

# LUFF-R

Heat Recovery Unit with Rotary



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### LUFF-R

#### LUFF-R 500/1000/1500 Heat Recovery Unit with Rotary

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#### General Terms and Conditions of Sale



The technical specifications and the performance data declared with this logo have been developed by the tests performed in Eneko Energy Laboratory which is established with the development Project support of Tübitak by regarding relevant standards.

### Supply and Exhaust Fan

Control unit is a control unit developed for controlling the heat recovery units and its complimentary accessories. It can be used to perform basic functions without control panel, or with Standard panels for more functionality. Moreover, the control unit can control all functions via ModBus and switch on/off via BMS as option. Standard and optional features of control unit can be found in Control Systems section.

### Casing & Insulation

The unit's casing is made up of double skinned high corrosion resistive 200 gr/m<sup>2</sup> galvanize coated steel. 30 mm thickness and 50kg/m<sup>3</sup> density of Rockwool insulation between the walls is used for thermal and sound insulation.

### Control System

Units are equipped with a microprocessor based control system to meet various design needs. Both electrically and electronically control hardware comes with the unit that's why the unit is "Plug and Play". With the use of optional, CO2 sensor or constant flow kit, fans regulate automatically according to user demand. Room control panel is supplied where no BMS protocol is demanded. The panel is BMS compatible and can handle various communication protocols like Modbus and Bacnet. Control System is also capable of controlling heating/cooling capacity when units are used with heating/cooling coils.

### Supply and Exhaust Air Filter

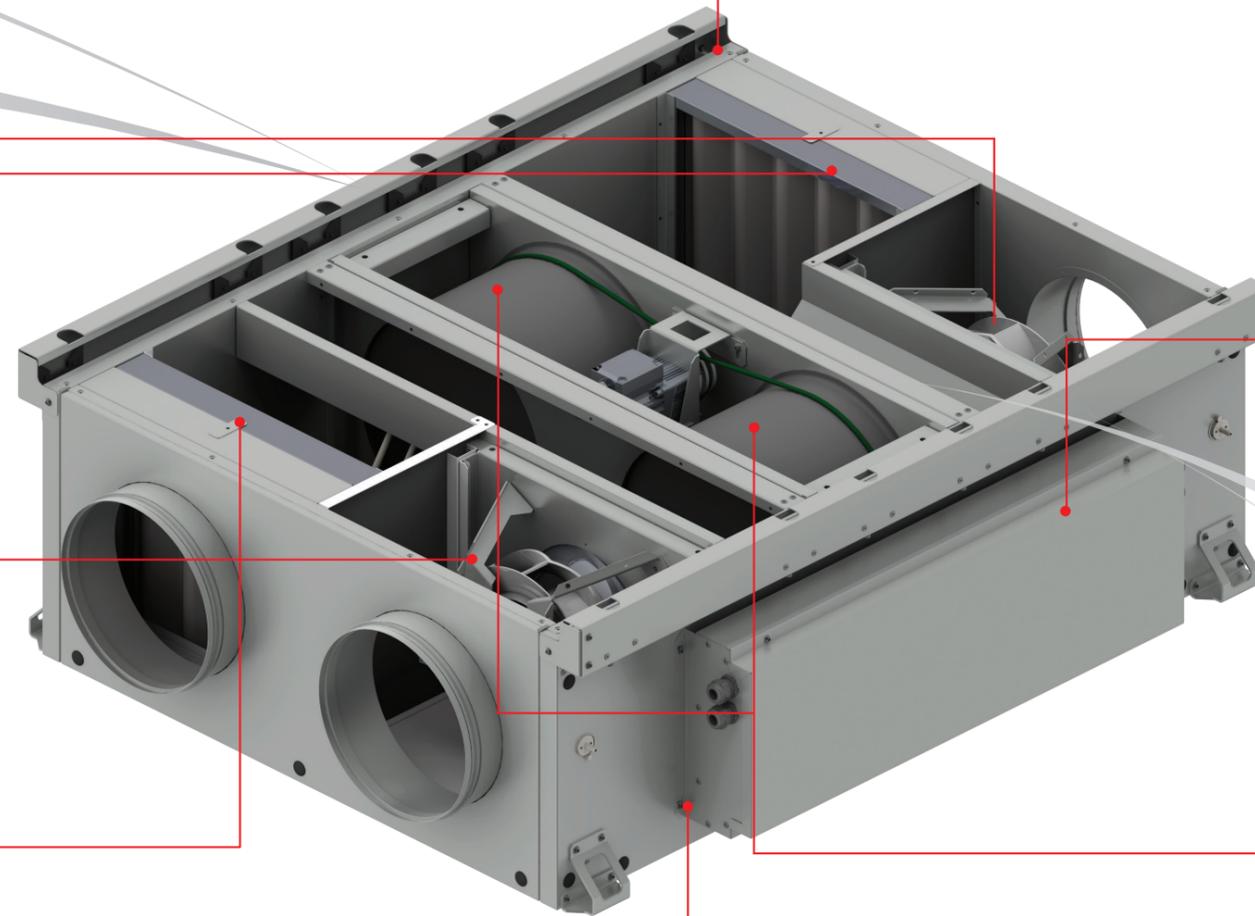
To improve indoor air quality and protect the internal components, ISO ePM1 >50% (F7) and ISO ePM10 >50% (M5) class filters (according to ISO 16890 standard) are used in the supply and exhaust airflows, respectively. As option, pre-filters with ISO Coarse 45% (G4) or ISO ePM10 >50% (M5) filters can be placed in the unit. Additionally, ISO ePM1 >80% (F9) class filters can also be integrated into the unit.

### Service Area

All service doors are at the bottom surface of the unit and supported by a sliding rail mechanism. This structure allows fast, safe and ergonomic service and maintenance operations even in applications with limited headroom. Thanks to its compact design, maintenance efficiency is increased by providing maximum accessibility with minimum space.

### Rotary Heat Recovery

LUFF-R units have high efficient rotary heat recovery exchanger. The exchanger transfers sensible heat and moisture between supply and exhaust air. Thus, it is also possible to transfer latent heat. With the optimization of heat exchanger, temperature and humidity efficiency is increased, pressure drop is decreased. Optionally, condensation rotor can be used for sensible heat transfer and sorption rotor can be used for humidity transfer. By using the purge system, the risk of mixing with the fresh air side of the exhaust air is reduced.



Unit Type			LUFF-R 500	LUFF-R 1000	LUFF-R 1500
Manufacturer			ENEKO		
ERP			ERP 2018		
Heat Recovery Efficiency <sup>1</sup>	(%)		82	77	75
Nominal Air Flow Range <sup>1</sup>	(m <sup>3</sup> /h)		400	700	900
Max. Air Flow Range	(m <sup>3</sup> /h)	(at 150 Pa)	460	940	1480
Max. Air Flow Range	(m <sup>3</sup> /h)	(at 0 Pa)	685	1090	1600
Nominal External Pressure	(Pa)		100	100	100
Unit Voltage	(V)		230	230	230
Key Points			1) Low Noise (due to 30 mm insulation) 2) Easy Service access 3) Compact structure - fit in small areas 4) It can operate without the need for a preheater at outdoor air temperatures down to -20 / -25 °C. 5) Provides high efficiency for applications with low airflow requirements.		
Fan			EC Fan		
Fan Material			Composite		
Heat Recovery Type			Sorption Rotor		
Installation			For indoor use only		
Installation Version			Horizontal/Vertical		
Supply Air Filter			ISO Coarse 45% (G4)/ISO ePM1 >50% (F7)		
Exhaust Air Filter			ISO Coarse 45% (G4)/ISO ePM10 >50% (M5)		
Duct Connections			Round		
Duct Connections Version			Horizontal		
Casing Material			30 mm Double Wall galvanised metal		
Direction Version			-		
Service Access			All service access is provided from the bottom thanks to the sliding panel design		
Accessories			See accessories page		

<sup>1</sup> EN 308 condition (OA = 5°C & 72%, RA = 25°C & 28%).

