Contractor shall not transfer or assign the contract, in whole or in part, without the written consent of the Employer, and in any case, not beyond the first tier. Any such consent, if given, shall not relieve the Contractor from any liability or obligation under the contract, and he shall be responsible for the acts, defaults and neglect of any subcontractor and his employees or agents.

2.9 Materials

All materials used in this contract shall comply with the latest edition of the relevant Standards Specifications or equivalent as acceptable to the Engineering Team.

The Engineering Team shall have the right to order the removal and replacement of any material from the site, which is not to specification or standard. The Contractor shall carry out such order at his own cost.

2.10 Tenderers to visit the Site

All Tenderers are strongly advised to visit the site and familiarise themselves with the site's constraints and logistical limitations to complete the works within the stipulated contract period. Under no circumstances shall the Contractor claim any compensation and/or disclaim any responsibilities for not visiting the site prior to tendering.

2.11 Program of Works

The Contractor shall submit a preliminary program of works together with their tender. A detailed program of works shall be prepared and delivered together with the financial offer. This program shall be used to monitor the progress of the work during the execution period.

Failure of any Tenderer to comply with this requirement shall constitute sufficient grounds for the disqualification of the respective offer.

2.12 Completion date

The complete installation must be finalised, tested and commissioned by 31 August 2026.

The tenderer should provide a Gantt chart outlining the approach to achieving this milestone.

Failure of any Tenderer to comply with this requirement shall constitute sufficient grounds for the disqualification of the respective offer.

2.13 Extension of period of completion

No extension of the completion date agreed upon shall be given to the Contractor with the exception of civil commotion or national calamities, hostilities, force majeure and/or national strikes.

Should the amount of any variation or other special circumstance which may occur be such as to fairly entitle the Contractor to an extension of time for the completion of work, the Engineering Team shall determine the amount of such extension.

Notwithstanding the above, the Contractor shall raise the request for extension within 2 days of any such variation order for approval or otherwise by the Engineering team. Otherwise, the Contractor will lose the benefit of time.

Delays in delivery by overseas suppliers shall not, in themselves, warrant an extension of the completion time.

Briefly, the only circumstance under which a time extension may be requested shall be the occurrence of a duly established variation.

2.14 Penalty for Delay

The Contractor shall complete the installation work by the agreed completion date in the Contract, subject to any extensions granted in writing.

If the work is not completed and delivered within the time specified in the contract, the Contractor shall be liable to a penalty equal to 1% (one per centum) of total Contract value for each week of delay or part thereof; subsequently as from fourth week of delay the applicable penalty shall be raised to 2% (two per centum) of total Contract value and so henceforth per week up to a maximum penalty value of 15% (fifteen per centum) of total Contract value.

The Contractor shall be liable for consequential losses incurred by the Employer if the delay exceeds 2 (two) months. Such penalty shall be automatically deducted from any amounts otherwise due to the Contractor.

2.15 Payment beyond contract sum

The Contractor shall not receive payment beyond the contract sum for any work for which he may consider that payments should be made as an extra, unless such work shall have been ordered as extra work in writing.

2.16 Arbitration

Any dispute, controversy or claim arising out of or relating to this contract, or the breach, termination or invalidity thereof, shall be settled by arbitration in accordance with the rules of the Malta Arbitration Centre as at present in force. Any reference in the General Conditions to other arbitration procedures shall not apply.

3 INSTRUCTIONS TO TENDERERS

3.1 General

It shall be the Tenderer's responsibility to acquaint himself with the site before submitting this tender. No claims shall be accepted nor compensation given to the Tenderer, nor shall the Tenderer disclaim responsibility resulting from not visiting the site.

The Employer does not bind himself to accept the lowest or any Tender nor to give reasons for rejection of any or all tenders.

The Employer reserves the right to accept any part of the Tender and/or to award different parts of the Tender to two or more Tenderers. In the event that more than one contractor is appointed, each contractor shall be required to liaise and coordinate in detail with the other contractor(s).

Without prejudice to the above, the Employer may give preference to submissions presented as a Joint Venture or consortium arrangement, where such a structure is considered to provide improved coordination, clearer allocation of responsibilities, and a single point of accountability for the execution of the Works.

Individual price entries in the Bill of Quantities may be examined separately, and if found to be inconsistent, may lead to the disqualification of the tender.

Should the Employer, due to circumstances beyond his control, be forced to stop the work or reduce the size of the project, the Employer reserves the right to cancel from the contractor's contract the works in that part of the project he was forced to stop or reduce.

The Contractor will be compensated only at cost for the equipment and materials already on site, or which have already left the manufacturer's or supplier's works.

3.2 Qualification of Tenderer

To be qualified for the award of this Contract, Tenderers are to provide evidence satisfactory to the Employer clearly demonstrating their capability and adequacy of resources to carry out this Contract in the stipulated period of time and according to the Tender Specifications.

In this regard, Tenderers are requested to deliver "the Company Information Sheet" as an example of works carried out, with at least equivalent scope, scale and complexity, when submitting their priced tenders.

3.3 Technical offer

Tenderers shall also submit, together with the documents already mentioned, supporting documentation for all equipment and materials they are offering, as per the priced entries in the Bill of Quantities.

This documentation shall include specifications of a technical nature, standards to which the material or equipment conforms, manufacturer, model number, construction, etc. in order to enable the Employer and the Engineering Team to evaluate conformity to the specifications in this document.

The Tenderer shall also indicate any deviations from the specifications in a covering letter.

Failure of any Tenderer to comply with these requirements shall constitute sufficient grounds for the disqualification of the respective offer.

3.4 Preparation of Tenders

The tenderer shall bear all the costs for the preparation of this tender offer, and the Employer shall not be responsible for or pay any expenses or losses which may be incurred by any tenderer in the preparation of this tender.

The Tenderer shall fill in all rates and prices for all items of the Works described in the Bills of Quantity. Items against which no rate or price is entered by the Tenderer will not be paid for when executed and shall be deemed covered by other rates and prices.

No alteration is to be made to this tender document. Any correction in the priced document to an entry by the Tenderer shall be initialled by the same Tenderer. **All entries must be in ink.**

The Tenderer must fill in all entries in the tender document. Failure to fill all entries or to supply information where specifically requested may lead to disqualification.

3.5 Tendered Rates to be Inclusive

The tendered rates shall be inclusive of all works as specified, as well as any other works which are of a contingent or indispensable nature for completing the work in its entirety and to the satisfaction of the Architect in Charge.

The tendered rates shall be inclusive of all materials necessary, profits, VAT duties, levies, customs duties, and landing charges on any imported goods as applicable at the closing date of tendering.

The rates also include the transport of all items of work to the site and their delivery to the required floor on completion.

3.6 Tendered Rates to be Fixed

The tendered rates shall be fixed, and no allowances shall be made for fluctuations in rates and prices or for any increase or decrease in the costs of labour and/or materials.

3.7 Tenders to be sealed prior to Deposition

Tender submissions are to be sent by email or similar electronic communications methods to MALTA DAIRY PRODUCTS Ltd. at the email address: info@benna.com.mt

Failure of any Tenderer to comply with these requirements shall constitute sufficient grounds for the disqualification of the respective offer.

Any Tender received by the Employer after the Tender submission deadline will not be considered.

The Employer may, at its discretion, extend the deadline for submissions of Tenders by issuing an amendment accordingly.

3.8 Tenders Validity

Tenders submitted in conjunction with this Contract shall remain valid for a period of 1 (one) month after the date of Tender opening.

3.9 Discrepancies

Tenderers shall promptly notify the Employer of any ambiguity in or discrepancy between any of the Tender Documents which they may discover upon examination of the Tender Documents.

3.10 Clarifications and addenda

Any request for clarification shall be submitted in writing within the timeframe indicated by the Employer. Clarifications that materially affect the understanding or interpretation of the Tender

Documents shall be communicated to all participating economic operators and shall form an integral part of the Tender Documents.

Tenderers who detect discrepancies, omissions, inconsistencies, or doubts within the Tender Documents shall resolve such issues exclusively by preparing and submitting a dedicated proposal to be attached to the tender offer in a separate document titled “Addendum.”

The Addendum shall clearly indicate:

- the identified discrepancy, omission, inconsistency, or deviation;
- the proposed technical and/or financial resolution;
- any related implications.

It shall be the responsibility of the Employer and the Engineering Team to evaluate the submitted Addendum as part of the tender assessment process. No further correspondence, requests for clarification, or exchanges of interpretation between the Tenderer and the Employer shall take place during the tender period for the purpose of resolving such discrepancies. All related matters shall be addressed exclusively through the Addendum submitted with the tender offer.

