



RAILWAY SEGMENT COOLING SYSTEMS

2ND EDITION

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A BIT OF HISTORY...

IN 1927, R. BLOKSMA SENIOR FOUNDED THE NEDERLANDSE RADIATEUREN FABRIEK IN AMSTERDAM. ORIGINALLY, DIRECTED TOWARDS THE REPAIR OF RADIATORS, NRF LATER STARTED ITS OWN PRODUCTION DEPARTMENT. SINCE THEN NRF HAS BEEN A KEY PLAYER IN THE AUTOMOTIVE, MARINE, INDUSTRIAL AND RAIL MARKET.

A MULTINATIONAL COMPANY

NRF is located in multiple countries for your convenience. You can reach us at your most convenient location.

 **THE NETHERLANDS:** Copper brass, cooling unit and marine box cooler production; customer service, validation lab, and wind tunnel.

 **SPAIN:** Copper brass and cooling unit production, Tech Center, and customer service.

 **POLAND:** Aluminium production, cooling unit production, and customer service.

 **FRANCE:** Customer service

 **ITALY:** Customer service

 **GERMANY:** Customer service



OVERVIEW OF OUR FACTORIES

FACTORY IN POLAND

LOCATION	Gdansk, Poland
M ²	4.100 m ²
PRODUCTION	Aluminium Bar and Plate cores for water, oil and air. Aluminium Multigallery tube cores (MGT).
CERTIFICATION	EN-ISO 9001 EN-ISO 14001 EN-ISO 3834-2 EN 15085 (CL1)



FACTORY IN GRANADA

LOCATION	Granada, Spain
M ²	6.000 m ²
PRODUCTION	Copper brass radiators. Aluminium parts. Remanufacturing department.
CERTIFICATION	EN-ISO 9001 EN-ISO 14001 EN 15085 (CL1)