## ■ Sound Performance Data

### Sound Pressure Levels (1,5 m) (dBA)

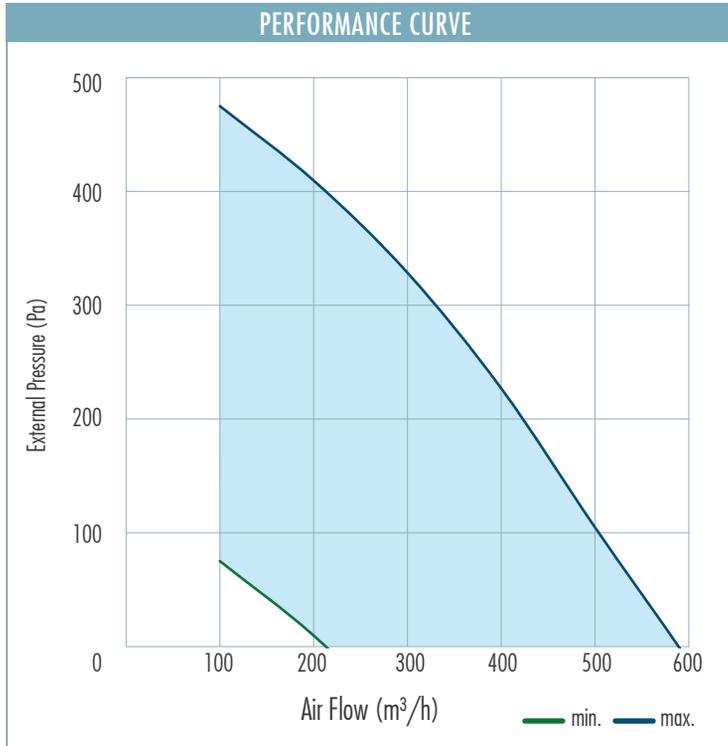
Unit Type	30% (dBA)	50 % (dBA)	70% (dBA)
500	43,28	43,52	45,66
1000	38,13	39,97	42,48
1500	42,40	44,42	48,97

### Sound Pressure Levels (3 m) (dBA)

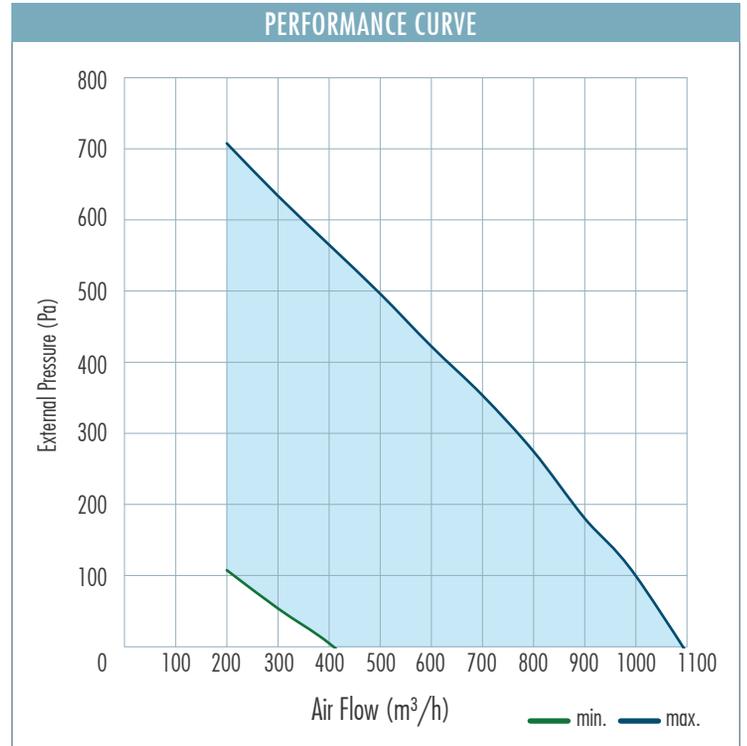
Unit Type	30% (dBA)	50 % (dBA)	70% (dBA)
500	37,26	37,50	39,64
1000	32,11	33,94	36,46
1500	36,38	38,40	42,95

It has been calculated based on maximum airflow (at 0 Pa).

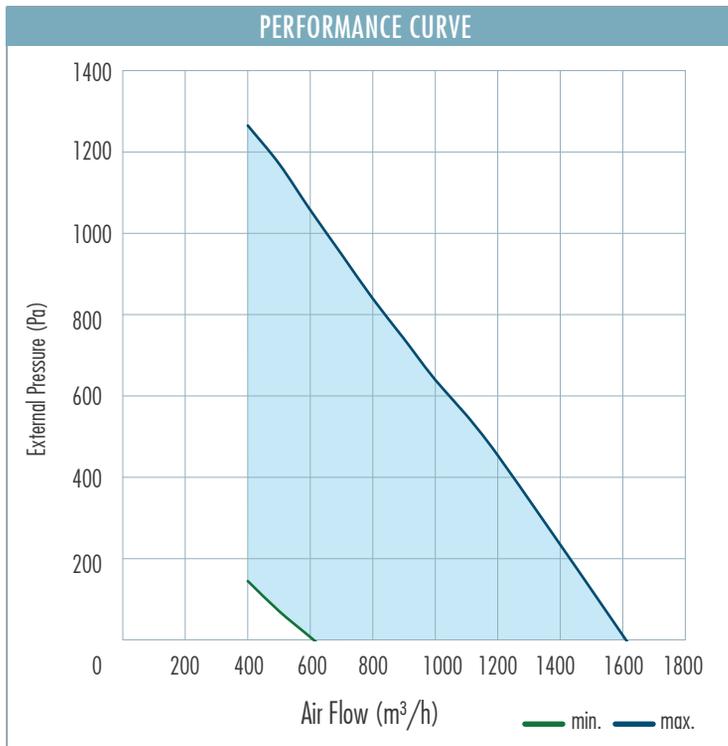
## LUFF-R 500



## LUFF-R 1000

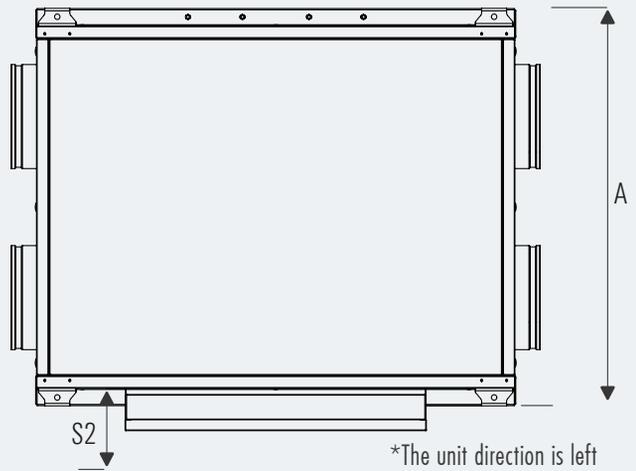
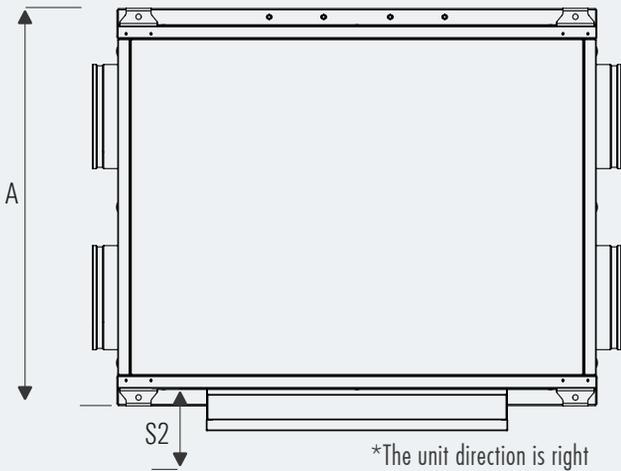
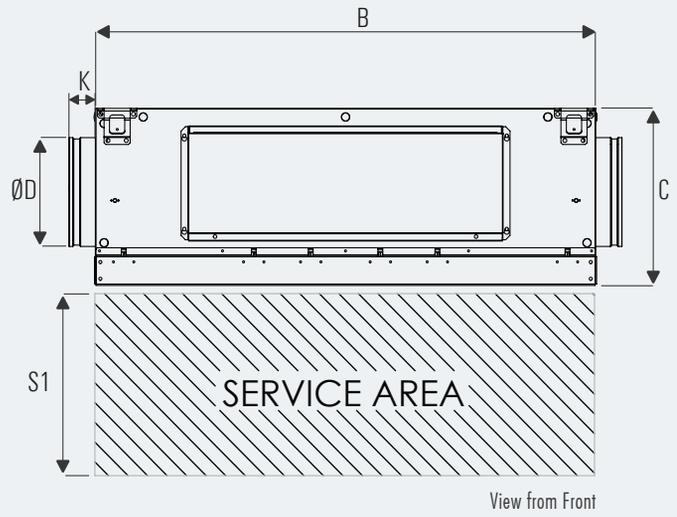
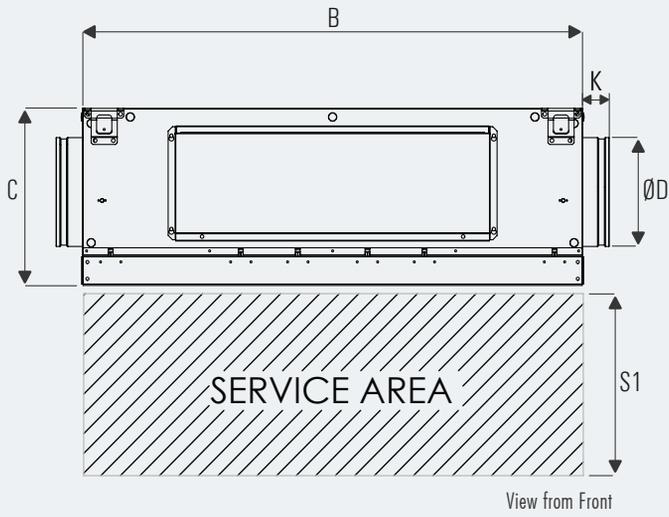