Each Tenderer shall ensure that the Addendum is complete, duly signed, and included with the tender submission. Failure to submit the required Addendum where discrepancies are identified may constitute grounds for disqualification.

3.11 Contractor’s Obligation for Discrepancy

Any additional discrepancies, omissions, variations or inconsistencies that may be discovered during the execution of the Works shall require all necessary adjustments, additions, corrections, integrations, or modifications to be carried out by the Contractor at no additional cost to the Employer in order to achieve full compliance with the Tender Specifications and the intended functional performance.

3.12 State of Use and Taking Over

Prior to the commencement of activities and the installation of the project within the designated areas, the Contractor shall formally assume control of the site, verify existing conditions, and conduct a full assessment of any potential interferences with structures, systems, ongoing operations, and functional activities.

This phase shall ensure the proper integration of the planned works, confirming the compatibility of the executed project with the existing conditions and compliance with all applicable regulations regarding safety, accessibility, permanent and live loads, system interferences, evacuation routes, and operational continuity.

The Contractor shall also identify any constraints, operational limitations, obstacles, or coordination requirements with third parties, and, where necessary, propose corrective measures and mitigation plans to safeguard structural integrity and service continuity.

Failure to identify interferences or to properly assess project integration shall not constitute grounds for claims or contractual cost adjustments.

3.13 Publicity of the Procedure

Adequate publicity of the procedure shall be ensured so as to allow fair and effective competition and equal access for interested economic operators.

Tender documentation shall be made available to interested parties free of charge and without discrimination.

3.14 CHILLER

The Contractor shall take over the existing chillers in their current condition and operational state. Prior to the start of the works and any intervention on the units, a Taking-Over and State of Use Report shall be drawn up.

Verification of the correct operation, operating conditions, and actual performance of the existing chillers shall be entirely the Contractor's responsibility.

The Contractor shall provide a Taking-Over and State of Use Report to be submitted with the offer, together with a dedicated technical note containing:

- performance analysis and functional condition,
- any detected non-conformities, deterioration, or inefficiencies, – proposed actions (repair, overhaul, or replacement),
- technical and economic justification for any required activities.

Any defect, malfunction, or performance deviation not reported in the State of Use Report but detected during the course of the works shall be remedied, corrected, or restored by the Contractor at no additional cost to the Client, where the failure to report is attributable to negligence, omission, or insufficient diligence during the taking-over phase.

Failure to submit the required State of Use Report may constitute grounds for disqualification.

3.15 ROOF STRUCTURE

The Contractor shall take over the existing roof structure in its current physical and operational condition. Prior to the commencement of the works and any intervention on the structure, the Contractor shall engage a licensed professional to conduct a structural assessment of the existing roof to certify its load-bearing capacity and structural compliance.

The verification of the roof's stability, load capacity, and actual structural performance shall be entirely borne by the Contractor through the appointed professional.

The Contractor shall, together with the offer, provide the Engagement Agreement with a licensed structural engineer/architect for the certification of the roof load capacity.

Failure to submit the required Engagement Agreement and structural certification documentation may constitute grounds for disqualification.

3.16 Operational Continuity Guarantee and Compensatory Measures

The Contractor shall guarantee, for the entire duration of the works, the continuous and regular operation of the Factory's production and operational activities, without interruptions, slowdowns, or limitations not previously agreed upon with the Client.

The Contractor shall plan and organise its activities so as not to interfere with ongoing industrial processes, implementing all necessary compensatory, safety, logistical, and temporary measures to ensure full operational continuity of systems and production cycles, including, but not limited to:

- installation of protective and segregating provisions for work areas,
- scheduling of activities during non-production hours,
- temporary bypasses, diversions, or technical solutions to guarantee continuity of services and utilities,
- constant coordination with the production manager and the Works Supervision.

Any interference, interruption, or limitation arising from organisational deficiencies, negligence, lack of planning, or inadequate preparation by the Contractor shall not constitute grounds for requests for extensions, additional compensation, suspensions, or claims, and any damages, economic losses, plant shutdowns, or production shortfalls shall be entirely borne by the Contractor.

The Contractor further undertakes to maintain continuous coordination with the Client and all operational functions involved, and to adopt all necessary measures to prevent disruptions and ensure the uninterrupted operation of the Factory.

4 TENDER EVALUATION AND AWARD

4.1 Evaluation of Tenders

The Employer will evaluate and compare only those Tenders which have been duly submitted the proposal in accordance with the Conditions and Specifications as detailed in these Tender Documents.

4.2 Criteria

Due to the complexity and specificity of the intervention and the strategic relevance that the project holds for Malta Dairy Products Ltd, the offers shall be evaluated on the basis of all submitted annexes listed in the following table in random order:

- 1) Technical offer – maximum 60 points.
 - quality and completeness of the proposed technical solution;
 - reliability of the execution methodology and operational continuity measures;
 - adequacy of automation and system integration solutions;
 - addendum
 - taking-Over and State of Use Report
- 2) Work Programme (Gantt Chart) – maximum 10 points.
- 3) Financial Offer (Price) – maximum 30 points.

The Employer does not bind himself to accept the lowest or any Tender nor to give reasons for rejection of any or all tenders.

The brands of the products indicated in the tender documents are not binding. Alternative products offering equivalent technical performance will be carefully evaluated.

4.3 Evaluation Committee and Impartiality

Tenders shall be evaluated by an Evaluation Committee composed of members possessing appropriate technical and professional expertise.

All Evaluation Committee members shall sign a declaration confirming the absence of any direct or indirect conflict of interest with any of the participating economic operators.

4.4 Clarification of Tender Items

The Employer may, at his discretion, ask any Tenderer to clarify items of his Tender, including a breakdown of rates.

4.5 Confidentiality

Information relating to the Tender evaluation process shall not be disclosed to Tenderers or to any other persons not officially involved in the award of the Contract until the successful Tenderer has been announced. Furthermore, the Employer reserves the right to withhold, even after the award of the Works, the disclosure of the contract price, purchasing conditions and the technical specifications submitted by the successful Tenderer.

4.6 Letter of Acceptance

The Employer will notify the successful Tenderer by a “Letter of Acceptance” that his Tender has been accepted. The Letter of Acceptance shall name the rates at which the Employer will pay the Contractor for any work carried out under this contract. The contractor shall receive the Letter of Acceptance prior to the expiration of the Tender Validity period.

4.7 Insurance Policy

The successful Tenderer shall, within one week from receiving the Letter of Acceptance, furnish the Employer with evidence of an Insurance Policy covering the following:

- i) Insurance against Accident to Workmen:
Such insurance shall be maintained during the whole of the time that any persons are employed by him on the works. Provided that, in respect of any persons employed by any Sub-Contractor, the Contractors’ obligations to insure under this sub clause shall be satisfied if the Subcontractor shall have insured against the liability in respect of such persons.
- ii) Insurance against Damage to person and property:
Indemnifying the Employer against all losses and claims in respect of death of or injury to any person, or loss of or damage to any property (other than the works) which may arise out of or in consequence of the execution and completion of the works, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in relation to the works.
- iii) Third Party Insurance:
Against liabilities for death of or injury to any person, or loss of or damage to any property (other than the works) arising out of the performance of the Contract.

Failure of the successful Tenderer to comply with this requirement shall constitute sufficient grounds for the annulment of the Award.

5 SAFETY AND STANDARDS

5.1 Occupational Health and Safety

The contractor shall assume full responsibility and accountability regarding the health and safety of his/her employees and/or subcontractors, including any third parties involved in the execution of this contract.

The contractor shall be bound to the legislation currently in force concerning health and safety in the workplace, as well as any other national legislation, regulations, standards, and/or codes of practice, in effect during the execution of the contract, regarding health and safety issues, as they apply to the contractor's particular operating situation and nature of work activities.

5.2 Compliance with Law

The Contractor shall comply with and fulfil all obligations imposed by Art 19 of the Police Laws and shall give all notices, obtain all permits, pay all fees that may be lawfully demanded by Public Officers in respect of works and comply with all requirements of the Law and any Lawful Authority.

5.3 Standard Technical Regulation

The installation/s shall comply with all relevant statutory Laws and Regulations current at the date of Tender (unless otherwise indicated) and, in particular, with the requirements set out in the clauses below.

5.4 Standards

The equipment and installation shall comply with all the Specifications. The Tenderers are, however, at liberty to offer equipment manufactured to other equivalent authoritative standards appropriate to the country of origin, provided that such alternative Standard is at least equal to the Specifications.

