ROMRADIATOARE® 95 YRS. 1926 2021

Your reliable manufacturing partner in Romania

www.romradiatoare.com

We design and manufacture heat exchangers and cooling systems for engines and other specialized applications, as well as a broad range of metal components and assemblies, and heat interface units (HIU) for heat distribution in buildings using centralized and decentralized heating systems.

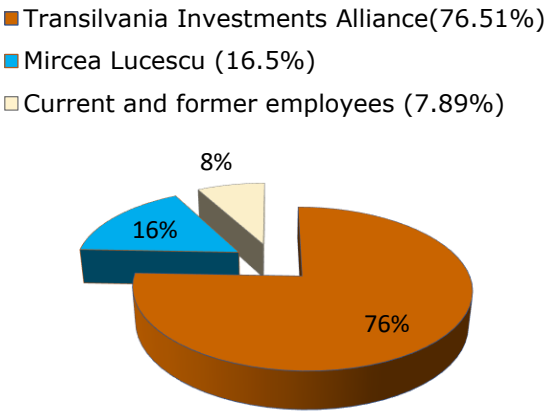
COMPANY INFORMATION

- **Established**: 1926, as a steel traction cable manufacturer
- **First Romanian company to produce radiators** (1948)
- **Production facilities:**
  - Total area =17,343 m^2;
  - Under roof area = 9.600 m^2
- **Location**: Brasov, Zizinului Street 113 A, ROMANIA
- **Employees**: 130
- **2022 turnover**: 5.4 mil €

- **Main business lines:**
  - **Heat exchangers** both for first endowment and as spare parts
  - **Cooling & heating systems** (integration of heat exchangers, motors, fans, metal enclosures and other components)
  - **Metal fabrications** (serial production of metal parts for OEM customers and tier I suppliers for automotive and agricultural equipment manufacturers)
  - **Thermal Modules (Heat Unit Interface)** Dedicated production and assembling line. More than 25,000 units produced
- **Certifications**:
  - ISO 9001:2015
  - DIN EN 15085-2
  - EN ISO 3834-2
  - SR EN ISO 14001:2015
  - SR ISO 45001:2018
  - Romanian Railway Supplier and Product Certifications (AFER)

Listed on the Bucharest Stock Exchange

Shareholders



Main shareholder:

Transilvania Investments Alliance (76.51%) is a Romanian self managed, closed-end equity fund, listed on the Romanian Stock Exchange, owning a share capital of €44 million and managing assets of € 300 million, consisting of stocks in about 230 Romanian companies
www.transilvaniainvestments.ro

OUR VISION

Become supplier of choice for OEMs and other technology-focused customers, in the areas of heat exchangers, metal fabrications and thermal modules.

OUR MISSION

Develop long-lasting partnerships with our customers, by consistently ensuring quick project implementation, short lead times, excellent quality and competitive prices.

OUR STRATEGY

Focus on those projects where our skills and capabilities can add significant value to the customer, so that long-lasting and mutually beneficial relationships can be developed.
Leverage our engineering skills and flexible production equipment to ensure a competitive cost base and short lead times for small and medium-volume production quantities.
Evolve: Continuously enhance and update our management skills, technical skills and technology portfolio in order to provide innovative and efficient solutions for our customers needs.

OUR KEY STRENGHTS

- **Proven capabilities & experience in developing and assimilating complex, customized projects** (product & tooling design, integration of 3rd party components, prototyping & testing, validation, serial production)

- **Flexible production technology** ensuring **short lead times** and **a competitive cost base** for **small and medium production batches**

- **In-house tooling design and execution** (stamping molds, bending tools, jigs & fixtures)
- **In-depth knowledge and experience with automotive & related industries QM core tools.** Our management systems are certified in accordance with ISO 9001:2015, DIN EN 15085-2, EN ISO 3834-2, SR EN ISO 14001:2015 ,SR ISO 45001:2018, Romanian Railway Supplier and Product Certifications (AFER)
- **Broad portfolio of constructive solutions, processing methods and materials** – allowing us to meet even the highest technical requirements for heat exchangers and metal fabrications
- **Dedicated logistics, supply, sales and design departments, which will identify the need and translate it into a product**
- **International experience** – we export over 80% of our products inside and outside of the EU market.

OUR CAPABILITIES

✓DESIGN/ASSIMILATION AND PRODUCTION OF METAL PARTS

ROMRADIATOARE has proven abilities to assimilate and successfully manage a broad portfolio of metal parts ranging from simple parts to complex assemblies.

Our ISO 9001:2015 certified metal fabrications process ensures consistent on-time, on-cost and on-quality deliveries to our partners.

Our ERP production control software contributes to the successful management of each customer's product portfolio (up to over 200 different PNs/customer/month), through all the steps of the process - from quote to execution drawings, machine programming, order processing, production, assembly, returnable & non-returnable packing and shipment.