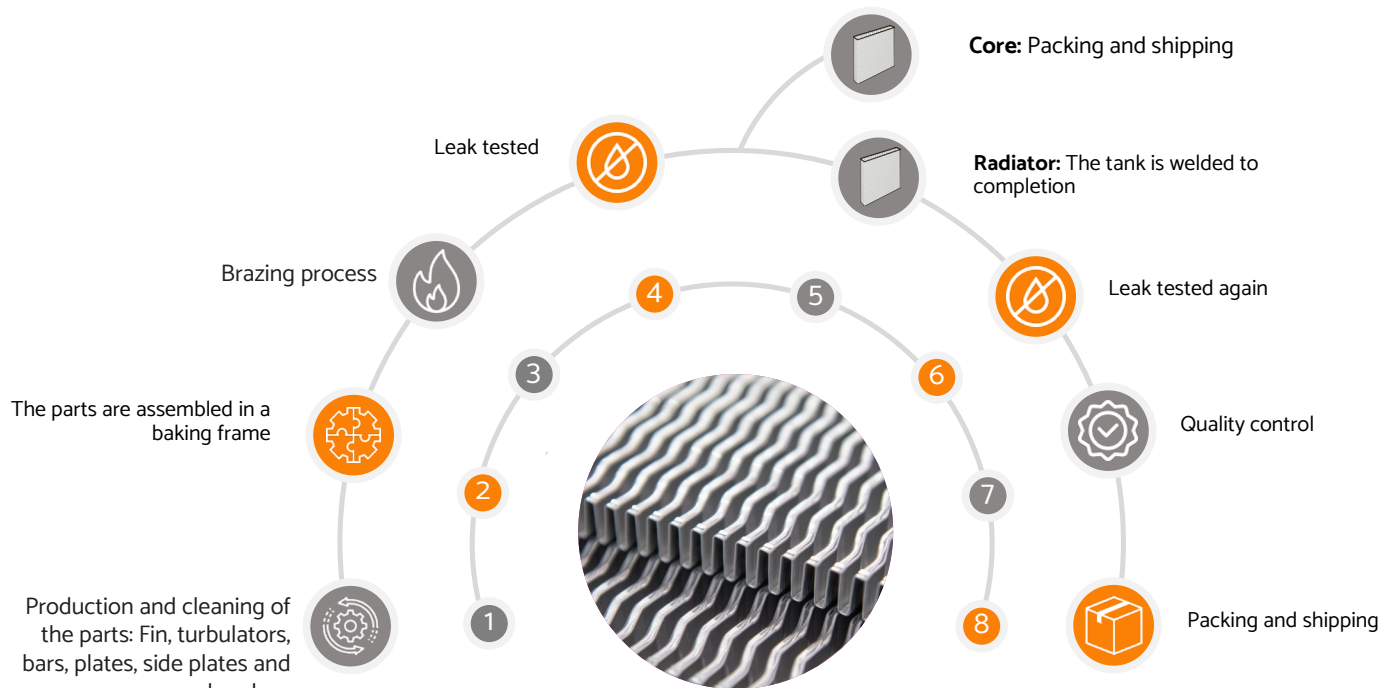
FACTORY IN THE NETHERLANDS

LOCATION	Mill, The Netherlands
M ²	10.000 m ²
PRODUCTION	Copper brass radiators. Marine box coolers. Remanufacturing department.
CERTIFICATION	EN-ISO 9001 EN-ISO 14001 EN 15085 (CL2)



OUR PRODUCTION PROCESS

OUR ALUMINIUM PRODUCTION



OUR COPPER PRODUCTION



RECORING & REMANUFACTURING SERVICES

Cooling systems can undergo comprehensive maintenance, extending their lifespan significantly. NRF offers complete maintenance and repair services for aluminium and copper brass radiators, allowing these cores to be rejuvenated and remain functional for longer periods. T

An additional benefit of our maintenance services is their contribution to environmental sustainability. Through the process of recoring, coolers receive a second life; the cooling section is replaced while other parts are reused. This practice not only extends the life of the equipment but also reduces waste and promotes the reuse of materials, aligning with our commitment to sustainable practices.

RECORING OR REMANUFACTURING?



Does the unit meet your thermal requirements?

Yes, it has been meeting them

What is the condition of your tanks?

Tanks are in good shape, but the core isn't

Tanks and core are in bad shape

RECORING

REMANUFACTURING

No, it hasn't been meeting them

A thermal calculation is made to select the best fin/turbulator combination to meet thermal performance

What is the condition of your tanks?

Tanks are in bad shape

Tanks are in good shape

RECORING

RECORDING

ADVANTAGES

- ✓ Fast availability of a fully functional cooler according to the original part.
- ✓ Price and time advantage because of re-use of the existing tanks and spare parts.
- ✓ Environment friendly recycling process.

CLEANING AND TESTING

- ✓ Heat Exchanger Cleaning
- ✓ Pressure Testing
- ✓ Minor Repairs

COOLING CORE REPLACEMENT

- ✓ Necessary in cases of major defects or leaks
- ✓ Complete replacement of the cooler core
- ✓ Perfect fit thanks to in-house production
- ✓ Wide range of cooling systems for water, oil, and air coolers
- ✓ Welding according to NEN/DINEN15085-2 standards

CUSTOMER ADVANTAGE

- ✓ Quick availability of a fully functional and pristine cooler
- ✓ 12 months warranty
- ✓ Significant cost advantage due to the reuse of existing tanks
- ✓ Environmentally friendly recycling process



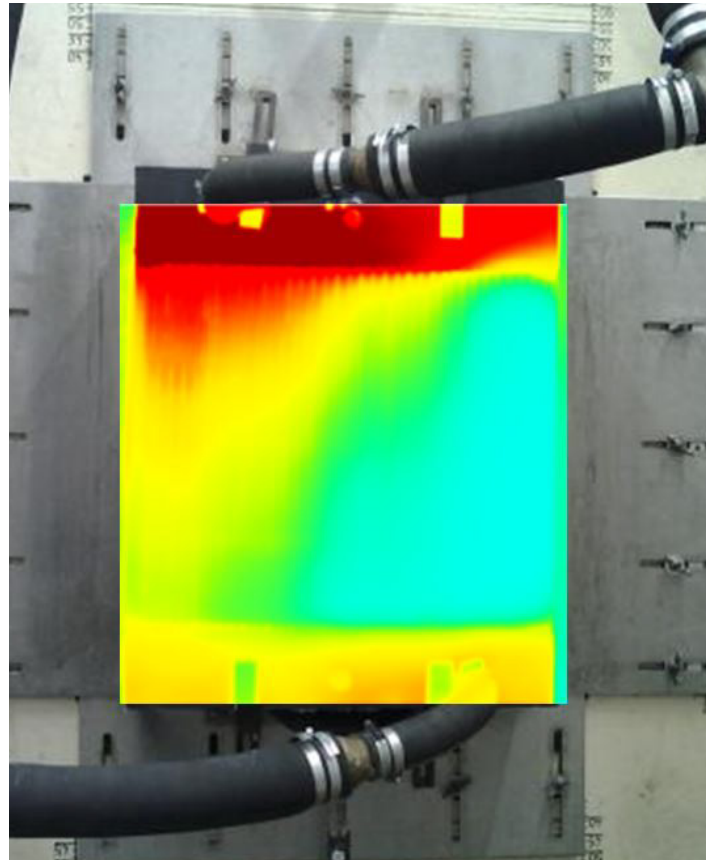
REMANUFACTURING

WHEN IS IT NEEDED?