5.5 Care of Existing Buildings

The Contractor shall take all steps to protect the building and any adjoining property. Every reasonable precaution is to be taken when delivering the work to the site, to avoid any damage or injury to property or persons.

Any damage to the building fabric caused by the contractor during delivery of the finished goods to the site will be borne by the contractor.

5.6 Accidents and Risks

The Contractor shall take responsibility for all risks of accident or damage to the work from whatever cause arising and shall be responsible for the sufficiency of all means by him for the fulfilment of the contract and shall not be relieved from such responsibility by any approval other than a written approval issued by the Engineer in Charge.

6 QUALITY CONTROL

6.1 Material quantities

The Contractor shall be responsible for the actual material quantities required for the complete working installation. No compensation whatsoever will be given to the Contractor for any extra material required to complete the installation due to non-observance of this condition.

The responsibility for the maintenance and preservation of the materials stored on site, as well as of the equipment, rests exclusively with the contractor.

6.2 Access to Site and/or Workshops

The Engineering Team, the Employer, or any person authorised by them or their representative shall have access to the site/workshop at all times.

6.3 Cleaning of Site on Completion

On completion of the works, the Contractor shall clear away and remove from the site such materials, leaving the whole of the site and the works clean to the satisfaction of the Employer.

6.4 Quality Controller

The Contractor shall nominate one qualified technical representative who shall direct all the works and be responsible for the manufacturing, finishing and delivery of all the items of work within the established time limits.

6.5 Inspections and Testing

The Engineering Team and or its representative shall be given facilities for the inspection of all works in progress, whether in workshops or on site. All expenses incurred in testing any of the items shall be borne by the contractor.

6.6 Samples

Before or during the execution of the works, additional samples may be requested from the contractor.

All costs of testing and provision of samples are to be borne by the Contractor. In all cases, and also once the samples are approved, it is the Contractor's responsibility to ensure that the works and materials comply with the specifications.

The Contractor shall provide, without extra charge, all labour and equipment required by the Engineer in Charge for testing and measuring the works and weighing, measuring, or testing the efficiency or any portion or portions of the completed work.

6.7 Bad Workmanship

The Engineering Team or the Employer or any person authorised by them or their representative shall, during the progress of the works, have the power to order:

- a) the removal, without affecting the agreed completion time, of any materials or equipment which, in his opinion, are not in accordance with the specifications or his instructions;
- b) the substitution by proper material or equipment;
- c) the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the method statement, drawings, specifications or instructions.

Any defects identified shall be remedied at no additional cost and without extension of contractual deadlines.

7 OTHER GENERAL CRITERIA

Ethics and Conflict of Interest

Any attempt by an economic operator to improperly influence the evaluation process or to obtain confidential information shall result in exclusion from the procedure.

Economic operators shall declare that no conflict of interest exists. Any situation of conflict of interest arising during the procedure shall be immediately disclosed to the Employer.

Protection (GDPR)

Any personal data processed in the context of this procurement procedure shall be handled in accordance with Regulation (EU) 2016/679 (GDPR) and shall be used exclusively for purposes related to the management of the tender procedure and the resulting contract.

FOI

The provisions of this tender are without prejudice to the obligations of the Contracting Authority under the Freedom of Information Act (Cap. 496 of the Laws of Malta). Prior to disclosure of any information to third parties, the tenderer shall be consulted in accordance with the said Act.

Gender Equality and Non-Discrimination

The Contractor shall ensure the application of the principle of gender equality and non-discrimination in the performance of the contract.

8 COMMISSIONING, TESTING AND DOCUMENTATION

8.1 Commissioning and testing

Upon completion of the works, the Contractor shall carry out full-scale tests to demonstrate the performance of the installation (s) to the Employer's satisfaction.

In addition, the Contractor shall ensure that the electrical installation is accepted by the Enemalta testers.

The Contractor shall be responsible for providing all test points, test instruments, all labour and any related equipment for carrying out such tests, even if such requirements are not detailed and specified elsewhere in these documents.

The Contractor shall provide all certified performance characteristics and test data for all of the functional equipment.

Under no circumstances shall piping be buried or insulated before tests have been carried out to the satisfaction of the Employer.

8.2 Take-Over Inspection

The Contractor shall advise the Employer of a suitable date for the final inspection.

The installation will not be considered ready for final inspection unless all components have been installed, labelled, tested, and the test certification has been issued.

8.3 Operating and maintenance instructions

On completion of all works and prior to handing over, the Contractor shall provide two copies of the complete set of operating and maintenance manuals comprising the following:

- a) general description of the installation, indicating the manner of working of each system, forming part of the works.

- b) Full instructions for starting up, operating and shutting down each individual assembly of equipment.
- c) Instructions as to the frequency and full requirements of routine and regular preventive maintenance necessary to maintain the equipment in a good working condition. This information is to be supplemented by the Manufacturer's Maintenance Instructions for all equipment.
- d) A recommended spare parts list including the current price of each part, the manufacturer's address and the local stockist/agent.
- e) Wiring diagram of the system and equipment.
- f) Three sets of "as built" drawings and one soft copy.

TECHNICAL SPECIFICATIONS

The technical specifications of this Tender are divided into four parts / lots, as follows: 1) Civil Works, 2) Electrical Works, 3) Plumbing Works and 4) Automation Works. Detailed specifications of each part are included in this section below:

1) CIVIL WORKS

PENETRATION AND CORING WORKS

Wall penetrations shall be carried out accurately and sized appropriately for the duct or pipe being installed. Any openings larger than required shall be neatly finished after the equipment is installed. This shall include drilling through walls, floors, and ceilings; chasing where and when required; sealing and making good of all unused openings and penetrations created during the installation of the system; and supporting equipment.

All necessary penetrations, core drilling and/or openings in reinforced concrete slabs and/or masonry walls and blockwork, sandwich panels and sheet metal, whether internally or externally within any area and/or level of the site, shall be included. This shall comprise, but shall not be limited to: removal, disposal and/or replacement, any modifications to underlying beams, temporary propping and/or scaffolding required to carry out such works, and final making good in accordance with watertightness requirements and fire safety regulations.

FIXING TO THE BUILDING STRUCTURE

Light fixings to brick, concrete or other masonry materials shall be by correctly sized screws fitted into plastic or metal expanding plugs located in correctly sized holes drilled in the structure.

All holes shall be carefully drilled by slow-speed rotary drills as recommended by the manufacturer of the fixing devices.

Where fittings to steelworks are required, they shall be by the use of metal clamps/hook bolts or similar devices, where the method of fixing does not require any drilling or cutting of the steelworks. Under no circumstances should structural steelworks be cut or drilled.

In all cases, the particular type and size of fixing device used shall be in accordance with the manufacturer's recommendations, having regard to the application and the load to be carried by the fixing device.

Any drilling and installation of threaded, bolted or resin-anchored fixings to the structure shall be included in the tender.

DEMOLITION AND DISPOSAL

Demolition works involving reinforced concrete structures and masonry elements shall be executed by the Contractor in full compliance with applicable standards, provisions governing site safety and structural dismantling.

Prior to commencing any demolition activities, the Contractor shall submit method statements, risk assessments, waste handling procedures, and, where required, structural sequencing plans for approval. Demolition shall be carried out in a controlled and systematic manner, ensuring structural stability, safety of personnel, neighbouring properties, and public areas at all times.

All resulting debris, including reinforced concrete fragments, masonry rubble, metal reinforcement and related waste, shall be segregated, collected and transported exclusively to licensed facilities, in accordance with ERA waste classification and traceability requirements. Any steel reinforcement or metal scrap shall be separated and handled in accordance with applicable recycling regulations. Unauthorised dumping or disposal shall not be permitted under any circumstances.

The Contractor shall implement dust suppression, noise mitigation and vibration control measures throughout the works, adopting appropriate screening, water spraying and operational limits. All temporary supports, access systems, scaffolding, and machinery shall comply with safety regulations and remain in place until needed to ensure structural integrity during removal.

Any damage to adjoining structures, infrastructure or finishes resulting from demolition works shall be repaired at the Contractor's expense and without extension of the contractual completion date.

CONCRETE

The reinforced concrete works shall be supplied and executed by the Contractor in full compliance with applicable standards, project requirements, and the applicable Eurocodes.

Prior to commencing the works, the Contractor shall submit all relevant conformity certificates for concrete, reinforcement and formwork systems, together with execution drawings and the proposed casting schedule.

Concrete shall be produced using certified and suitable materials, placed within the prescribed time limits and compacted by appropriate vibration to eliminate voids and ensure homogeneity. Reinforcement shall be installed in accordance with the approved drawings, kept clean and correctly spaced, and protected against deformation, corrosion or contamination. Formwork shall ensure stability and the correct geometry of the elements, while shoring and supports shall remain in place until the minimum required strength is achieved.