- ✓ **Our standard materials include**: steel, stainless steel, galvanized steel, aluminum, brass.
- ✓ **Our production capabilities include**: laser cutting, punching, press brake forming, hydraulic/mechanic pressing, MIG/MAG & TIG/WIG welding, spot welding, fastners stud welding, open flame welding, precision machining, powder painting, assembly, packaging.
- ✓ **Outsourced finishing treatments**: e-coating, anodizing, zinc plating (audited and validated suppliers and processes).
- ✓ **Our product portfolio includes**: tractors and other agricultural machinery components, truck components, brackets and other car safety belt components, hydraulic & pneumatic tanks, windshield replacement parts, various machined parts, enclosures for home appliances and electrical equipment.

OUR PORTFOLIO

ROMRADIATOARE 95 YRS 1926 2021

✓ MAIN CUSTOMERS

AGCO Your Agriculture Company

VOLVO

V B.S.A.

SOFTRONIC

Haulotte

LINDENBERG ANLAGEN

Autoliv

RENAULT TRUCKS

VERMOREL

Průmyslové výměníky s.r.o.

RONERA RUBBER
POWER THROUGH ELASTICITY

Pneumatis

EXPRESS SERVICE

IPE LOCOMOTORI srl 2000

SC SANTIERUL NAVAL ORȘOVA SA

DB Cargo

GFR GRUP FEROVIAR ROMÂN
member of Grampet Group

OUR CAPABILITIES

✓MAIN MACHINERY FOR METAL FABRICATION

CUTTING & PUNCHING:
- ✓ 2 x Laser cutting machines – thickness up to 15mm
- ✓ 2 x Punch press
- ✓ Tubes & bars cutting machines

FORMING:
- ✓ Mechanic & hydraulic presses (up to 250 tones)
- ✓ 3 x CNC press brakes
- ✓ Cnc Tube bending machines

OUR CAPABILITIES

✓MAIN MACHINERY FOR METAL FABRICATION

MACHINING:
- ✓ 2 x CNC Lathe
- ✓ CNC Universal Machining Centre (milling)
- ✓ Drilling & Flow drill (Thermal Friction Drilling)

WELDING:
- ✓ MIG/MAG
- ✓ TIG/WIG
- ✓ Spot welding
- ✓ Fastners stud welding
- ✓ Open flame welding

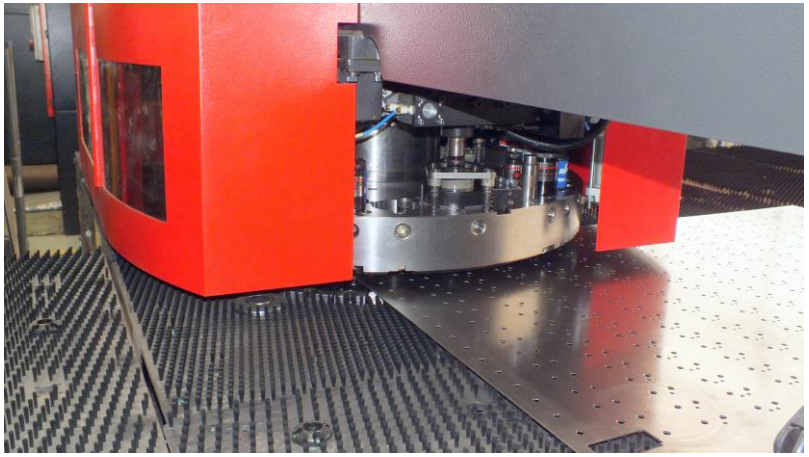
MECHANICAL ASSEMBLY

SURFACE TREATMENTS:
- ✓ **In-house powder painting line**
- ✓ E-coating (outsourced)
- ✓ Zinc plating (outsourced)
- ✓ Other surface treatments upon specific request