- ✓ Necessary with larger defects or leakages.
- ✓ Complete cooler core replacement.
- ✓ Perfect fit because of in-house production.
- ✓ Large range of cooling systems for water, oil and air coolers.
- ✓ Welding done according EN 15085 (CL1)

ADVANTAGES

- ✓ Fast availability of a fully functional cooler in perfect shape.
- ✓ 12 months guaranteed.

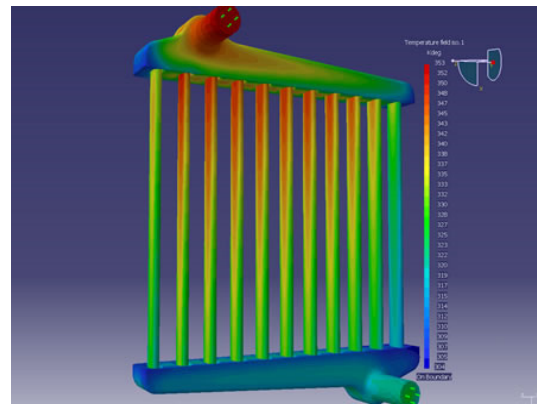
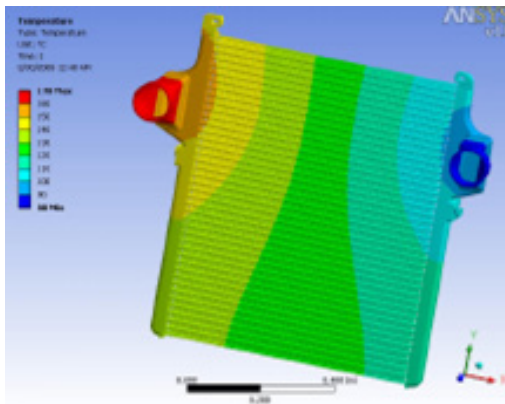


OE PRODUCT DEVELOPMENT

ELECTRIC, HYBRID OR FOSSIL ENERGY BASED

PRODUCT DEVELOPMENT RESEARCH & DESIGN

- ✓ Full concept development from customers specs to final 3D design & drawings.
- ✓ NRF Proprietary Thermal & Mechanical Calculation Software to select the best option in terms of thermal performance (high heat dissipation & low pressure drop).
- ✓ Siemens NX software for design & mechanical simulations.
- ✓ Computational Fluid Dynamics (CFD) & Finite Element Analysis (FEA) to simulate the heat distribution & ensure mechanical resistance acc. to the Regulatory Framework that applies (i.e., shock & vibration or pressure resistance acc. PED/PD5500 or ASME VIII).
- ✓ Company certified for designing & manufacturing of railway components according to EN 15085.