## LUFF-R 1500



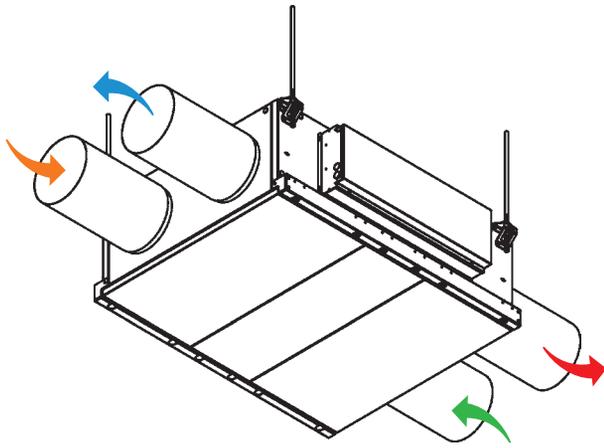
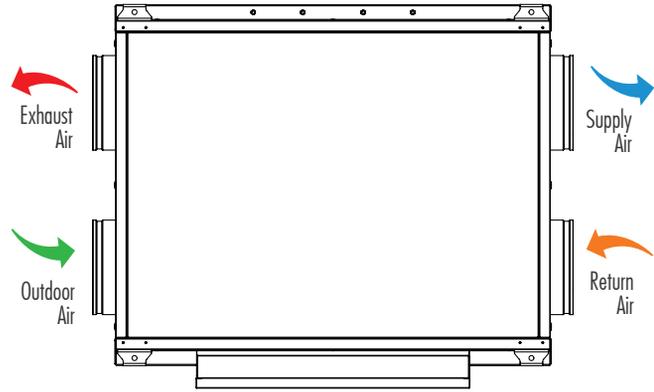
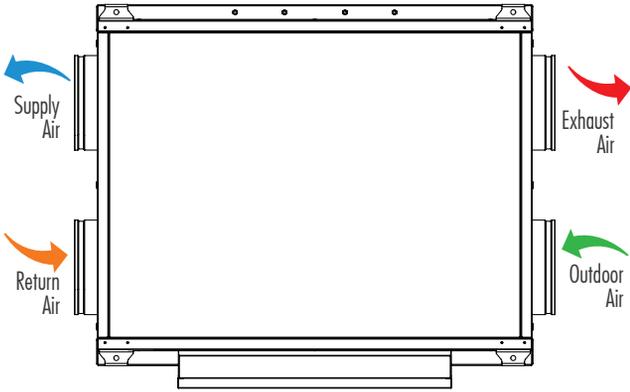
## Unit Dimensions

### LUFF-R Unit Dimensions

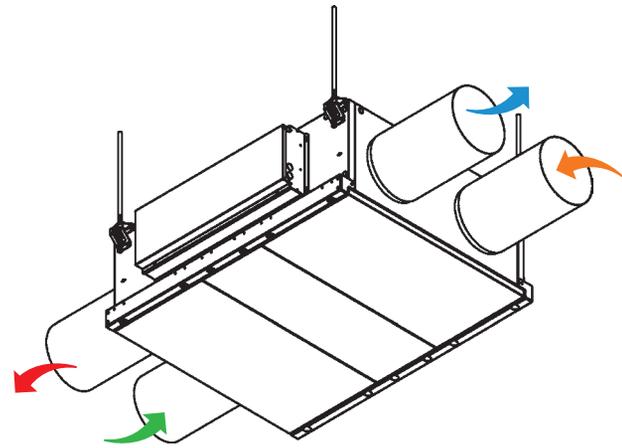


	LUFF-R 500	LUFF-R 1000	LUFF-R 1500
A	840	944	944
B	900	1150	1150
C	350	400	400
K	40	60	60
ØD	200	250	250
S1	400	500	500
S2	500	500	500
Unit Weight	48	53	57

\*All measurement values are mm. Unit weight is kg.



\*The unit direction is left



\*The unit direction is right

Automation Options		Control Cards
Standard	Optional	Enecon Plus (Standard)
Outdoor Air Temperature		☑
Supply Air Temperature		☑
Return Air Temperature		☑
Supply Fan Control		☑
Exhaust Fan Control		☑
Fan Alarm		☑
External Low Speed		☒
External Normal Speed		☒
External High Speed		☒
Fire Alarm		☑
Rotor Control (On/Off)		☑
Rotor Alarm		☑
Dirty Filter Control (DPS)		☑
MODBUS RTU		☑
MODBUS IP		☒
BacNET MSTP		☒
Weekly Timer		☑
	Outdoor Damper On/Off Control	☒
	Rotor Control (Proportional)	☒
	Constant Flow	☒
	Constant Pressure	☒
	Humidity Control	
	CO2 Control	
	Exhaust Temperature	☒
	Dx Coil Control(On/Off)	
	Dx Coil Control(Proportional)	⊖
	Water Cooling Coil Control(Proportional)	
	Water Heating Coil Control(On/Off)	
	Electrical After-Heater (1 STEP)	⊖
	Water Heating Coil Control(Proportional)	☑
	Electrical Pre-Heater (1 STEP)	☑
	Electrical Pre-Heater (2 STEP)	
	Outdoor Damper (On-Off)	⊖
	BMS(Start on/stop)	
	Electrical After-Heater (2 STEP)	⊖
	Water Cooling Coil Control(On/Off)	
	Freeze Protection	☑
	Exchanger Freezing Pressure Control	☒
	BacNET IP (with touchpanel)	☑
	Web Browser (TCP/IP)(with touchpanel)	☑
	Dirty Filter Control (Time)	☑

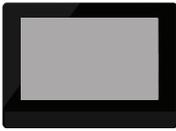
- ⊖ Only one of defined functions is selectable for this control card.
- ⚠ The optional features in the table vary according to the product.
- ⚠ Technical staff should be consulted for IO information.

Automation Options		Control Cards
Standard	Optional	Corrigo (Alternative)
Outdoor Air Temperature		☑
Supply Air Temperature		☑
Return Air Temperature		☑
Supply Fan Control		☑
Exhaust Fan Control		☑
Fan Alarm		☑
External Low Speed		☑
External Normal Speed		⊗
External High Speed		☑
Fire Alarm		☑
Rotor Control (On/Off)		☑
Rotor Alarm		☑
Dirty Filter Control (DPS)		☑
MODBUS RTU		
MODBUS IP		⊕
BacNET IP		
BacNET MSTP		
Weekly Timer		☑
	Outdoor Damper On/Off Control	☑
	Outdoor Damper Proportional Control	⊗
	Rotor Control	☑
	Constant Flow	⊗
	Constant Pressure	⊗
	Humidity Control	⊕
	CO2 Control	⊕
	Exhaust Temperature	☑
	Dx Coil Control(On/Off)	
	Dx Coil Control(Proportional)	⊕
	Water Cooling Coil Control(On/Off)	
	Water Cooling Coil Control(Proportional)	⊕
	Electrical After-Heater (2 STEP)	
	Water Heating Coil Control(On/Off)	☑
	Water Heating Coil Control(Proportional)	☑
	Electrical Pre-Heater (1 STEP)	☑
	Electrical After Heater (1 STEP)	☑
	Freeze Protection	☑
	Exchanger Freezing Pressure Control	⊗
	Web Browser (TCP/IP)	⊗
	Dirty Filter Control (Time)	⊗

⊕ Only one of defined functions is selectable for this control card.