Following casting, concrete shall be protected against rapid drying, vibration, impact and thermal shock, and shall be properly cured by suitable methods to ensure the correct development of mechanical performance. All required testing — including slump tests, specimen sampling and dimensional checks — shall be carried out in accordance with applicable standards and design requirements, with all related costs and assistance borne by the Contractor.

REBAR

High-bond reinforcing steel bars. Structural steelwork shall be supplied, fabricated, and installed by the Contractor in full compliance with applicable standards, project requirements, and the applicable Eurocodes.

Prior to delivery, the Contractor shall submit all certificates of conformity, mechanical properties documentation, and production certification for the steel. All bars shall be new, free from corrosion, oil, residues and deformation, and shall bear traceable identification marks.

Installation shall follow the approved execution drawings, ensuring correct bending, spacing, cover, and secure tying of reinforcement. Splices and laps shall be executed in accordance with the design specifications and relevant standards, ensuring structural continuity and adequate anchorage.

STRUCTURAL STEELWORKS

Structural steelwork shall be supplied, fabricated, and installed by the Contractor in full compliance with applicable standards, project requirements, and the applicable Eurocodes.

Prior to fabrication, the Contractor shall submit shop drawings, weld maps, certificates of conformity for steel grades, galvanising or protective coatings, and all relevant traceability documentation. All steel components shall be new, properly identified, free of deformation, corrosion, contamination, or coating defects, and in conformity with the specified grades and tolerances.

Fabrication and erection shall be carried out strictly in accordance with the approved drawings and statutory requirements. Welding, bolting and mechanical fastening shall comply with relevant Eurocode standards and MSA-adopted standards; welded connections shall be performed by certified welders in compliance with EN ISO 9606 and EN ISO 17660 where applicable, while bolted joints shall use certified high-strength fittings conforming to EN standards.

Cutting, drilling and any modifications to structural members shall be carried out only where expressly detailed and authorised.

Structural works shall be covered by a ten-year warranty against material and workmanship defects.

2) ELECTRICAL WORKS

Electrical works carried out in connection with the above detailed works shall be strictly in accordance with the latest edition of the I.E.T. and Enemalta regulations. This shall include power factor correction where necessary.

Prior to commencement of the works, the Contractor shall submit single-line diagrams, installation layouts, lists of equipment and materials, CE compliance certificates and documentation relating to protection devices and earthing systems.

All electrical equipment, distribution boards, wiring, protective devices and accessories shall be new, certified and free from defects. Cable installation shall ensure separation between power, lighting, data, and emergency systems, using appropriate routing and containment that are protected against mechanical damage, moisture, and external agents. Conduits, trays and junction boxes shall be securely fixed and positioned, with inspection access provided where required.

The earthing system shall ensure full continuity and protection, including earth electrodes, equipotential bonding and adequately sized conductors, with verification of earth resistance values duly recorded. Protective systems shall be selective, coordinated, and compliant with required safety standards, and shall include high-sensitivity residual-current devices, circuit breakers, and surge protection against overvoltage, lightning, and ground faults.

Upon completion of the works, the Contractor shall perform all functional and instrumental tests required, including insulation resistance, continuity checks, earth resistance measurements and operational testing of panels and circuits. The final handover shall include the conformity certificate, as-built documentation, technical manuals, and records of all tests carried out.

The entire electrical installation, including all materials and workmanship, shall be guaranteed for a minimum period of twenty-four months against malfunction, installation defects or premature deterioration. Any repair or replacement carried out during the warranty period shall automatically renew the guarantee for the component concerned.

3) PLUMBING WORKS

The work is intended as complete, as part of a single system in which there will be a main thermal transfer fluid (water-propylene glycol mixture) cooling distribution with related circulation pumps, a series of heat exchangers for the transfer of heat between the food fluid and the main thermal transfer fluid, and a series of automatic control and monitoring systems for operating parameters and set points, such as temperature, pressure and flow. With this premise, the contracting authority requires the contractor to guarantee compliance with the main objective, which is to achieve a milk temperature at packaging of +2°C with a tolerance of ±0.5°C.

Such systems shall include:

- a) the relocation and technical-functional verification of the existing chillers and their connection to the new distribution network;
- b) the piping for the supply of the water-glycol mixture to the chillers, and, where applicable, to the heat exchangers, the thermal storage tank, the discharge pipelines, as well as any required water treatment system;
- c) the electric pumps (including standby units), where accelerated circulation systems are provided, complete with hydrometers, shut-off valves, and anti-vibration devices;
- d) all piping complete with fittings and joining components (i.e. sleeves, elbows, nipples, reducers, locknuts, pipe clamps, flanges, bolts, brackets, etc.) and accessories, such as expansion joints, valves and shut-off gates at the base of the rising and descending columns, and, where required, automatic discharge devices or drain traps with collection boxes;
- e) the insulation of piping with insulating material (with specification of its characteristics);
- f) the heat exchangers complete with all accessories, namely: control valves, air discharge grids or air valves for specific cases, flanges or three-piece fittings, and support brackets;
- g) two-coat anti-rust painting of all metal surfaces that are not stainless steel;
- h) the electrical equipment, switches, contactors, motor protection devices and, where deemed necessary, the electrical panel of the circulation pumps (GP2), as well as fuses, ammeters, voltmeters and the electrical lines between the panel and the equipment;
- i) the regulation and control devices, with respective indicators, for any automatic control of valves, regulators, and temperature stabilisers;
- j) pure propylene glycol in the quantities indicated in the bill of quantities, as well as any additions and integrations required after the testing and commissioning phase.

All products and/or materials used, where CE marking is applicable in accordance with current technical legislation, must bear such marking.

Regarding cooling systems employing a liquid heat transfer fluid, the following definitions apply:

- a) "Direct" indicates systems obtained through the use of cooling heat exchangers, including temperature control systems.

A cooling system also refers to the set of machinery, equipment, and works required to achieve the specified and predetermined operating conditions.

DEFINITION OF THE COOLING SYSTEM

The cooling system is defined as:

"System: fixed technological plant intended for the cooling service of water in mixture with propylene glycol, comprising production, distribution, storage and heat utilisation systems as well as regulation and control devices."

The cooling system consists of four main subsystems:

- generation system
- distribution system
- heat exchange system
- regulation system

The thermal carrier supply system is composed of a heat transfer fluid, in this specific case a mixture of treated water and propylene glycol; therefore, reference will be made to a hydronic system.

The cooling system will serve a food production facility, therefore industrial, and will be constructed in compliance with Local and EU Standards relating to mechanical systems (excluding civil or assimilated systems).

All products and/or materials used, where bearing of CE marking is applicable under current technical regulations, must be provided with such marking.

SYSTEM CONFIGURATION AND REQUIREMENTS

The newly implemented system shall include the recovery and verification of the functionality and operability of two existing air-cooled refrigeration units (Chillers), one currently operating on the chilled water-cooling circuit and the second stored in the plant's external yard.

Specifically, for the second Chiller stored in the external yard, all necessary checks shall be carried out to ensure the unit is immediately operational upon positioning and connection to the hydronic circuit. To guarantee this, the Contractor shall perform a preliminary inspection prior to submitting the offer, availing itself of the authorised service centre or the manufacturer's representative (Trane), in order to indicate and report, in addendum to the bill of quantities, the costs foreseen for the restoration and commissioning of the same Chiller.

The Contracting Authority will not accept any additional costs arising from repairs or replacement of components or the entire unit after the award of the contract.

Any costs presented prior to or at the time of offer submission will be duly assessed by the Employer, which may explicitly request the submission of a new price for the supply and installation of a new refrigeration unit (Chiller).

PRESCRIPTIONS FOR COOLING SYSTEMS

a) Outdoor temperature – The minimum and maximum outdoor temperatures to be used as a basis for system design calculations shall be those specified in the project.

b) System operating regulation temperature – With a minimum temperature of -2°C of the water measured at the outlet of the chillers or of the thermal storage tank or of the manifold, the system must be capable of ensuring the cooling of the food fluid (milk) to the design temperature.

The temperatures, as specified under item b), shall be maintained with reduced power usage compared to the maximum power calculated, with the various temperatures measured at the return lines from the utilities.

Given the load factor m , defined as the maximum refrigerating capacity exchanged at the utilities (glycol–water mixture to milk heat exchangers), multiplied by the project simultaneity factor f_c , the average outdoor temperature t_E measured during commissioning, and the corresponding temperatures referred to in points b) and a): the system shall ensure a supply temperature to the utilities of -2°C with the permitted tolerances for load factor values not exceeding 0.8.