OUR CAPABILITIES

ROMRADIATOARE® 95YRS 1926 2021

✓MAIN MACHINERY FOR METAL FABRICATION



OUR CAPABILITIES

ROMRADIATOARE® 95 YRS 1926 2021

✓3D MEASUREMENT AND GAUGING TOOL

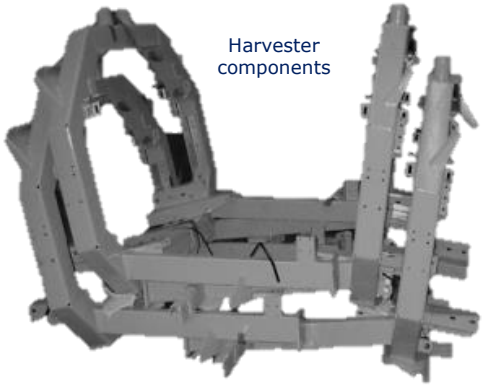
OUR PORTFOLIO

✓MAIN PRODUCT TYPES FOR METAL FABRICATION

Mechanically processed parts

Various metal parts for tractors

Harvester components



Windshield repair/replacement parts

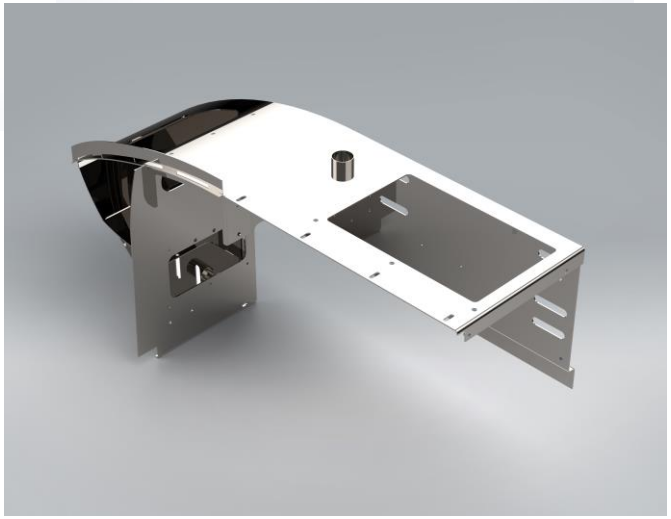
Metal enclosures

Sub-assemblies for right-of-way maintenance machinery

OUR PORTFOLIO

ROMRADIATOARE® 95YRS 1926 2021

✓METAL FABRICATION



OUR CAPABILITIES

✓ ENGINEERING

Our teams of skilled engineers with extensive production background oversee all areas of new project implementation, from design and choice of materials to testing, validation and serial production implementation.

The new product assimilation process relies on modern tools to optimize the "performance-quality-cost ratio":

- **SOLIDWORKS** - 3D design, product modeling, performance simulation
- **SOLIDCAM** - CNC post-processing software
- **UNILAB Radiator Suite**
- **UNILAB Coils, Easy Coil**
- **FEATURE CAM**
- **ISO specific QM Core Tools**: SPC, MSA, APQP, PPAP, FMEA
- **METALIX**

Other capabilities:
- In-house tooling design & execution;
- Vibration test bench; hydraulic test bench

✓ SOURCING & MATERIALS CONTROL

Our standard processed materials include copper, brass, aluminum, steel, stainless steel and galvanized steel, all sourced from our reliable European supplier base, subjected to periodical review and approval. We also have a **strong partner base** for key components such as fans, electrical motors, controls, valves, gaskets or special fasteners.

The materials sourced are subjected to dimensional, mechanical and chemical composition tests, in our own laboratory, equipped with: spectrometer, traction-compression machine, microscope, deep drawing coefficient measuring device as well as usual dimensional measurement tools.
Material certifications are available upon request.

OUR CAPABILITIES

✓DESIGN AND PRODUCTION OF HEAT EXCHANGERS

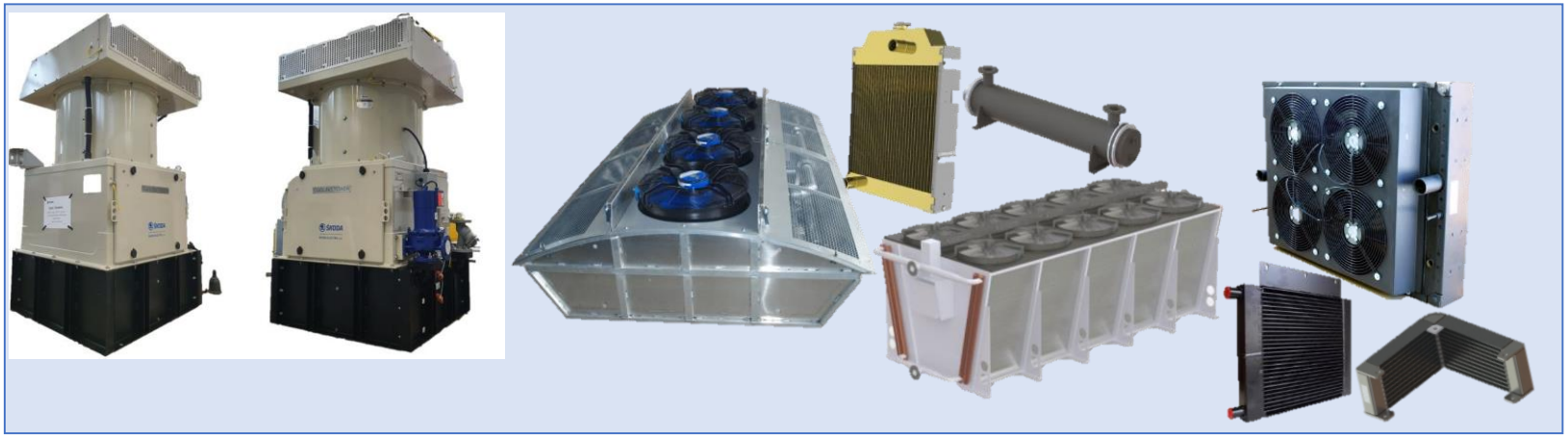
The broad range of constructive solutions and processing technologies available in the same location allows us to "mix & match" in order to optimize the design of heat exchangers and cooling/heating systems, and tailor them to the specific requirements of our customers.