⚠ The optional features in the table vary according to the product.

⚠ Technical staff should be consulted for IO information.

Control Panel			Control Cards	
Panel Type	Panel Descriptions	Standard	Alternative	
		Enecon Plus	Corrigo	
	Enecon Plus STD Panel	Wall-mounted type Max:30 m communication ability, Colour option: Black	✓	
	Enecon Plus Touch Button Panel	Wall-mounted type Max:30 m communication ability, Colour option: Black	✓	
	Enecon Plus Wifi Panel	Wall-mounted type Max:30 m communication ability, Colour option: White	✓	
	Enecon Plus 7 " Touch Panel	Wall-mounted type Max:30 m communication ability	✓	
	Corrigo STD Panel E3-DSP	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability		✓
	Corrigo STD Panel 4.3 " Panel	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability		✓
	Differential Pressure Switch			
	CO <sub>2</sub> Sensor			
	Humidity Sensor			

## ■ Selection of Electrical Cable Cross-Section

Unit Model	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm <sup>2</sup> ) for 50M and PF=0.8
LUFF-R 500	230	0,26	2,2	3	2,5
LUFF-R 1000	230	0,45	3,8	6	2,5
LUFF-R 1500	230	1,1	4,6	6	2,5

The data in the table shows the maximum power/current values. Please check unit label for updated values.

## ■ Cable Cross-Section Formulas

$$1$$

$$I_{\text{current}} = \frac{P}{U \cdot \cos Q}$$

$$I_{\text{cable}} > I_{\text{current}}$$

$$2$$

$$\%e = \frac{100 \cdot P \cdot L}{k \cdot S \cdot U^2}, \quad S = \frac{100 \cdot P \cdot L}{k \cdot \%e \cdot U^2}$$

$$\%e = \%3$$

$$3$$

$$I_{\text{cable}} > I_{\text{fuse}} \geq I_{\text{current}}$$

$$\text{Cable Cross-Section } S = \text{Max } (S1, S2, S3, 1.5 \text{ mm}^2)$$

- P : Power
- I : Current
- U : Voltage
- S : Conductor cross section
- k : Conductor coefficient
- L : Conductor length
- %e : The voltage drop

## ■ Example of Cable Cross-Section Calculation

$$P : 1 \text{ kW} \quad L : 50 \text{ m}$$

$$U : 230 \text{ V} \quad \%e : \%3$$

$$PF: \cos Q : 0.8 \quad k : 56 \text{ m} / \Omega$$

$$1$$

$$I_{\text{current}} = \frac{1000 \text{ W}}{230 \cdot 0,8} = 5.43 \text{ A}$$

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than calculated "I<sub>current</sub>" value.

$$S1 = 1.5 \text{ mm}^2$$

$$2$$

$$\%e = \%3$$

$$S = \frac{100 \cdot 1000 \cdot 50}{56 \cdot 3 \cdot 230^2} = 0.56 \text{ mm}^2$$

$$S2 \geq 0.56 \text{ mm}^2 \geq 0.75 \text{ mm}^2$$

$$S2 = 0.75 \text{ mm}^2$$

$$3$$

$$I_{\text{cable}} > I_{\text{fuse}} \geq I_{\text{current}}$$

$$I_{\text{cable}} > 10 \text{ A} \geq 5.43 \text{ A}$$

"I<sub>fuse</sub>" which will be higher than "I<sub>current</sub>", is selected.

The cable will be used, is selected from the cable cross-section table so that the equivalent ampere value in the table should be higher than selected "I<sub>fuse</sub>" value.

$$I_{\text{cable}} = 24 \text{ A}$$

$$S3 = 1.5 \text{ mm}^2$$

$$\text{Cable cross-section } S = \text{Max } (S1, S2, S3, 1.5 \text{ mm}^2)$$

$$S = \text{Max } (1.5, 0.75, 1.5, 1.5)$$

$$S = 1.5 \text{ mm}^2$$

### ■ Duct Type Electric Heaters



It is used at the outlet of the heat recovery unit in cold climates, and at the fresh air inlet to protect against freezing in very cold climates. As standard, it features a galvanized steel casing and stainless steel heating elements. Optionally, a stainless steel casing is also available. Electric heaters are equipped with two high temperature protection systems. When the temperature inside the electric heater reaches 70 °C, the automatic high temperature protection is activated and the heater is automatically switched off.

If the 70 °C automatic high temperature protection does not activate or if the temperature inside the electric heater reaches 110 °C, the second protection system is triggered, and the heater remains deactivated until a manual reset is performed. Designed with up to a maximum of three stages, the electric heaters are automatically staged according to the set temperature entered on the room control panel when used in conjunction with the unit's automation alternatives. Eneko electric heaters are supplied as standard with Delta (three-phase) connection.

#### Heating Capacity Calculation

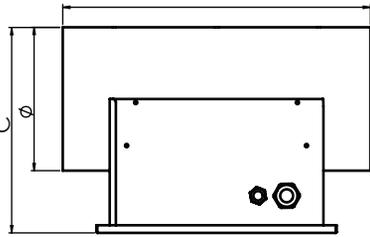
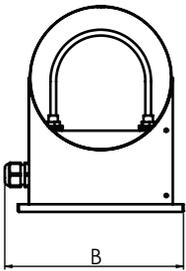
$$Q = 0,33x V x (T_2 - T_1)$$

Q : Heating Capacity (W)

V : Air Flow through electric heater (m<sup>3</sup>/h)

T<sub>1</sub> : Air temperature before the heater (°C)

T<sub>2</sub> : Air temperature after the heater (°C)



Unit Model	Capacity (kW) 1	A	B	C	Ø	
LUFF-R	500	1kW	430	250	283	200
		1.5kW	430	250	283	200
		2kW	430	250	283	200
		3kW	430	250	283	200
		4kW	430	250	283	200
	1000	1.5kW	430	300	341	250
		3kW	430	300	341	250
		4.5kW	430	300	341	250
		5kW	430	300	341	250
		6kW	430	300	341	250
	1500	1.5kW	430	300	341	250
		3kW	430	300	341	250
4.5kW		430	300	341	250	
5kW		430	300	341	250	
	6kW	430	300	341	250	

\*All measurement values are mm.

#### Electrical Heater Capacity

Unit Model	Pre-heater/After-heater					
	Capacity (kW) 1	Capacity (kW) 2	Capacity (kW) 3	Capacity (kW) 4	Capacity (kW) 5	
LUFF-R	500	1	1,5	2	3	4
	1000	1,5	3	4,5	5	6
	1500	1,5	3	4,5	5	6

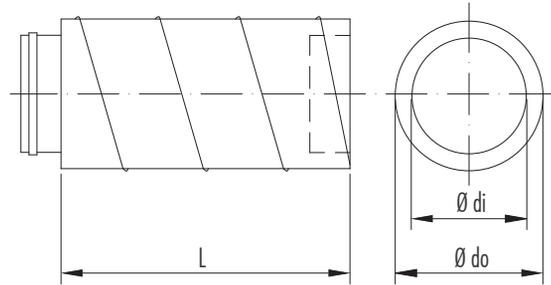
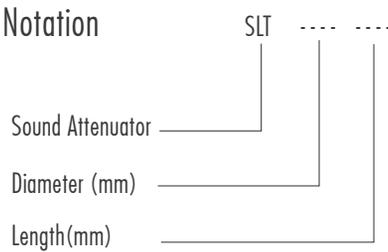
\*The heaters indicated in colour are 3~/400/50

## ■ Sound Attenuator For Circular Ducts



Sound attenuators are designed for standard duct dimensions. Various lengths are available according to attenuation demand. Sound attenuation capacities are given in the table. For better performance sound attenuators can be used in series. For the best result the sound attenuators shall be installed just after the unit.