The maximum power required by the system is equal to 453.1 kW (load factor 1).

The reduction in power, with the maximum taken as unity, shall be a function of the load factor.

c) Water temperature – The maximum permissible temperature difference of the water between the supply and the return, at the corresponding maximum system power, shall be: for systems with glycol water mixture and forced circulation, 4°C .

For temperature differences in the chiller exceeding those indicated above, technical justifications must be provided explaining the rationale for adopting such differences.

The above requirements shall be verified after a proper operation period of at least five consecutive days for cooling systems.

In the event of intermittent operation, especially during long shutdown periods, the system shall operate for the time required to restore full and correct working conditions to the entire installation.

“COLD PRODUCTION”

For cooling (cold generation), it shall be noted that the available cooling water flow rate is $132\text{ m}^3/\text{h}$ at -2°C .

The refrigeration plant shall be located outdoors on the roof, as indicated in the design drawings, in a dedicated area that is easily accessible and compliant with applicable regulations.

The refrigeration plant will consist of two existing chillers: one is currently in operation and will be repositioned, and the other is currently in storage and shall be verified prior to commissioning.

The chillers are identified as follows:

manufacturer: TRANE

model: CXAM 120 HE SQ

unit code: CXAM120E1A12B4F1A2A1B1EXXB1B2AXXA8AXA4A3A1D1XXLXS

The premises of the refrigeration plant shall comply with current requirements for accident prevention and fire safety.

DIRECT COOLING SYSTEM

The system shall operate as a closed, pressurised circuit.

- a) Circulation of the cooling fluid – Circulation in the pipelines and in all heat exchangers shall be ensured by supplying the cooling capacity corresponding to the fraction of maximum power specified under the prescriptions for cooling systems, item b).

In systems with forced circulation, free passage of the water shall be ensured, independently of the pump, either by means of specifically designed pumps or by bypass lines equipped with shut-off valves. The pumping group shall consist of three units plus one standby unit (on ground level), all with equal power.

In secondary pipelines, water velocity shall not normally exceed 1 m/s, while in main pipelines it shall not exceed 2 m/s. Where, in exceptional cases, slightly higher velocities are envisaged, these shall, in any case, not cause vibrations or disturbing noise.

- b) Piping – The piping must be firmly fixed to the existing structural supports in such a way as to allow movement caused by thermal expansion, avoiding, where possible, routing beneath floors or ceilings. Along their entire length, pipelines shall be thermally insulated and any uncovered areas that may cause condensation, dripping, and subsequent freezing must be avoided. If this arrangement is not feasible, pipelines may be protected with an equivalent alternative and supported by brackets that enable expansion.

Piping shall follow the shortest possible route, consistent with optimal system operation, and be arranged without creating obstruction.

Where free movement of pipelines through walls or slabs cannot be ensured by other means, passages shall be constructed within wall sleeves.

Risers and downpipes shall be fitted at the lower ends with shut-off valves for possible isolation and with drain cocks connected to a dedicated recoverable collection system, accessible at any time. Direct discharge to the sewer is not permitted.

Risers shall be equipped at their upper ends with air discharge extensions. These extensions shall be connected to the expansion tank at their highest points by collection lines or externally above the water level. Where necessary, air relief lines shall be equipped with shut-off cocks. In systems with sealed expansion vessels, the air discharge lines may be replaced by automatic or manual air release valves. All piping shall be supplied complete with fittings and connections, threaded or socket type, or flanged, or by TIG welding, including supports and fixing brackets; the piping shall also be equipped with shutoff valves on main branches and with expansion joints, taking into account any structural expansion joints in reinforced concrete elements.

Insulation shall be carried out with particular care, using appropriate non-combustible, non-oxidising, non-hygroscopic, and chemically, physically, and biologically resistant insulating materials.

- c) System supply – The water supply for the installation shall be sourced from the internal distribution network at the point defined in the design and shall be conveyed to the system’s expansion/feed tank, including provision for discharge. Taking into consideration the characteristics of the available water, which shall be specified, the Contractor shall provide a mixing system for the feed water with propylene glycol, with a propylene glycol volume percentage not lower than 20% and not exceeding 30%.
- d) Expansion vessels – Expansion vessels, equipped with individual shut-off devices (for maintenance and replacement), shall have sufficient capacity to fully contain, with adequate surplus, the volume increase occurring in the water-glycol mixture under maximum system temperature conditions, when the system is idle and cooling source unavailable.
- e) Heat exchangers – The maximum allowable temperature difference between inlet and outlet flow in the heat exchangers shall not exceed 5°C.

HEAT TRANSFER FLUID DISTRIBUTION SYSTEM

Introduction

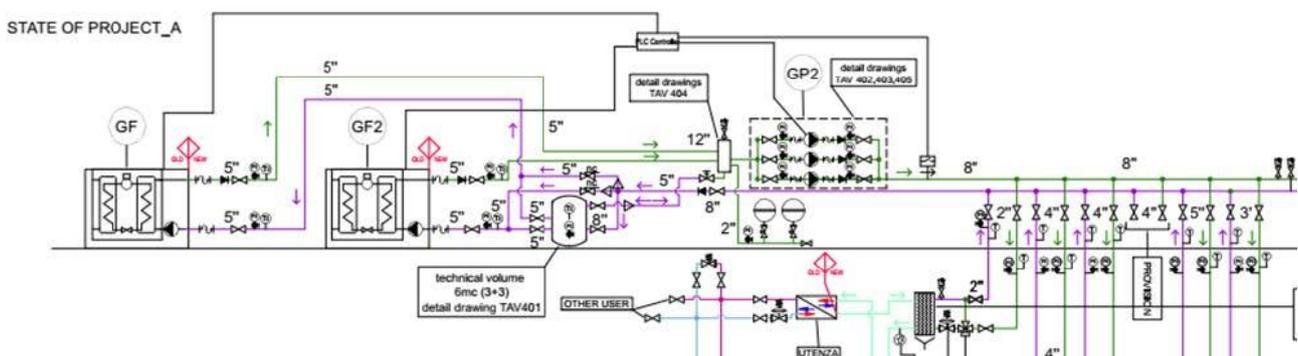
The cooling system will use a mixture of water and propylene glycol (maximum 30%) as a heat transfer fluid.

Considering the forced circulation regime, in which the water inside the piping is moved by an electrically driven circulation pump, the piping configuration shall be as follows: water distribution to the heat exchangers via a two-pipe direct-return system.

Distribution System via Two-Pipe Direct Return Circuit

The water distribution layout with a two-pipe direct return configuration provides terminals arranged in parallel and two pipelines: one for supply and one for return.

The supply pipeline, starting from the generator, includes as many branches as there are utilities, and the returning water from each heat exchanger flows back into the return pipeline, which is directed to the generators (chillers).



The hydronic circuit is a partially balanced system, as the majority of the secondary branches have similar pressure drops, allowing the heat transfer fluid to distribute uniformly according to system demand.

For branches that are not balanced, balancing operations shall be carried out during commissioning, ensuring the correct pressure drop is achieved from the reference values of the self-balanced branches.

Below are the hydraulic data of the system:

ID	utenza	SCAMBIATORE		RAFFREDDAMENTO										
		potenza raffredda- mento	T	T	q nom		diametr o raccord o	diametro derivazion e	Dp	L	Dp tot	Dp SCAMBIAT ORE	H min pompa	
			mandata	ritorno	l/h	l/min	"	mm	mm/ mt	m	mm	mm	mm	mm
106	YOGHURT <i>parziale UTENZA</i>	14	-2	0	6020	100,33	2	60,3	30	10	300	5000	8700	87,0
104	PASTORIZZATORE <i>parziale UTENZA</i>	233	-2	3	40076	667,93	4	114,3	29	10	290	11000	16790	167,9
101	RICEVIMENTO <i>parziale UTENZA</i>	140	-2	1	40133,3	668,89	4	114,3	29	10	290	11000	17950	179,5
113	CONFEZIONAMENTO <i>parziale UTENZA</i>	14	-2	0	6020	100,33	2	60,3	29	10	290	11000	14890	148,9
ICE	PRODUZIONE ACQUA GELIDA <i>parziale UTENZA</i>	380	-2	4	54466,7	907,78	5	139,7	21	10	210	11000	17590	175,9
	TOTALI	809			158756	2645,93	8	219	12	20	240			
	<i>da centrale a utilizzo +sfavorito maggiorazione per miscela GLICOLE PROPILENICO</i>												17950	179,5
													21540	215,4

The electric pumps selected to meet the hydraulic requirements of the system are listed below:

manufacturer: GRUNDFOS

model: TP 65-340/2 A-F-A-BQQE-LW1

number of units: 4 - of which 3 in operation and 1 as a spare (not installed)

HEAT EXCHANGE SYSTEM OF THE HEAT TRANSFER FLUID

Introduction

The heat exchange system consists of terminals that indirectly exchange heat with the secondary food fluid, namely milk.