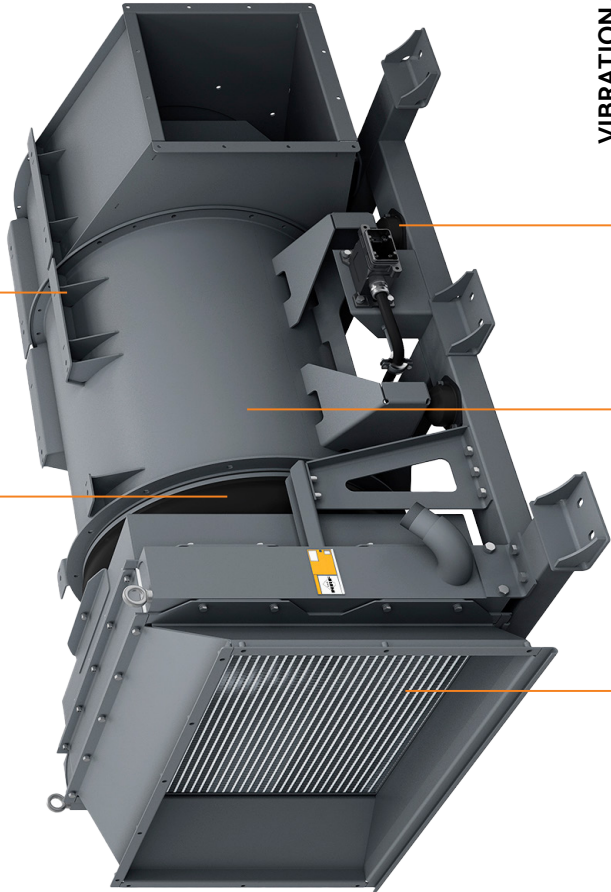
EMU COOLING UNIT

Roof mounted cooling system that can be adapted to cool different vehicles.



COMPENSATOR

MOUNTING BRACKET FOR WALKABLE AREA



B&P RADIATORS

Cooler is a 114mm depth B&P
Heat dissipation 28 kW

VIBRATION & SHOCK ABSORBERS

AXIAL FAN

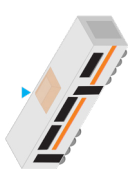
7,5 kW MOTOR SELECTED BASED ON 1500(PA) AIR PRESSURE DROP

ADVANTAGES:

✓	Aluminium based frame for weight reduction
✓	CL1 certification
✓	In-house manufacturing
✓	Adaptable to specific coating requirements
✓	FEA and Fatigue Analysis Simulations based on railway norms

CERTIFICATIONS:

FIRE PROTECTION	EN 45545
DESIGN AND PRODUCTION	EN 15085 (CL1)



ROOF MOUNTED UNIT

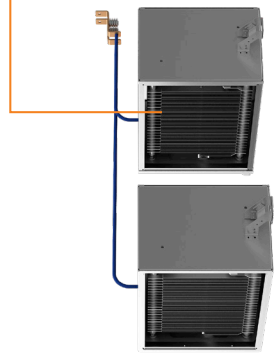
TRAM COOLING UNIT

The tram cooling unit is one of our most recent and advanced developments.



WATER COOLER/ RADIATOR

Aluminium material for weight reduction.
Core on site manufacturing with full testing capabilities.
Adaptable tanks according to customer's fixing points.
Wide range of Fins and Turbulators.

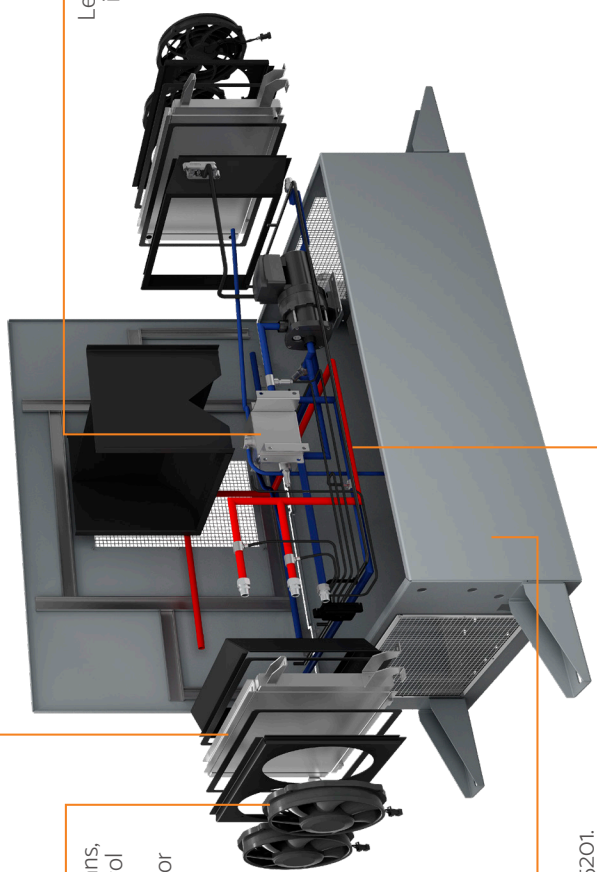


BRAKE RESISTOR UNIT

High efficiency Brake Resistor, adaptable to customer space.
Connections on the side of the box.
Acc. to norm IEC 60322.

FAN AND FAN COWL

Light weight solution for fans, with variable velocity control through the control unit.
Easy disassembly system for cleaning and maintenance operations.