Constructive solutions available: tube & fin, plate & bar, expanded tube & fin coils, welded tubes, extruded tubes, shell & tube, finned tubes.

Range of materials used: aluminum, brass, copper, steel, stainless steel.

Main machinery available:

- Fin & turbulator forming machines
- Headerplates stamping presses
- Tube forming
- CAB Brazing furnace
- Soldering owen
- Tube expanding machines
- Brazing & soldering equipment
- Hydraulic pressure testing equipment



OUR CAPABILITIES

✓DESIGN AND PRODUCTION OF HEAT EXCHANGERS

- **Heat pipe heat exchanger (HPHX), Heat pipes.**

Overview

In general the applications come within a number of broad groups, each of which describes a property of the heat pipe. These groups are [5]:

- Separation of heat source and sink
- Temperature flattening
- Heat flux transformation
- Temperature control
- Thermal diodes and switches

Application example: Multi-stage heat-pipe heat exchanger for improving the energy efficiency of the HVAC system in a hospital operating room

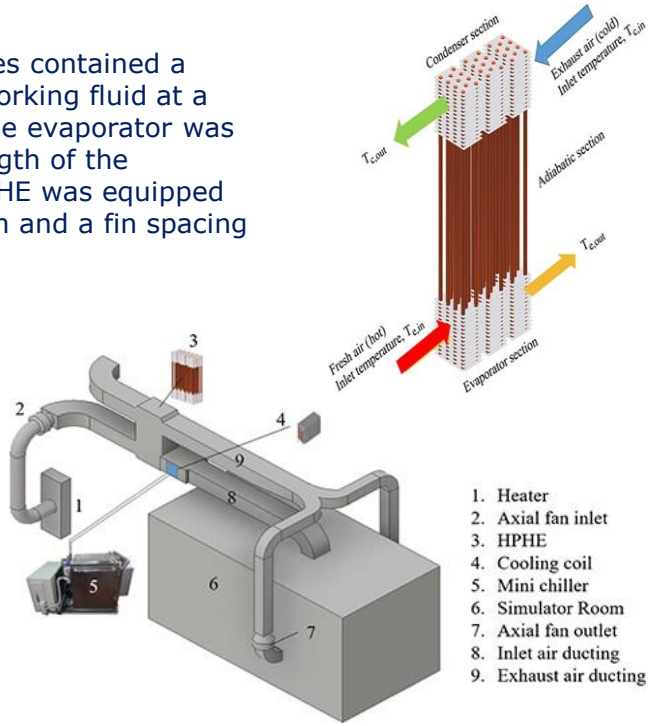
Figure 1 HPHE design.

The heat-pipe tubes were made of copper, and the inner surface of the tubes contained a wick structure of sintered copper. The tubes were filled with water as the working fluid at a filling ratio of 50%. The outer diameter of the heat pipe was 10 mm, and the evaporator was 160 mm long. The length of the adiabatic section was 360 mm, and the length of the condenser section was 190 mm. To enhance the heat-transfer area, the HPHE was equipped with a continuous wavy fin made of aluminum with a thickness of 0.105 mm and a fin spacing of 2 mm, as shown in Figure 1.

Figure 2 Experimental test model.

HPHE design.

The experimental test model was equipped with system control and a measurement device, as shown in Figure 2. The heat input involved a 4000-W heater equipped with a proportional–integral–derivative temperature controller that was placed before the axial fan inlet to customize the fresh-air inlet temperature in the evaporator section. The mini-chiller device consisted of a circulating thermostatic bath, a cooling coil and a pump with a flow meter, which was used to deliver chilled water through the cooling coil that was mounted in the ducts of the air-handling unit.