The heat transfer fluid, a mixture of water and propylene glycol, flows from the chillers through the piping network and reaches the exchange terminals, where heat is removed. The hydraulic terminals are:

- heat exchanger utility 101_receiving
- heat exchanger utility 104_pasteurizer
- heat exchanger utility 106_yogurt
- heat exchanger utility 113_packaging 1
- heat exchanger utility 114_packaging 2
- heat exchanger utility 115_packaging 3
- heat exchanger utility ICE_chilled water production

These components differ in heat-exchange capacity and in the return temperatures of the heat-transfer fluid to the chillers.

Heat is mainly exchanged through:

- conduction – diffusive transport of energy occurring when a temperature gradient exists, i.e. contact between two bodies (or parts of the same body) at different temperatures.

Heat Exchangers

The heat exchangers are composed of identical elements (plates) assembled together inside a single housing. The heat transfer process takes place mainly by conduction. The performance of these terminals depends on multiple factors, including:

- supply and return water temperatures
- difference between the average water temperature and the temperature of the secondary food fluid
- material
- flow rate of the primary and secondary fluids

Supply and return temperature

The heat exchangers are connected to the chillers via supply and return lines equipped with shut-off valves to prevent interruptions to thermal service during maintenance.

They operate at low supply temperatures ($T_m = -2^\circ\text{C}$) and a temperature differential of approximately 3–4°C between supply and return.

Thermal gradient between the average water temperature and the secondary fluid (milk)

The thermal output q of each heat exchanger decreases as the temperature difference between the average water temperature and the secondary fluid decreases.

The average water temperature is calculated as the mean value between supply and return water temperatures:

$$T_{media} = \frac{T_m + T_r}{2}$$

The thermal output increases with the number of elements (plates) N installed to compensate the cooling load Q of each utility.

The number of plates is therefore given by the ratio between the thermal capacity that the exchanger must provide and the thermal output of each element:

$$N = \frac{Q}{q}$$

Material

The material strongly influences the exchanger's thermal characteristics, in particular its heat transfer capacity. The plates shall be made of stainless steel AISI 316L.

Technical characteristics of each heat exchanger:

Heat exchanger utility 101 receiving

N.1 Plate exchanger NT100M

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 20.000 l/h

Feed temperature:	8°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	40.000 l/h
Cooling media Thermal profile:	-2°C >1 °C
Pressure drop product:	0.28 Bar
Pressure drop cooling media:	1 Bar
CIP:	20.000 l/h
Frame material and external surface:	S355J2+N/1.4301

Heat exchanger utility 104 pasteurizer

N.1 Plate exchanger NT100M

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 20.000 l/h

Feed temperature:	12°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	40.000 l/h
Cooling media Thermal profile:	-2°C >3 °C
Pressure drop product:	0.27 Bar
Pressure drop cooling media:	1 Bar
CIP:	23.000 l/h
Frame material and external surface:	S355J2+N/1.4301

Heat exchanger utility 106 yogurt

N.1 Plate exchanger NT50T

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 3.000 l/h

Feed temperature:	6°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	6.000 l/h
Cooling media Thermal profile:	-2°C >0 °C
Pressure drop product:	0.12 Bar
Pressure drop cooling media:	0.46 Bar
CIP:	4.000 l/h
Frame material and external surface:	1.4541 – Stainless steel

Heat exchanger utility 113 packaging 1

N.1 Plate exchanger NT50T

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 3.000 l/h

Feed temperature:	6°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	6.000 l/h
Cooling media Thermal profile:	-2°C >0 °C
Pressure drop product:	0.12 Bar
Pressure drop cooling media:	0.46 Bar
CIP:	4.000 l/h
Frame material and external surface:	1.4541-Stainless steel

Heat exchanger utility 114 packaging 2

N.1 Plate exchanger NT50T

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 3.000 l/h

Feed temperature:	6°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	6.000 l/h
Cooling media Thermal profile:	-2°C >0 °C
Pressure drop product:	0.12 Bar
Pressure drop cooling media:	0.46 Bar
CIP:	4.000 l/h
Frame material and external surface:	1.4541-Stainless steel

Heat exchanger utility 115 packaging 3

N.1 Plate exchanger NT50T

Plate exchanger
Plate 316 L, NBR

Thermal profile for Cow Milk 3.000 l/h

Feed temperature:	6°C
Outlet Temperature:	2°C
Cooling media Flow – chilled water:	6.000 l/h
Cooling media Thermal profile:	-2°C >0 °C
Pressure drop product:	0.12 Bar
Pressure drop cooling media:	0.46 Bar
CIP:	4.000 l/h
Frame material and external surface:	1.4541-Stainless steel

Heat exchanger utility ICE_chilled water production

N.1 Plate exchanger NT150M

Plate exchanger
Plate 316 L, EPDM

Thermal profile for cold water 65.000 l/h

Feed temperature:	8°C
Outlet Temperature:	3°C
Cooling media Flow – chilled water:	55.000 l/h
Cooling media Thermal profile:	-2°C > +4°C
Pressure Drop hot side:	0.8 bar
Pressure Drop cold side:	0.65 bar
Frame material and external surface:	1.4541-Stainless steel

REFRIGERATION UNITS

Introduction

The cooling generation system is composed of two refrigeration units.

Each refrigeration unit consists of a single apparatus that transfers heat from a lower-temperature zone to a higher-temperature zone via mechanical work supplied by an energy source. The refrigeration units are of the following type:

- electric vapour-compression refrigeration units (compressor motor electrically powered), EHP
– Electric Heat Pump

The refrigeration unit cools the heat transfer fluid (water mixed with propylene glycol) by removing heat from the utilities (heat exchangers) and subsequently rejecting it to a higher temperature medium (outdoor air).

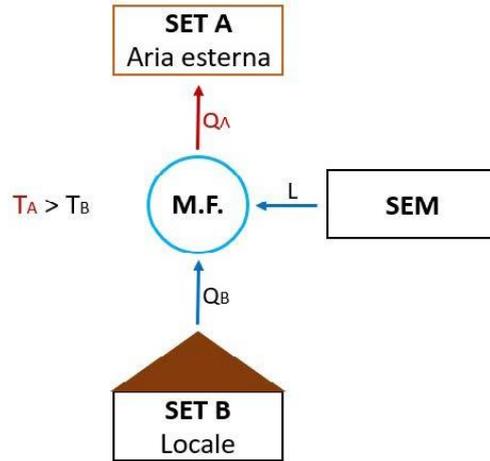
Energy performance

The energy performance of the refrigeration unit is measured by a dimensionless coefficient equal to the ratio of the useful effect to energy consumption.

This parameter expresses the thermodynamic quality of the performance:

- Refrigeration unit – the EER (Energy Efficiency Ratio) represents the ratio between the thermal energy removed from the SET (thermal energy reservoir) at a lower temperature and the mechanical energy supplied (work)

$$EER = \frac{Q_B}{L}$$



The installed refrigeration units were originally designed to operate with a heat transfer fluid at temperatures above 0°C; however, as indicated by the unit code, they may also operate at temperatures below 0°C, down to -2°C.

Such operating conditions are permitted only if the heat transfer fluid (water) is mixed with propylene glycol at a minimum concentration of 20% and a maximum of 30% by volume, to avoid excessive derating of the effective cooling capacity.

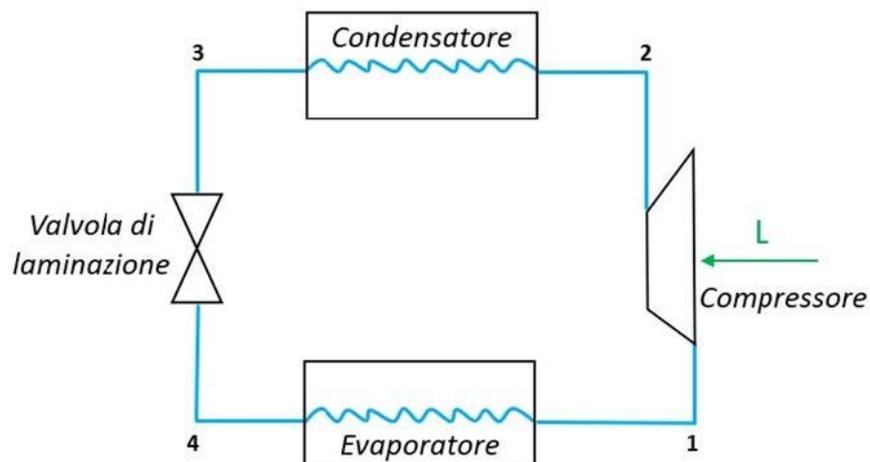
The correct percentage of glycol must be verified and approved by the manufacturer, including via its authorised local service centre.