EXPANSION TANK

Level sensor included and integrated in the control system.

PIPING SYSTEM

Rigid Stainless-Steel pipes combined with flexible hoses to avoid any vibration issues.
Pressure and temperature sensors included and integrated in the control system.

BOX

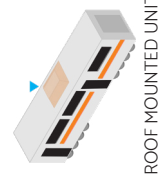
Welding acc EN 15085.
Fixing elements acc. EN 25201.
Full adaptability to customer fixing system.
Easy open lid system for maintenance operations.
Aluminium frame and external plates designed for weight optimization of the system.
Flexible position to adapt to hydraulic and electrical customer interfaces.

ADVANTAGES:

✓	Light weight
✓	Modular design
✓	Condition base monitoring ready
✓	Low energy consumption
✓	Accoustic test (fitted to customer requirements)
✓	Shock and vibration test

CERTIFICATIONS:

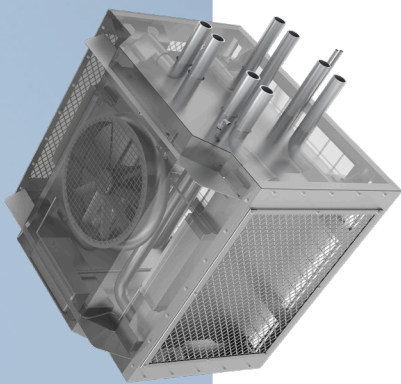
FIRE PROTECTION	EN 45545
DESIGN AND PRODUCTION	EN 15085 (CL1)
SHOCK AND VIBRATION	EN 61373



ROOF MOUNTED UNIT

SHUNTER COOLING UNIT

A cooling unit fitted specifically for your needs. Fully integrated on the engine room of the shunter locomotive.



FAN UNIT

Hydraulic fan motor.
Reduced package space.
The system uses a variable displacement pump.

EXPANSION TANK

Material (aluminium or stainless steel) and thickness according to pressure requirement.

CONTROL UNIT

Data logging from coolant temperature sensor as well as level sensor and air temperature sensor.

CHARGE AIR COOLER/OIL COOLER/ RADIATOR

Aluminium material for weight reduction.
Casted tanks to adapt the cooler to the customer space and interface.
Core on site manufacturing with fully tested capabilities.
Wide range of Fins & Turbulators available.

MESH

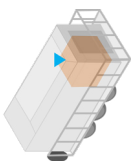
Possibility to incorporate a filter according to EN 45545.
Wire mesh with sheet metal frame.

ADVANTAGES:

✓	Light weight
✓	Modular design
✓	Condition base monitoring ready
✓	Data monitoring
✓	Low energy consumption
✓	Noise optimized

CERTIFICATIONS:

FIRE PROTECTION	EN 45545
DESIGN AND PRODUCTION	EN 15085 (CL1)



SIDE MOUNTED UNIT

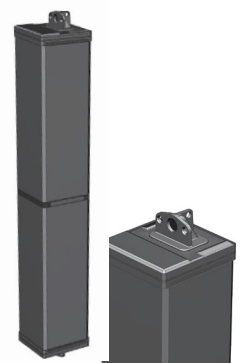
SECTION PART RADIATORS

For Shunters Diesel Locomotives.

- ✓ PRX cooling system with 11,18 or 9,66 Fins per Inch.
- ✓ Coolers come with bevelled edges for easy mounting and handling.
- ✓ Strong and stable Lockseam tube with 0,24mm tubewall.
- ✓ Ribbed fins for stability and better air turbulence > better cooling capacity.

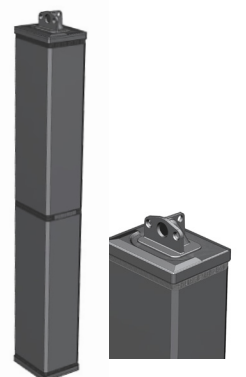
“773” 195X204 HEADER (CORE 197X200)

HEIGHT	OES NO.	SYSTEM	NO. ROWS	SUPPORT HEADER	MIDDLE HEADER	NRF CORE	NRF RAD
986	0,077,300,220	PRX 11,18	8	X		12029	532029
1086	0,077,300,240	PRX 11,18	8	X	X	12030	532030
1186	0,077,300,260	PRX 11,18	8	X	X	12002	532002
1286	0,077,300,280	PRX 11,18	8	X	X	12031	532031
1336	0,077,300,290	PRX 11,18	8	X	X	12032	532032