Int J Low-Carbon Tech, Volume 16, Issue 2, May 2021, Pages 259–267, https://doi.org/10.1093/ijlct/ctaa048

AN OVERVIEW OF THE HEAT PIPE TECHNOLOGY

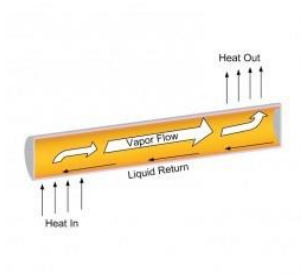


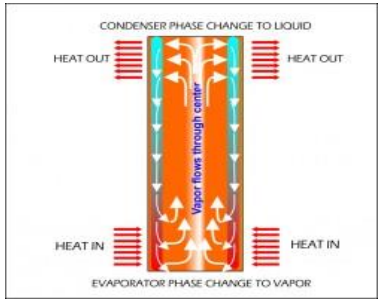
Figure 1. Illustration of Heat Pipe operation.

A heat pipe is a two phase heat transfer device with a very high effective thermal conductivity. It is a vacuum tight device consisting of an envelope, a working fluid, and a wick structure. As shown in Figure 1, the heat input vaporizes the liquid working fluid inside the wick in the evaporator section. The saturated vapor, carrying the latent heat of vaporization, flows towards the colder condenser section. In the condenser, the vapor condenses and gives up its latent heat. The condensed liquid returns to the evaporator through the wick structure by capillary action. The phase change processes and two-phase flow circulation continue as long as the temperature gradient between the evaporator and condenser are maintained.

BENEFITS OF THESE DEVICES INCLUDE:

- High Thermal Conductivity (10,000 to 100,000 W/m K)
- Isothermal
- Passive
- Low Cost
- Shock/Vibration tolerant
- Freeze/thaw tolerant

AIR-TO-AIR HEAT PIPE HEAT AND GAS-TO-LIQUID HEAT PIPE HEAT EXCHANGERS UTILIZE HIGH PERFORMANCE HEAT PIPES

- 

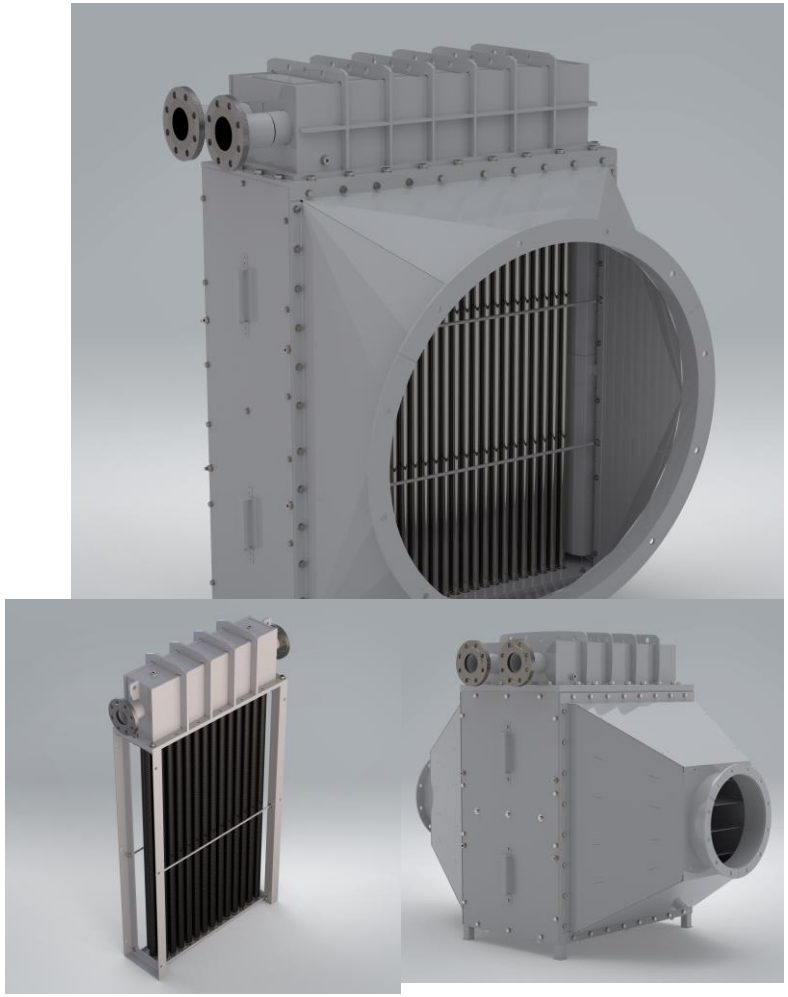
- Heat pipes function by absorbing heat at the evaporator end of the cylinder, boiling and converting the fluid to vapor. The vapor travels to the condenser end, rejects the heat, and condenses to liquid. The condensed liquid flows back to the evaporator, aided by gravity. This phase change cycle continues as long as there is heat (warm outside air) at the evaporator end of the heat pipe. This process occurs passively (no external electrical energy required).