### Notation



### Sound Attenuator Capacity [dB]

UNIT MODEL	SLT	63	125	250	500	1k	2k	4k	8k	
LUFF-R	500	200-600	2	3	6	7	13	17	18	20
	1000	250-600	2	3	7	7	18	21	20	22
	1500	250-600	2	3	7	7	18	21	20	22

### Sound Attenuator Dimensions [mm]

UNIT MODEL	SLT	Length (L)	Ø di	Ø do	
LUFF-R	500	200-600	600	200	260
	1000	250-600	600	250	310
	1500	250-600	600	250	310

\*All measurement values are mm.

## ■ Duct Type Circular External Damper

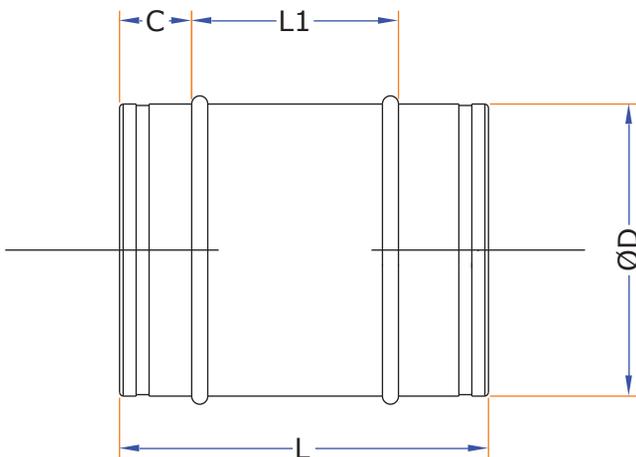


Unit Model	Aeff(m2)	Qmin(m3/h)	Qmax(m3/h)	
LUFF-R	500	0,031	170	1017
	1000	0,049	265	1590
	1500	0,071	382	2289

Aeff = Effective Area

Qmin = Air flow rate when the velocity in the duct is 1.5 m/s

Qmax = Air flow rate when the velocity in the duct is 9.0 m/s



Unit Model	ØD	L	L1	C	
LUFF-R	500	198	280	180	50
	1000	248	280	180	65
	1500	298	360	230	65

### ■ Duct Type Heating Coil/Cooling Coil



Duct type heating/cooling coils are assembled in modules as suitable to mount inside duct and have standard capacity. Coils consist of copper tubes and aluminum fins. Inlets and outlets of modules are suitable for duct connections as in heat recovery ventilation units. Additionally, cooling coils have drain pan and extra insulation to prevent condensation of modules. Both heating and cooling coils can be controlled separately as on/off or proportionately via automation system. All values are calculated according to EN 308 standard.

### ■ Duct Type Heating Coil

			90/70°C Water			80/60 °C Water		
Unit Model	Airflow (m <sup>3</sup> /h)	Duct Type Heating Coil Box Model	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
LUFF-R								
500	500	Capacity 1	13,6	2,5	1,6	13,5	1,9	1,1
1000	1000	Capacity 1	12,8	4,7	8,6	12,7	3,8	5,8
1500	1500	Capacity 1	19,1	5,5	11,3	19,0	4,4	7,7

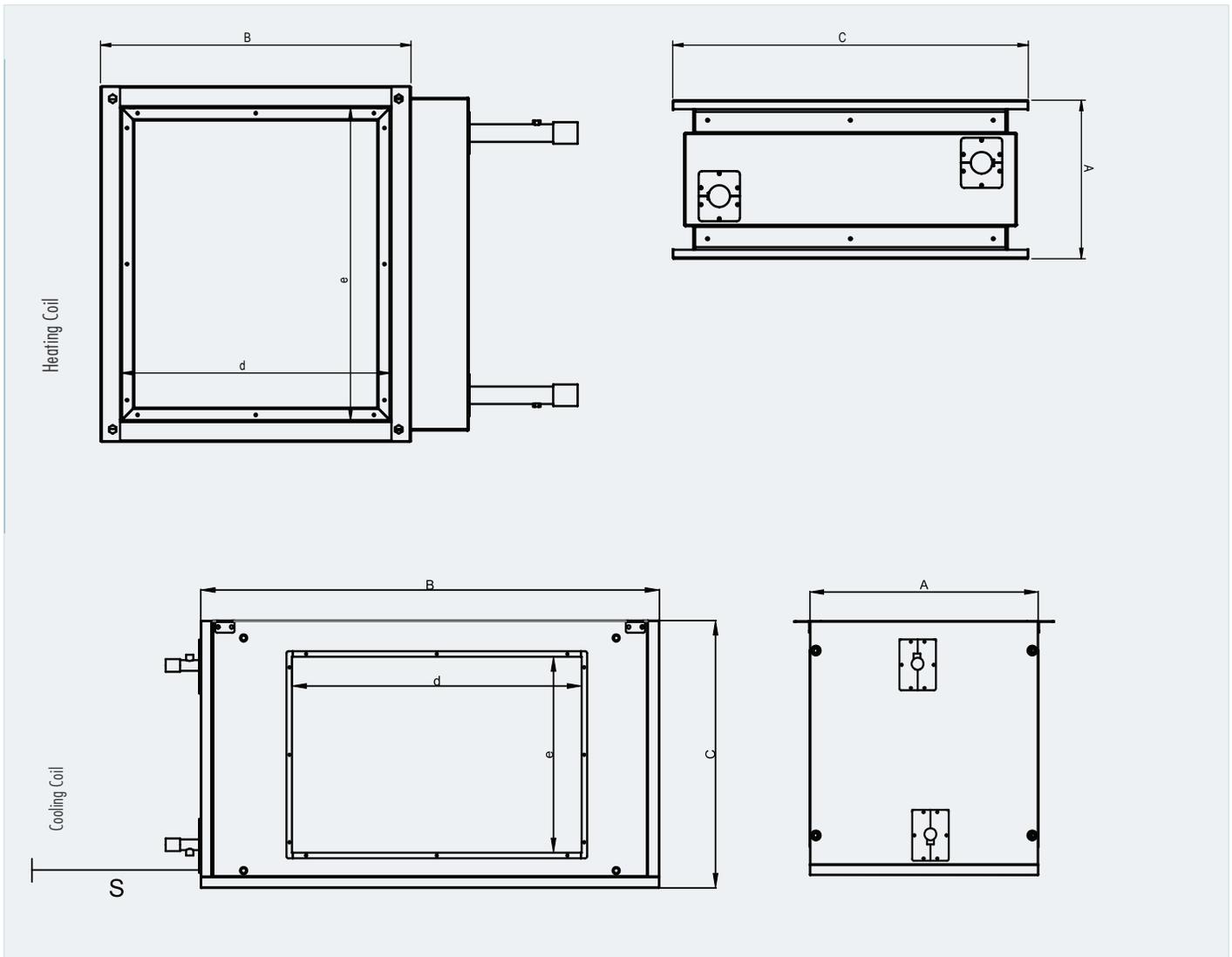
			70/50°C Water			60/40°C Water		
Unit Model	Airflow (m <sup>3</sup> /h)	Duct Type Heating Coil Box Model	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
LUFF-R								
500	500	Capacity 1	13,3	1,4	0,6	13,2	0,8	0,2
1000	1000	Capacity 1	12,6	2,9	3,6	12,4	2,0	1,8
1500	1500	Capacity 1	18,9	3,4	4,7	18,7	2,3	2,3

			R32 - 4°C/45°C			R410A - 4°C/45°C		
Unit Model	Airflow (m <sup>3</sup> /h)	Duct Type Heating Coil Box Model	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
LUFF-R								
500	500	Capacity 1	12,7	2,3	0,1	12,6	2,3	0,1
		Capacity 2	7,9	1,9	0,2	7,9	1,9	0,4
1000	1000	Capacity 1	22,1	2,9	0,5	22,1	2,9	1,0
		Capacity 2	6,3	5,7	0,1	6,3	5,5	0,1
1500	1500	Capacity 1	35,9	3,4	0,7	35,8	3,3	1,3
		Capacity 2	8,8	6,7	0,1	8,7	6,5	0,2