OPERATING PRINCIPLE AND CHARACTERISTICS OF VAPOR-COMPRESSION REFRIGERATION UNITS

The operation of the vapour-compression refrigeration unit is based on the phase transition of a refrigerant fluid within a Carnot cycle.

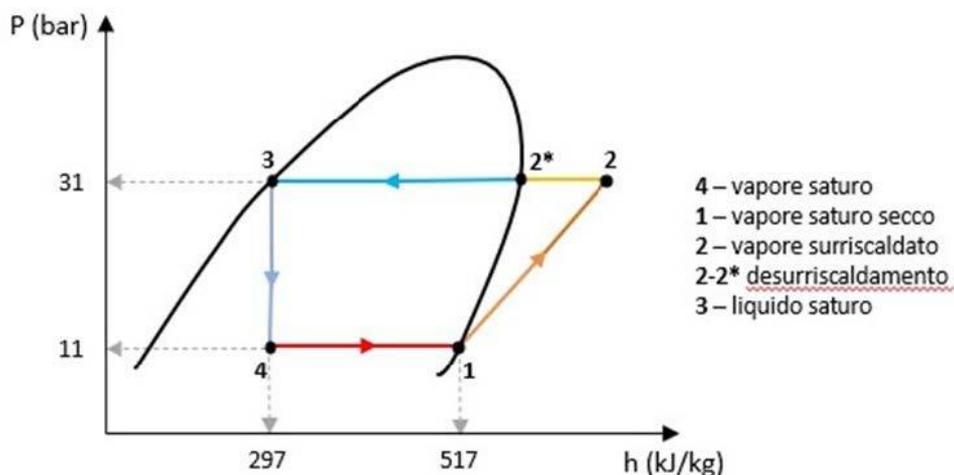
The circuit is composed of four main elements:

- evaporator
- compressor (driven by electric motor or gas engine)
- condenser
- expansion valve



Starting from the evaporator, the refrigerant is in a saturated vapour state (4). In this section, heat is absorbed, and the fluid evaporates, reaching the condition of dry saturated vapour (1). It then passes through the compressor, where it is compressed, pressure increases, and the fluid reaches the state of superheated vapour (2). In the next step, in the condenser, it is first de-superheated and then condensed, as the accumulated heat must be released; during condensation, it reaches the saturated liquid state (3). Finally, it passes through the expansion valve, where it expands, the pressure decreases, and it returns to the saturated vapour condition (4), allowing the cycle to start again.

The most commonly used refrigerant is R32, which at atmospheric pressure evaporates at approximately -52°C ; however, within the system, the refrigerant operates at a pressure higher than atmospheric, increasing its boiling temperature. Below is the pressure–enthalpy (P–h) diagram of R32:



At 11 bar, R32 evaporates at approximately 10°C , and at 31 bar, it condenses at approximately 50°C . Vapour-compression refrigeration units/heat pumps can be classified as follows:

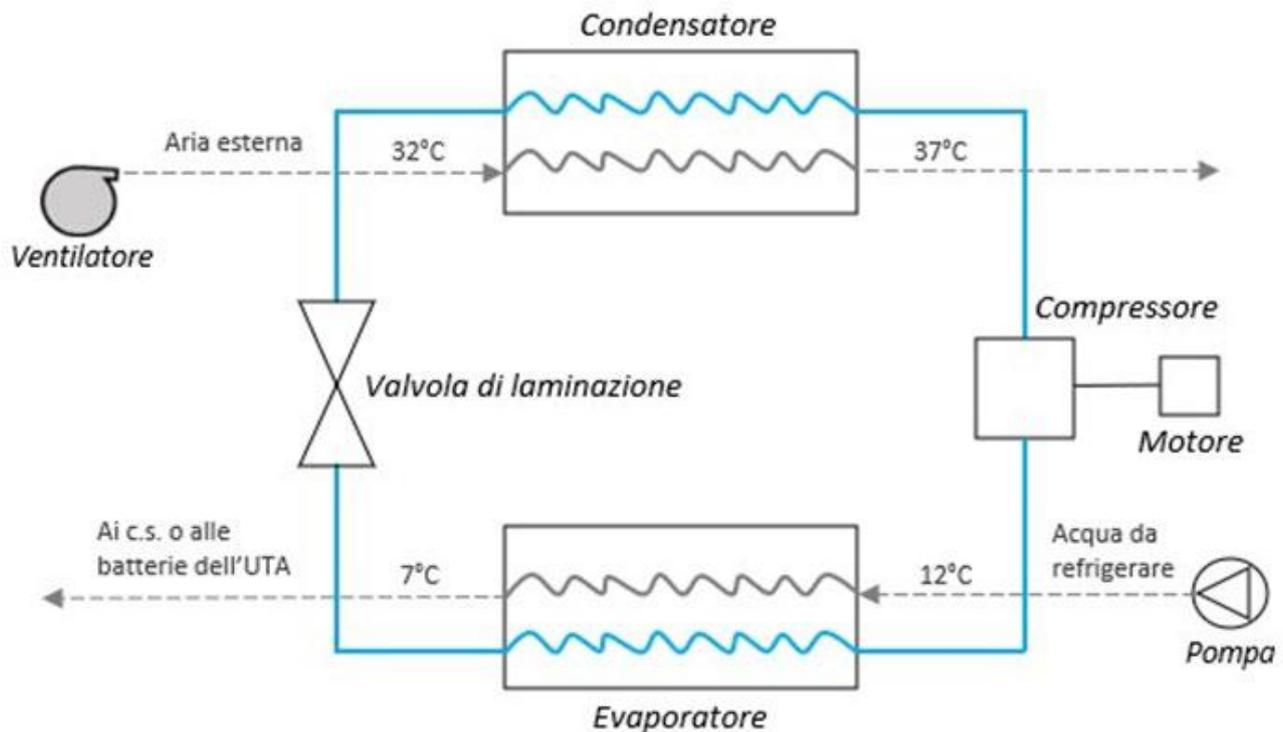
- water-to-air refrigeration unit: refrigeration system with evaporation on the water side and condensation on the air side.

WATER–AIR REFRIGERATION UNIT

The water–air refrigeration unit uses the supply water to the utilities (heat exchangers) as the cold source; the useful effect is therefore delivered to the water, which then indirectly cools the milk.

When operating in cooling mode, evaporation occurs on the water side, and condensation occurs on the air side. In other words, the refrigerant evaporates by removing heat from the water, and then condenses by releasing the heat it has accumulated to the outdoor air. This type of refrigeration unit is defined as a chiller or water chiller.

In this case, a circulation pump delivers the water to be cooled through the piping network; at the evaporator, the refrigerant absorbs heat from the water, which cools from approximately $+3^{\circ}\text{C}$ to -2°C , and is then delivered to the heat exchangers. Subsequently, at the condenser, the refrigerant condenses by releasing heat to the external air, which is moved through the heat exchanger by a fan, increasing in temperature from approximately 32°C to 37°C .



QUALITY AND ORIGIN OF MATERIALS

All materials used in the system shall be of the highest quality, properly manufactured and fully compliant with the intended service, as specified in the Bill of Quantities and the Technical Data Sheets annexed to this Specification.

Upon request, the Contractor shall submit to the Works Supervision all documents proving the origin of the various materials.

Should the Works Supervision reject any materials, even if already installed, because, in its justified opinion, they are deemed unsuitable in quality, workmanship or performance for the proper completion of the system and therefore unacceptable, the Contractor shall, at its own care and expense, replace them with materials compliant with the prescribed requirements.

EXECUTION OF WORKS

All works shall be carried out in accordance with best engineering practice and the prescriptions issued by the Works Supervision, ensuring full compliance with all conditions set forth in the Special Contract Specifications and in the project documents.

The execution of the works shall be coordinated in accordance with the instructions of the Works Supervision and with the needs arising from the simultaneous execution of all other works in the building performed by third parties.

The Contractor shall be fully liable for any damage caused by itself or its personnel to any works of the building.