Source:: https://www.1-act.com/resources/heat-pipe-resources/

Heat Pipe Heat Exchanger

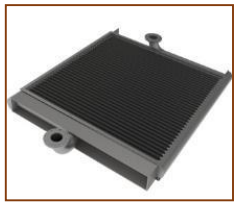
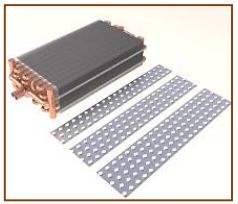
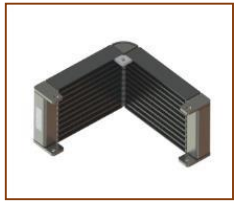
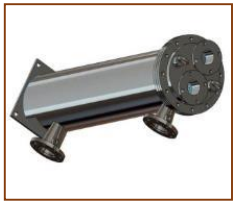
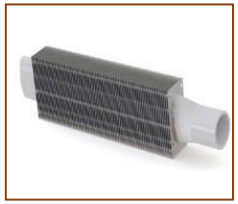
There are a large number of techniques for recovering heat from exhaust air or gas streams or from hot water streams. Features of heat pipe heat exchangers that are attractive in industrial heat recovery applications are:

- No moving parts and no external power requirements, implying high reliability.
- Cross-contamination is totally eliminated because of a solid wall between the hot and cold fluid streams. Easy to clean.
- A wide variety of sizes are available, and the unit is in general compact and suitable for all.
- The heat pipe heat exchanger is fully reversible—i.e., heat can be transferred in either direction.
- Collection of condensate in the exhaust gases can be arranged, and the flexibility accruing to the use of a number of different fin spacing can permit easy cleaning if required.



OUR CAPABILITIES

✓CONSTRUCTIVE SOLUTIONS AVAILABLE FOR HEAT EXCHANGERS

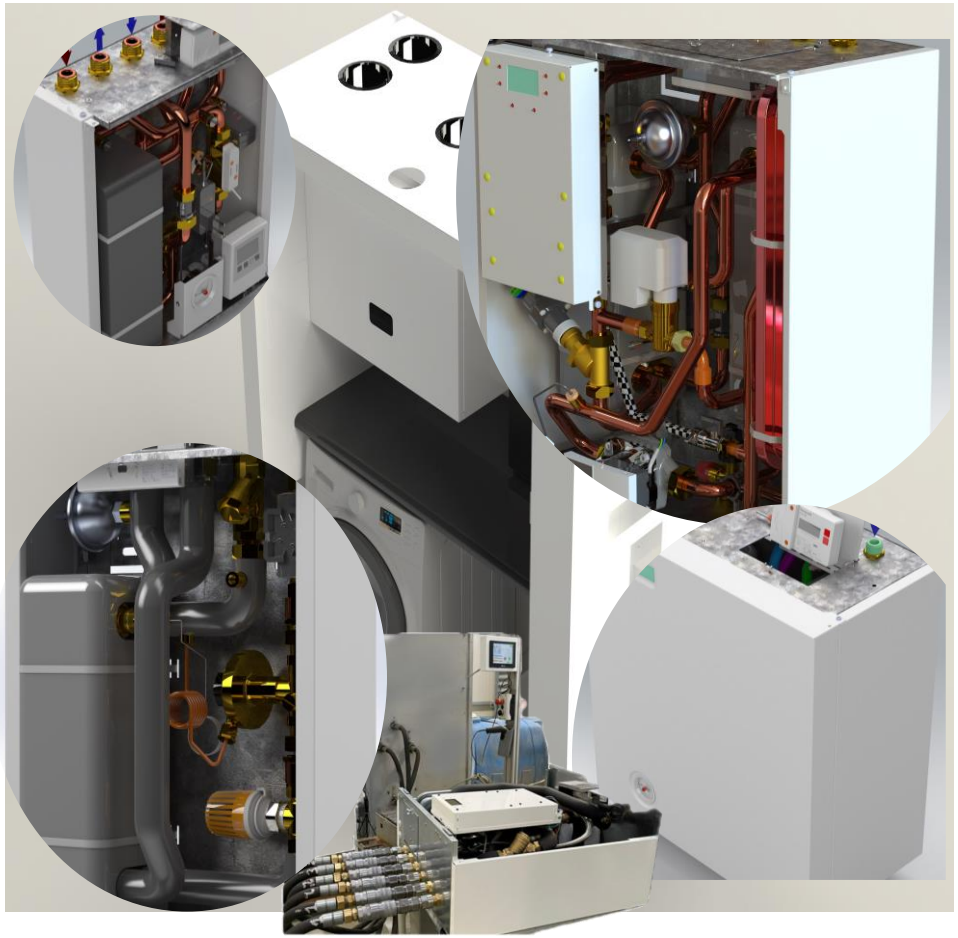
Tube & Fin			
Plate & Bar			
Shell & Tube			
Finned tube			

✓BRAZED ALUMINUM HEAT EXCHANGERS

ROMRADIATOARE produces brazed aluminum heat exchangers using the NOCOLOK CAB (controlled atmosphere) brazing technology, which is the preferred process for manufacturing aluminum heat exchangers.