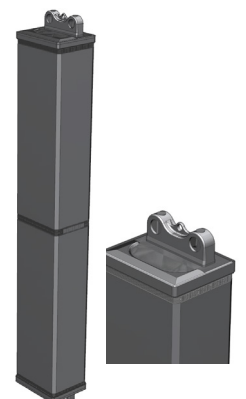
“783” 195X154 HEADER (CORE 197X150)

HEIGHT	OES NO.	SYSTEM	NO. ROWS	SUPPORT HEADER	MIDDLE HEADER	NRF CORE	NRF RAD
936	0,078,300,215	PRX 11,18	6	X	X	12006	532006
1186	0,078,300,265	PRX 11,18	6	X	X	12012	532012
1236	0,078,300,275	PRX 11,18	6	X	X	12004	532004
1286	00.783.0D.285	PRX 11,18	6	X	X	12005	532005
2286	0,078,300,485	PRX 11,18	6	X	X	12015	532015



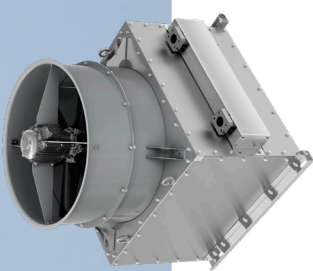
“798” 195X154 HEADER (CORE 197X150)

HEIGHT	OES NO.	SYSTEM	NO. ROWS	SUPPORT HEADER	MIDDLE HEADER	NRF CORE	NRF RAD
536	0,079,800,135	PRX 9,66	6			12024	
586	0,079,800,145	PRX 9,66	6			12025	
636	0,079,800,155	PRX 9,66	6	X		12026	
986	0,079,800,225	PRX 9,66	6	X		12027	
1086	0,079,800,245	PRX 9,66	6	X	X	12028	
1136	0,079,800,255	PRX 9,66	6	X	X	12013	532013
1336	0,079,800,295	PRX 9,66	6	X	X	12014	532014



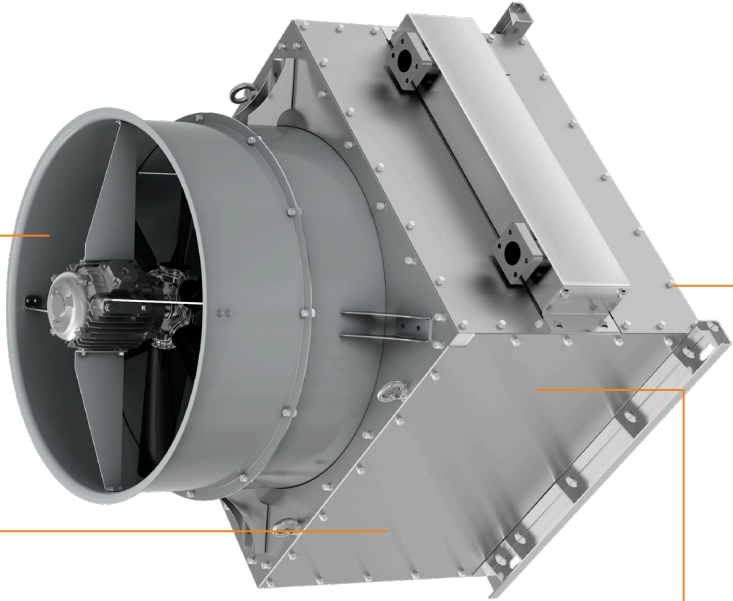
SIDE MOUNTED COOLING TOWER

Based on transformer and convertor specifications we can design a tailor-made cooling tower compatible with our single, double and/or tripple circuit radiators.



LIGHTWEIGHT FRAME

MOTOR SAFE BLADES



ALUMINIUM B&P RADIATOR

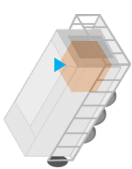
FLANGES

ADVANTAGES:

✓	Light weight
✓	Modular design
✓	Condition base monitoring ready
✓	Low energy consumption
✓	Acoustic test (fitted to customer requirements)
✓	Shock and vibration test

CERTIFICATIONS:

FIRE PROTECTION	EN 45545
DESIGN AND PRODUCTION	EN 15085 (CL1)
SHOCK AND VIBRATION	EN 61373



SIDE MOUNTED UNIT



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