### ■ Duct Type Cooling (Changeover) Coil

			7/12 °C Water			6/10 °C Water		
Unit Model	Airflow (m <sup>3</sup> /h)	Duct Type Change-Over Coil Box Model	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
LUFF-R								
500	500	Capacity 1	13,3	2,2	9,9	13,6	2,7	20,7
		Capacity 2	6,9	1,4	12,7	7,2	1,6	26,8
1000	1000	Capacity 1	29,8	3,2	19,0	30,8	3,8	40,0
		Capacity 2	15,9	1,85	22,8	16,5	2,2	48,1
1500	1500	Capacity 1	44,0	3,7	25,1	45,7	4,4	52,8
		Capacity 2	19,5	1,6	18,2	20,5	1,9	37,9

■ Duct Type Coil Dimensions

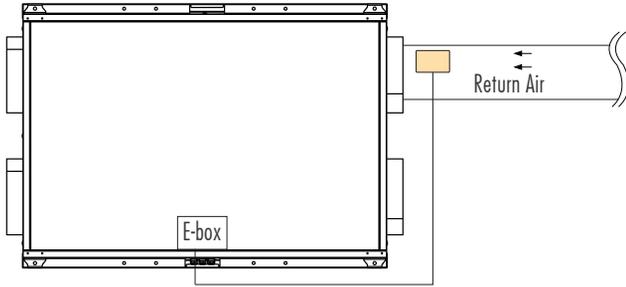


Unit Model	Duct Type Coil Box Model	a	b	c	d	e	s
LUFF-R 500	Heating Coil-Capacity 1	190	311	332	260	280	311
	Dx Coil-Capacity 1	450	510	490	270	270	510
	Dx Coil-Capacity 2	450	510	490	270	270	510
	Change-Over Coil-Capacity 1	450	510	490	270	270	510
	Change-Over Coil-Capacity 2	450	510	490	270	270	510
LUFF-R 1000	Heating Coil-Capacity 1	190	311	332	260	280	311
	Dx Coil-Capacity 1	450	510	490	270	270	510
	Dx Coil-Capacity 2	450	510	490	270	270	510
	Change-Over Coil-Capacity 1	450	510	490	270	270	510
	Change-Over Coil-Capacity 2	450	510	490	270	270	510
LUFF-R 1500	Heating Coil-Capacity 1	190	381	431	330	380	381
	Dx Coil-Capacity 1	450	860	640	620	420	860
	Dx Coil-Capacity 2	450	860	640	620	420	860
	Change-Over Coil-Capacity 1	450	610	540	370	320	610
	Change-Over Coil-Capacity 2	450	510	490	270	270	510

\*All measurement values are mm.

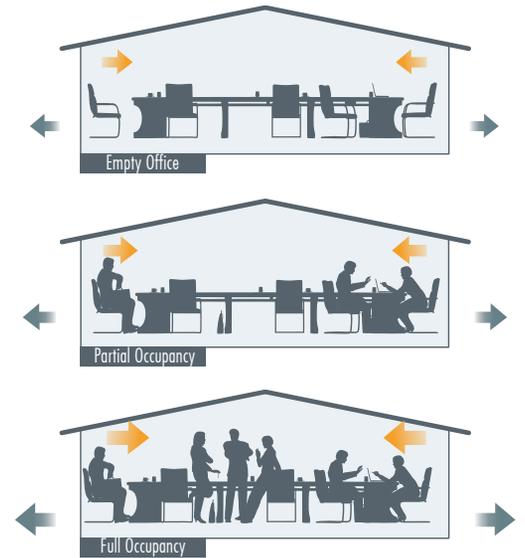
### ■ Ventilation on Demand

Air Quality Sensor (CO<sub>2</sub> / Humidity) is mounted to the return air duct and is connected to control system of unit. The set point for the desired indoor air quality is set during the installation. According to the demand indoors, LUFF-R units are modulated automatically by the sensor. Annual energy consumption of the unit is reduced as a result of the modulation, ending in reduction in energy costs.



Fresh air demand in a space is calculated according to human occupancy and/or physical properties of the conditioned space. The calculation is based on the maximum indoor occupancy. In practice maximum occupancy is observed for only a small period of time annually where lower air flow rates will be sufficient for most of the year. By reducing the air flow rate according to the fresh air demand; it is possible to reduce units electrical consumption and reduce also energy consumption used to condition the space. It should be noted that by increasing fresh air rate, indoors heating/cooling demand will also be increased.

With the help of control panel, it is possible to regulate fresh air rate according to the demand indoors. Eneko Indoor air quality sensor (CO<sub>2</sub>/Humidity) sensor is mounted to the return duct or the conditioned space and the demanded condition is set. A 0-10 V signal will be created and LUFF-R unit's air flow will be regulated according to the signal.





## SHIPMENT

Shipment is made for the buyer's account. Mode of shipment and shipping route, transport and packaging and other securities respectively shall be at our choice. We shall be entitled, however, not obliged to insure deliveries in the name and for account of the buyer. Risk passes to the buyer when shipment is handed over to the person performing the transport or left our Works for shipment. If shipment is delayed upon buyer's request, risk passes to the buyer with the ready for shipment note. If ordered goods are rejected after the ready for shipment note, we shall be entitled to request payment and store the goods at buyer's expense. Discharge of the goods is made at buyer's expense.



## RETENTION OF TITLE

In any event ENEKO shall retain full ownership of all materials supplied whilst the payment conditions of the entire amount have not been complied with, said materials may be removed from the customer at our request. Should the customer be declared bankrupt or insolvent and has not made paid the entire amount of payments. ENEKO shall be entitled to recover the goods. ENEKO may interrupt the supply without incurring any liability whatsoever if he had notice of or became aware of a decrease in the creditworthiness of the purchaser or if any of the existing negotiable instruments or debts were not properly complied with, shall result as being unpaid and protested.



## WARRANTY

ENEKO Products are under warranty (defect in material or workmanship) for 2 years from the date of sale reflected on the invoice. Under this warranty, ENEKO is under the obligation to replace the part requested under warranty.

The followings are excluded from ENEKO warranty:

- Normal wear and tear
- Defective assembly or handling
- Third party compensation

Parts the subject of a claim shall be sent to our warehouse as carriage paid with relevant report completely filled in, wherein the parts shall be subjected to analysis.



## LIABILITY

ENEKO, for any losses/damages, shall only be responsible within the limits of the law. Owing to basic obligations undertaken by simple negligence, if the contract is violated, ENEKO's liability shall be limited to compensate for losses which are emerged specific and predictable. ENEKO shall not carry any responsibility in case of a single negligence in breach of non-essential contractual obligations.



## PROPERTY RIGHTS

The purchaser in no event and under no circumstances whatsoever shall publish or use the trademark, trade name or logo of ENEKO without a prior written permission.



## GOVERNING LAW AND JURISDICTION

This agreement shall be governed with all aspects of the Turkish Law. The courts of Izmir/Turkey shall have an exclusive jurisdiction to adjudicate any dispute arising under or in connection with this agreement.



## GENERAL

The sale of all Products of ENEKO shall exclusively be made on the basis of these General Terms and Conditions of Sales. Any other conditions and General Conditions of Purchase of the Buyer are not accepted.



## OFFERS

Our offers are non-binding and without obligation. Contracts for delivery and all other agreements (including subsidiary agreements) as well as declarations of our representatives shall only become legally binding for us after written confirmation. We do not render planning service.

Proposals made and information provided by our representatives shall be non-binding. Illustrations, drawings, dimensions and weights or other performance data shall only be binding if this is expressly agreed in writing.



## TERMS OF ORDER

Purchase orders shall be sent to ENEKO in written form and shall be non-binding unless they are accepted by written confirmation (order confirmation) from ENEKO. Each order shall include properly identified Products ordered and relevant shipping dates.



## PRICE OF THE GOODS

Prices are net Ex Works according to current Incoterms unless stated otherwise and do not include any kind of taxes. Prices are valid at the date of delivery will be applied. We reserve the right to adjust prices for confirmed orders as well to reflect any increase in our costs for any reason beyond our control like force majeure, shortage of primary material or labor strikes, official orders, transportation or similar problems. In this case, a new price agreement shall be required for higher rates. If such an agreement is not made, we shall be entitled to withdraw from the contract by written notice within 15 days.