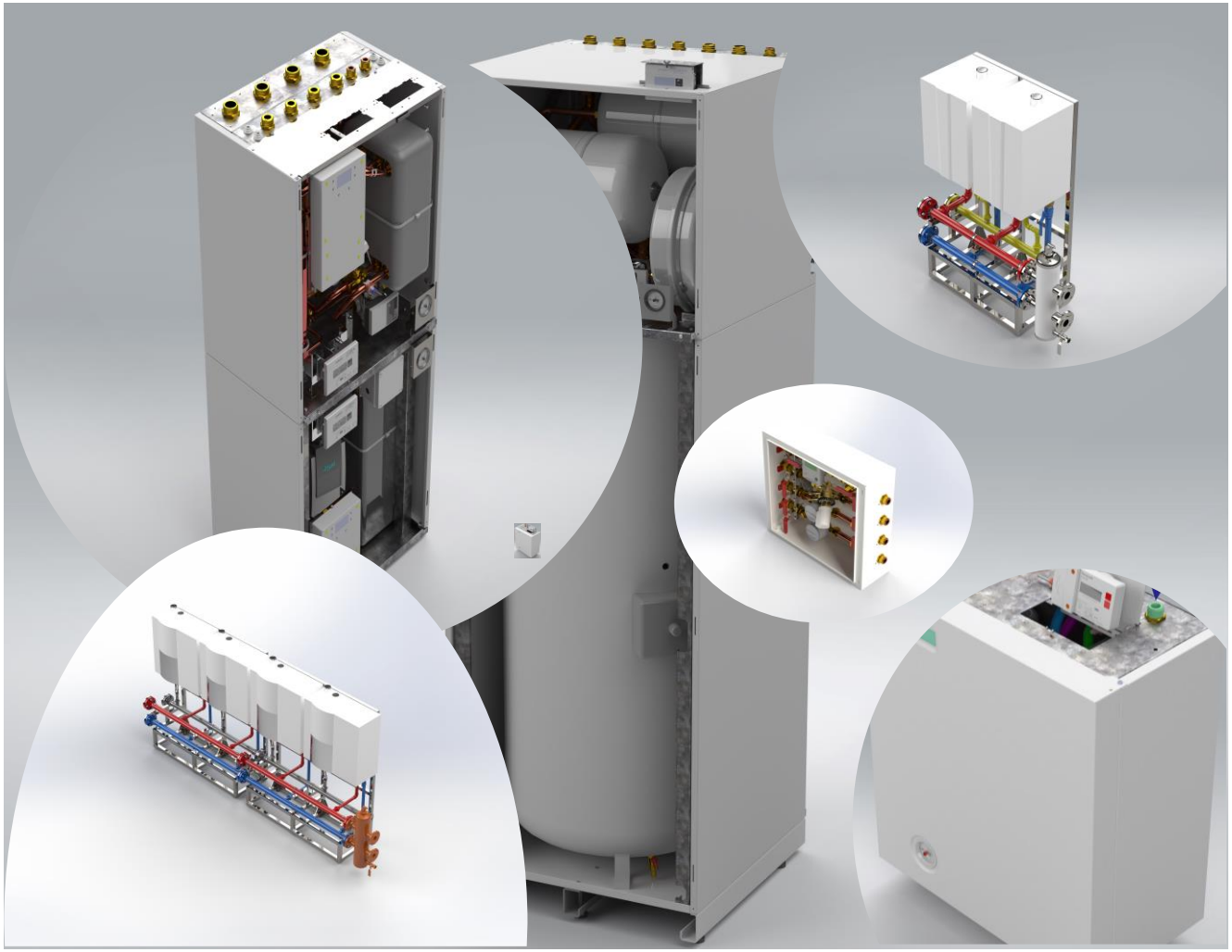
Our portfolio of brazed heat exchangers includes radiators, condensers, oil coolers, intercoolers, combi-coolers, cooling assemblies both for first endowment (OEM) and for spare parts (OES), which are currently used in applications such as:

- Naval gen sets
- Hydraulic systems
- Stationary engines
- Automotive
- Heavy duty vehicles
- Industrial vehicles
- Agricultural vehicles
- Military vehicles
- Construction machinery
- Railway vehicles
- Compressors