PRELIMINARY CHECKS AND TESTING OF THE SYSTEM

The checks and preliminary tests listed below shall be carried out during the execution of the works and completed prior to issuance of the completion certificate:

- a) preliminary verification, to ascertain that the quantity and quality of the materials supplied for the system are compliant with contractual requirements;
- b) before commissioning of the new cooling system, static pressure tests, flushing and cleaning of the new network shall be performed, ensuring that filling with the water-propylene glycol mixture takes place without any contamination;
- c) preliminary circulation, tightness and expansion test with cooling fluids. After the test referred to under item b) has been carried out, the following cases apply depending on the system type:
- d) for chilled glycol-water systems, the water temperature in the chillers shall be brought to -2°C and maintained for the time required to perform accurate inspection of all piping and heat exchangers;
- e) inspection shall commence once the network has reached steady-state operation at the prescribed maximum value of -2°C;
- f) the test result shall be considered satisfactory only when all heat exchangers, without exception, reach the specified temperature, when expansions have not caused leaks or permanent deformation, and when the expansion vessel can fully contain the variation in system water volume.

The above checks and preliminary tests shall be carried out by the Works Supervision in the presence of the Contractor, and a formal test report shall be drafted indicating the results obtained.

Should the Works Supervision raise objections regarding said results because, in its opinion, they are not compliant with this Specification, the completion certificate shall only be issued after having confirmed, with an explicit statement in the report, that the Contractor has carried out all modifications, additions, repairs and replacements deemed necessary.

It is understood that, despite the satisfactory outcome of the aforementioned checks and preliminary tests, the Contractor shall remain responsible for any deficiencies subsequently detected, including after final testing, and for the entire duration of the warranty period provided under the relevant contractual article.

4) AUTOMATION WORKS

AUTOMATION IMPLEMENTATION AND PLC BACKUP

1. Introduction

This technical specification defines the activities required for integrating the cooling system into the current production process.

The solution must include the implementation of a Backup PLC on the existing plant, ensuring:

1. Production continuity during commissioning phases.
2. Compliance with the quality and safety standards of the dairy.
3. Compatibility with existing logic, without unapproved proprietary solutions.

2. Supply Flow Diagram

1. Installation of a new backup PLC, required exclusively for the transitional commissioning phase.
Note: This PLC is not part of the final supply but should be considered as Temporary Equipment.
2. Insertion of new boards into the plant configuration.

3. Supply of 1 PC (technical sheet attached) to be connected to the current infrastructure.
4. Supply of 1 Siemens WinCC TIA Portal license (technical sheet attached: 6AV2104-4DD070AK0).
5. Prohibition of customised solutions or those not compliant with required standards.

Important Note:

The current plant does not have technical documentation or commented software. Therefore, the supplier will be responsible for reconstructing the complete documentation.

3. Required Activities

3.1 Design and Documentation

1. Preparation of the electrical diagram for the new boards to be inserted.
2. Current electrical documentation is available only in paper format.

At the end of the activity, updated documentation must be provided in digital format.

3.2 Preliminary Software Activities

1. Upload the software and partially reconstruct the affected process logic, ensuring operational continuity.
2. For the cooling phase, it will be necessary to reconstruct documentation and logic related to pasteurisation.

3.3 Hardware Configuration Modification

1. Insert the new boards into the existing configuration.
2. A minimum plant downtime is allowed, without stopping normal production.
3. The downtime slot will be identified by the Client and must be agreed upon in advance.

3.4 Offline Software Modification

1. Update the software to integrate the management of the cooling phase.

4. Validations

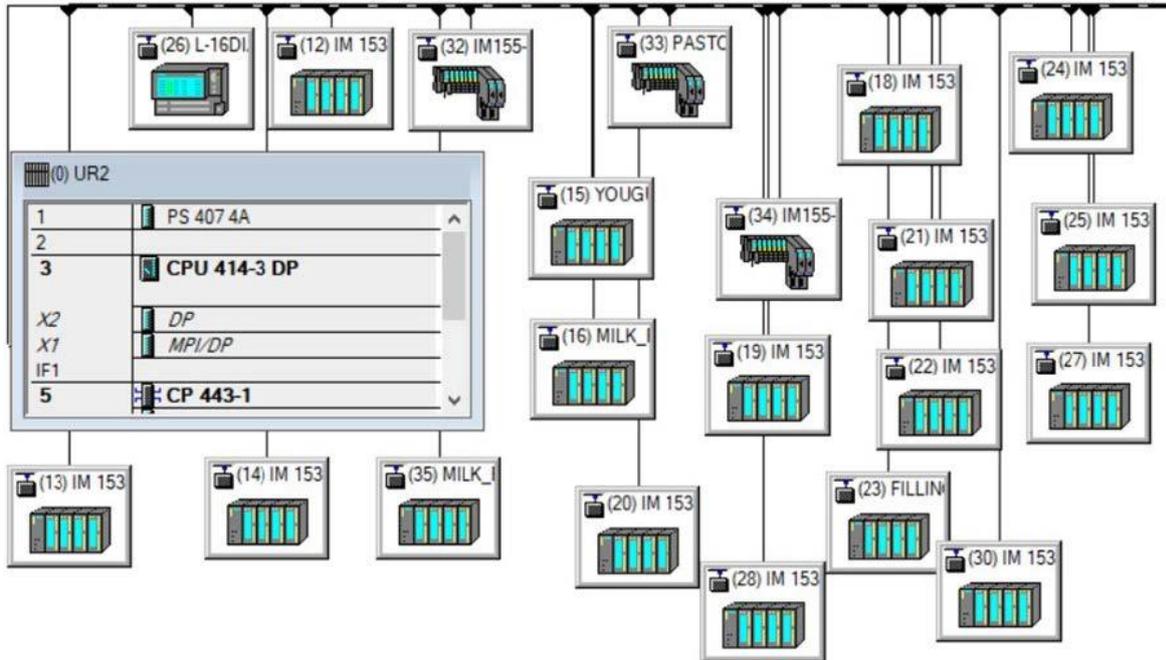
1. Each phase (design, hardware configuration, software integration) must be validated by the Dairy Technical Team.
2. The Technical Team reserves the right to exclude the supplier from the tender if the proposed solution is deemed inadequate.

5. Binding Clause

1. To protect normal dairy operations, the submission of the offer accompanied by the above-described solution will be considered a mandatory requirement.

6. Technical Proposal Requirements

1. Given the sensitivity of the solution, the proposal must be:
 - Complete and detailed, including:
 - Updated electrical diagram
 - Software architecture
2. Integration plan
3. Standardised, without unapproved proprietary solutions.
4. Compatible with existing logic and production continuity requirements.



ANNEX

CIVIL WORKS

- 1.MLT_BOQ_Chilling System_Civil Works_REV.02
- 2.MLT_BOQ_Chilling System_Civil Works_REV.02.xlsx
- 3.MLT_D_S_100_Supporting structure Report
- 4.MLT_D_S_101_Supporting structure_REV.02
- 5.MLT_D_S_102_Supporting structure_REV.02



MLT_BOQ_Chilling System_Civil Works_REV.02 MLT_BOQ_Chilling System_Civil Works_REV.02.xlsx MLT_D_S_100_Supporting structure Report MLT_D_S_101_Supporting structure_REV.02 MLT_D_S_102_Supporting structure_REV.02

ELECTRICAL WORKS

- 6.MLT_D_M_501_Electrical Technical Document



MLT_D_M_501_Electrical Technical Document

PLUMBING WORKS

- 7.TAV201_Utility distribution layout EN_06
- 8.TAV301_P&ID Cooling system EN_06
- 9.TAV302_P&ID Cooling system – electrical section EN_06
- 10.TAV401_Thermal tank 3 m³_06
- 11.TAV402_Pump manifold A_06
- 12.TAV403_Pump manifold M_06
- 13.TAV404_Chiller manifold M_06
- 14.TAV405_Pump group GP2_06
- 15.TAV501_3D view_1
- 16.TAV502_3D view_2
- 17.TAV503_3D view_3
- 18.TAV1001_Bill of quantities_04
- 19.TAV1001_BOQ.xlsx
- 20.TAV1002_Attachment – technical data sheets of components



TAV1002.pdf



TAV1001_BOQ_Plumbing.xlsx



TAV1001.pdf



TAV503.pdf



TAV502.pdf



TAV501.pdf



TAV405.pdf



TAV404.pdf



TAV403.pdf



TAV402.pdf



TAV401.pdf



TAV302.pdf



TAV301.pdf



TAV201.pdf

AUTOMATION WORKS

MLT_D_M_601_Automation.xlsx

Technical data sheets_6AV2104

Technical_spec_pc_i7



Technical_spec_pc_i
7.pdf

Technical data
sheets_6AV2104.pdf

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