## TERMS OF PAYMENT

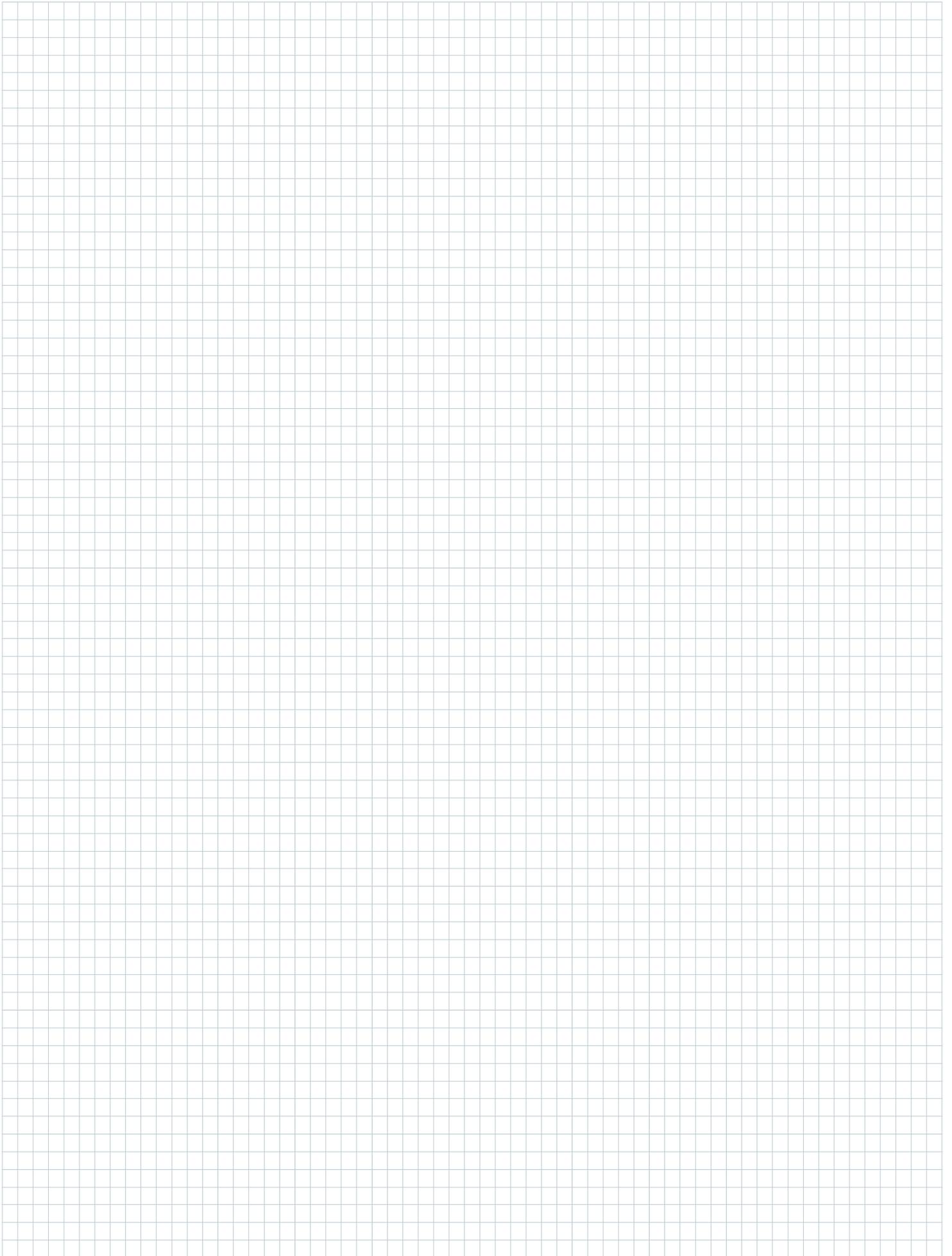
Payments shall be carried out according to the contractual terms as defined and set forth in the order confirmation. If the payment conditions have not been agreed upon conclusion of the contract, the payment terms and payment dates specified in our invoices shall be binding. Deadlines for discounts and periods allowed for payment shall begin to run upon receipt of the invoice. Payments by draft, bills of Exchange or anyway extended payments shall mean neither credit novation, nor prejudice to the Retention of Title agreement, nor to territorial competence. If buyer fails to make payment by due date, we are entitled to charge the buyer with a relevant interest on the unpaid amount.