- **A Heating Interface Unit (HIU)** is a device used to control the flow and distribution of hot water in central heating systems. Its main function is to regulate the temperature and pressure of hot water supplied to individual units or rooms in a building, such as apartments or condominiums. An HIU typically includes components such as a heat exchanger, control valves, temperature sensors, and a control system. It can also be equipped with measurement and monitoring devices to track the flow and consumption of hot water. HIUs are designed to be compact, efficient, and reliable, and are often used in multi-dwelling buildings to provide individual heating control for each unit.
- **Dedicated** production and assembly line, specialized machinery designed and fabricated by our company
- **Dedicated** product and technology design team
- **Dedicated** sourcing and logistics team
- **Full traceability procedure**
- Project initiated 2012, serial production kick-off: June 2013
- To date:
    - **over 80 product types designed and assimilated, with over 110 derivatives**:
        - Heating units only, without storage
        - Heating units only, with storage
        - Cooling units only
        - Combined heating and cooling units
    - **Over 100 individual components** / unit
    - Components integrated from over 15 main supply partners worldwide
    - **Over 25.000 units built and delivered**

ROMRADIATOARE



OUR CAPABILITIES

✓ERP CLARVISION

We are using **ERP Clarvision** software for anything and everything related to: aquisitions, logistics, stock management, production planning, production, cost control, accounting, human resources, payroll.

DEVELOPMENT

✓LEAN IMPLEMENTATION

At the beginning of 2017 we have started the implementation of Lean Management & Lean Manufacturing system with the heat interface units assembly line, with excellent results.

Based on this success, we are continuing Lean implementation in the remaining business production units: metal fabrication and heat exchangers.

CERTIFICATIONS


CERTIFICATE

dqs

Romradiatoare SA

ISO 9001 : 2015


IQNET

Building trust together

Certificate

ROMRADIATOARE SA

ISO 14001 : 2015

Registration Number: RO – 3123


IQNET

Building trust together

Certificate

ROMRADIATOARE SA

ISO 45001 : 2018

Registration Number: RO – 3464


ROMÂNIA

MINISTERUL TRANSPORTURILOR ȘI INFRASTRUCTURII

AUTORITATEA FEROVIARĂ ROMÂNĂ-AFER

AUTORIZAȚIE DE FURNIZOR FEROVIAR

seria AF nr. 8904


CERTIFICAT DE CONFORMITATE

CERTIFICATE OF CONFORMITY

NR. 4601


LICENȚĂ/AUTORIZAȚIE

LICENCE/AUTHORIZATION

NR. 4601

ISO 9001:2015 issued by DQS – recognized by IQNET

DIN EN 15085-2 issued by TUV

EN ISO 3834-2 issued by TUV

SR EN ISO 14001:2015 issued by SRAC - recognized by IQNET

SR ISO 45001:2018 issued by SRAC

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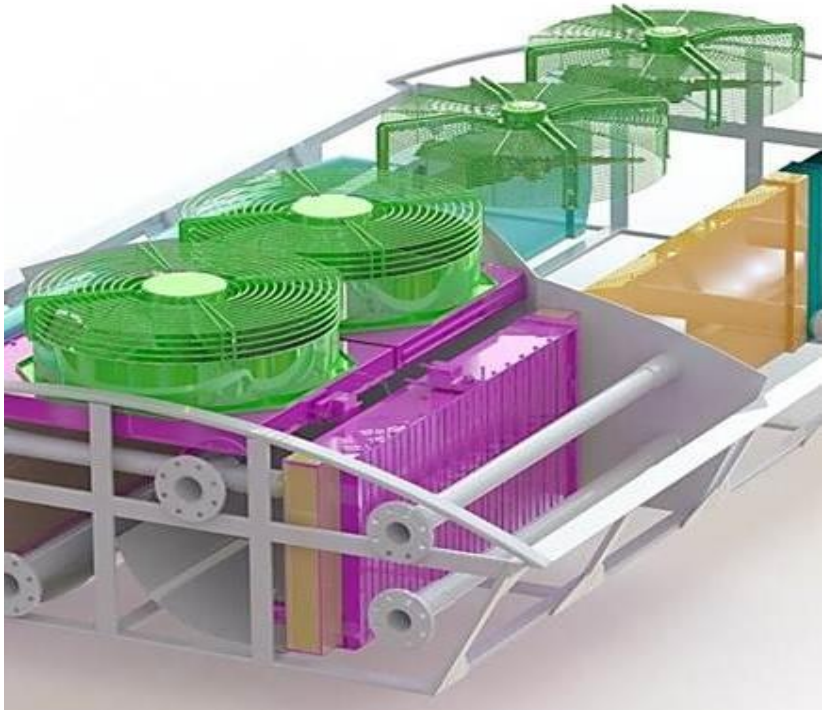

ROMRADIATOARE S.A.
113 A Zizinului Street 500407 – Brașov, Romania
Tel: 0040-268-317550 / 0040-268-313500
Fax: 0040-268-317500 / 0040-268-317600
E-mail: romradiatoare@romradiatoare.com

www.linkedin.com- Romradiatoare-Brasov
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