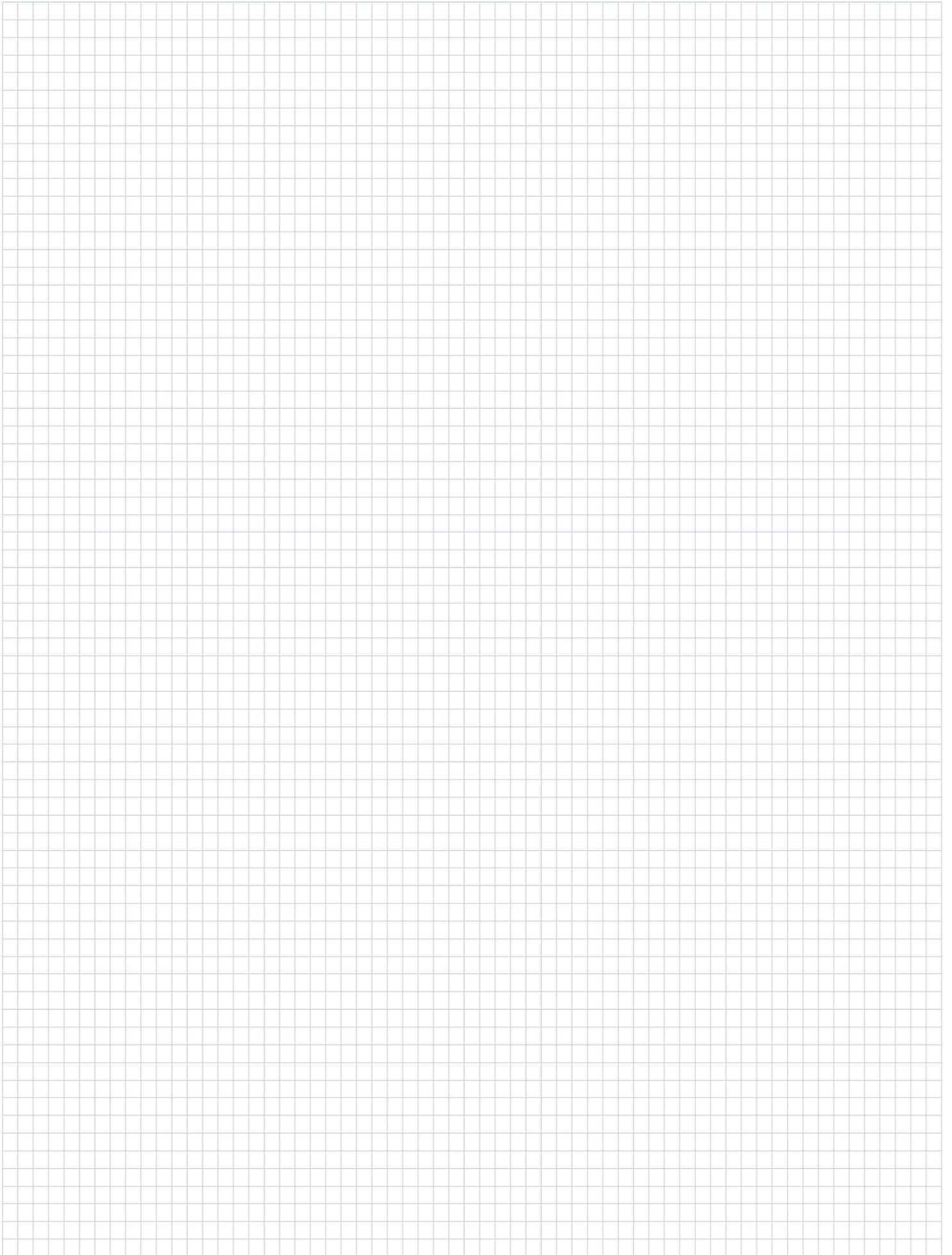


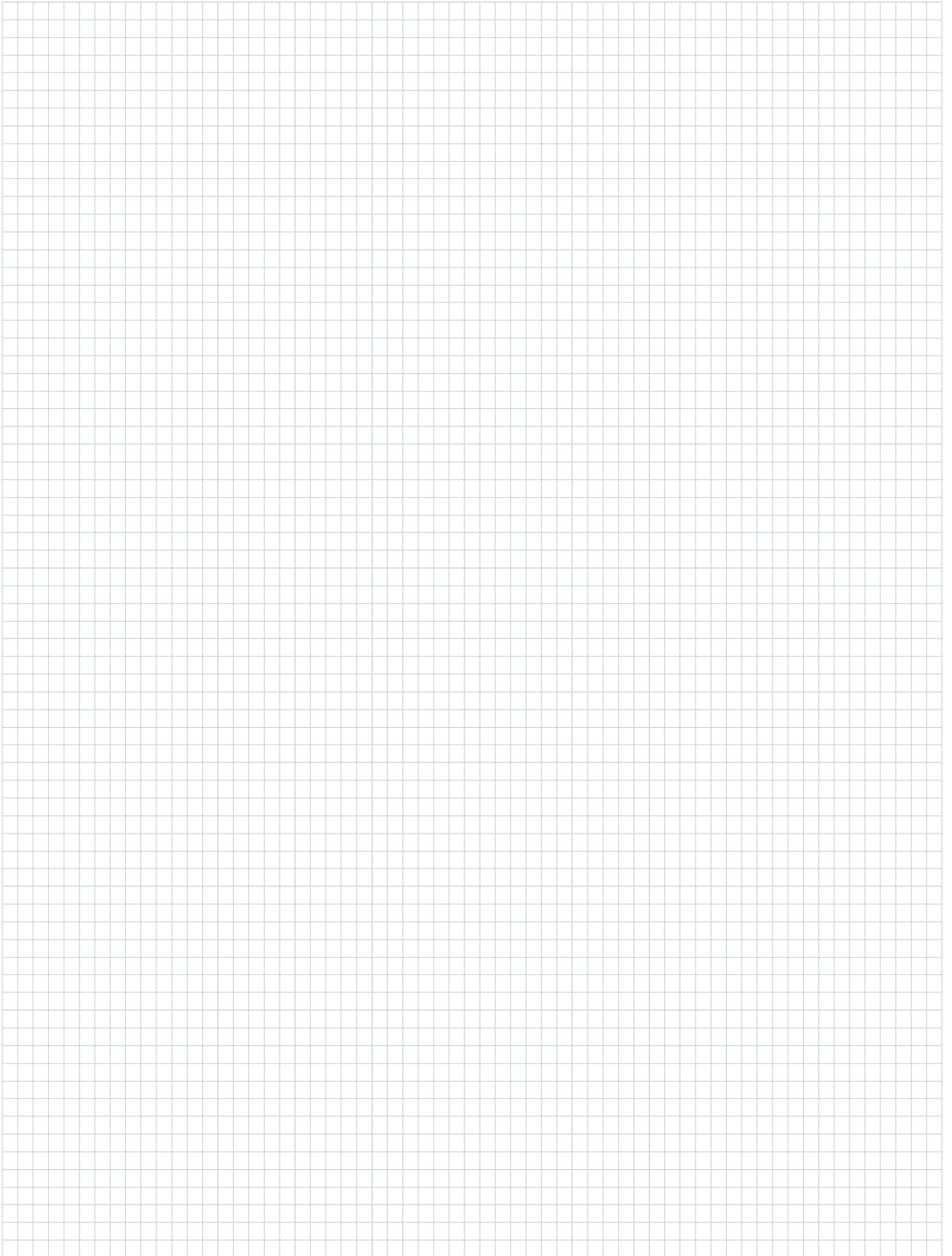
## TERMS OF DELIVERY

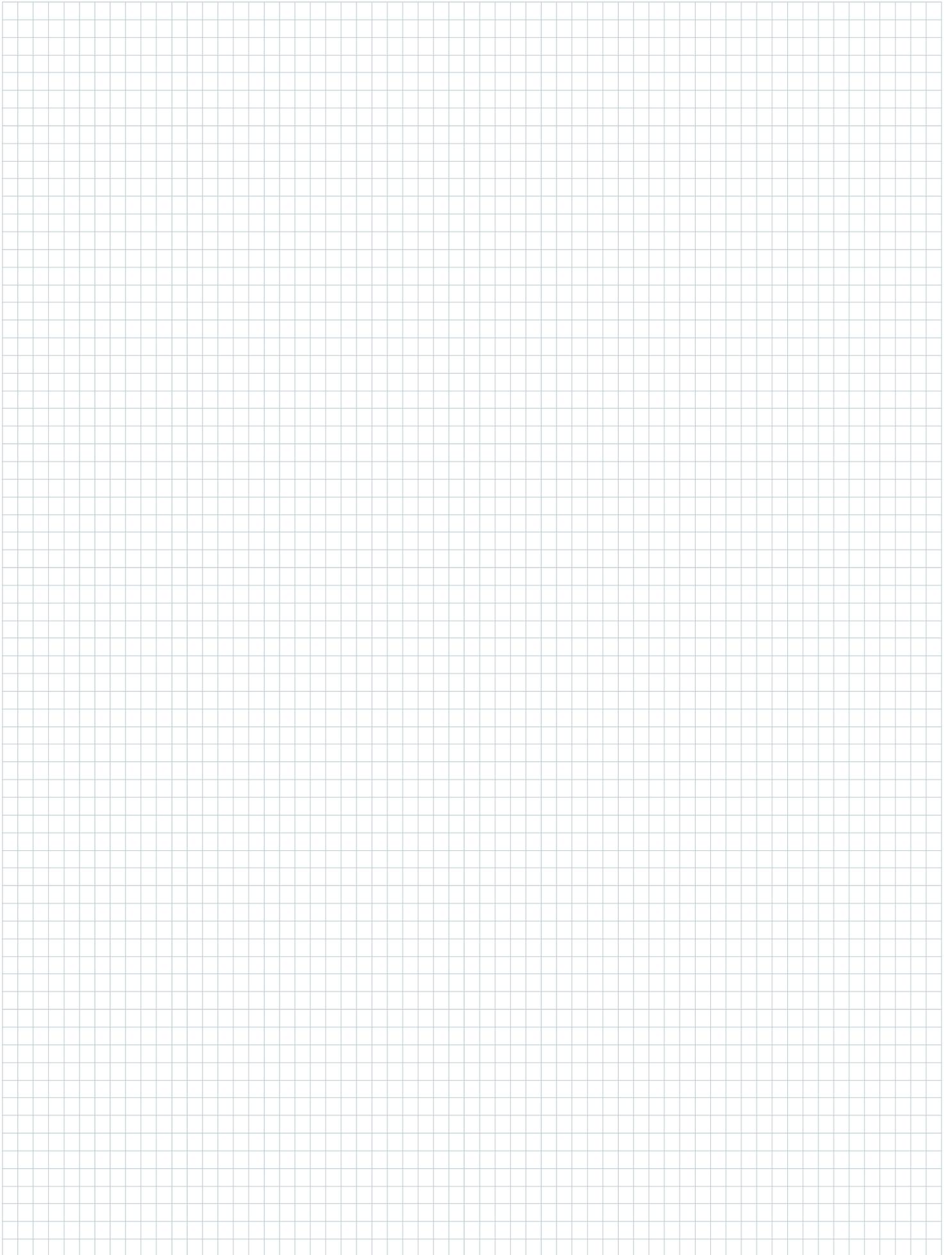
Delivery time information is only approximate. We shall only be in default if the performance is due and a written demand for payment was issued.

Delivery day is the day of dispatch Ex Works. We shall also not be liable with regard to bindingly agreed periods and dates in the event of delays in delivery and of performance due to force majeure and events which considerably complicate or make delivery impossible not only temporarily-strike lockout, breakdown, delay in supply with important raw and auxiliary materials even if the delay occurs at our supplier, in particular. These delays entitle us to postpone delivery for the period of the impediment plus a reasonable start-up period or to withdraw from the contract as a whole or in part. If delivery time is extended or we are released from our delivery commitment, the buyer may not derive a claim for damages from it. However, we may only rely on the circumstances mentioned if we notify the buyer immediately. We shall be entitled to make part deliveries. Any part delivery shall be considered as independent transaction. In case of default, our liability is limited to contract-typical foreseeable damage.













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In parallel with our ongoing product development in R&D department, all rights of changing all technical specifications are reserved by ENEKO without any declaration and notice.

