ESU (700)

Decentralized Heat Recovery Unit

eneko®

Index

ESU 700
Decentralized Heat Recovery Unit

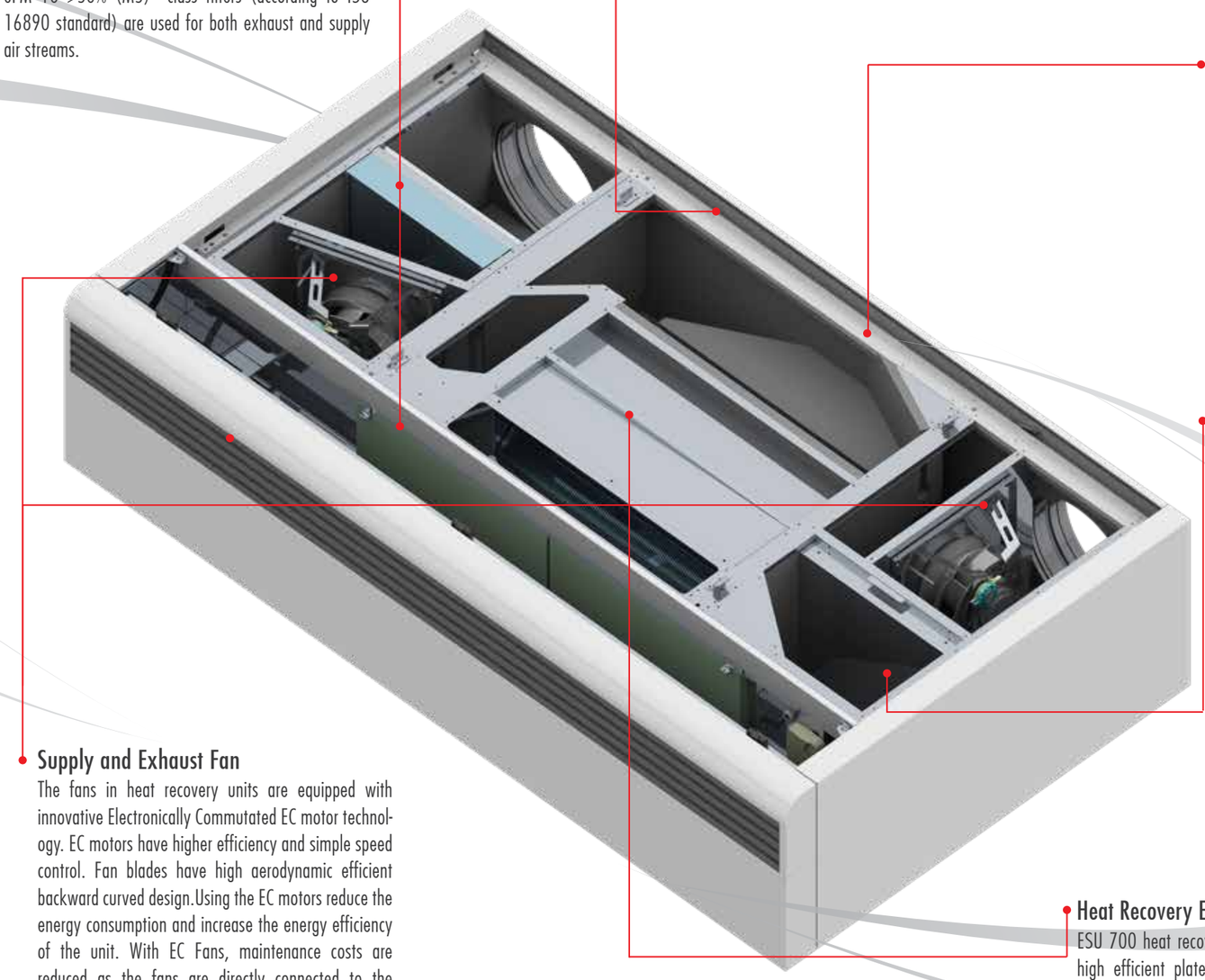
The technical specifications and the performance data declared with this logo have been developed by the tests performed in Eneko Energy Laboratory which is established with the development Project support of Tübitak by regarding relevant standards.

Supply and Exhaust Air Filter

To increase indoor air quality and to protect the equipments used in unit,ISO ePM 1 >50% (F7), &ISO ePM 10 >50% (M5) class filters (according to ISO 16890 standard) are used for both exhaust and supply air streams.

Casing & Insulation

ESU 700 features a body made of 200 g/m² galvanized steel sheet, offering high corrosion resistance. Its exterior is painted. The M1-class non-combustible insulation inside provides maximum protection for both fire safety and sound insulation, ensuring safe and comfortable operation of 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.

Control System

Plug&Play

Control unit is developed for controlling of heat recovery units' equipments, meeting the demands coming from the customers and is user-friendly designed. Control unit is capable of commanding the equipments in standard unit and optional accessories. Control unit can be performed the basic functions without any control panel, with Standard Panel can be also used more functional. Besides, the control unit can control the all functions via ModBus and switch on/off via BMS as optional.

Supply and Exhaust Fan

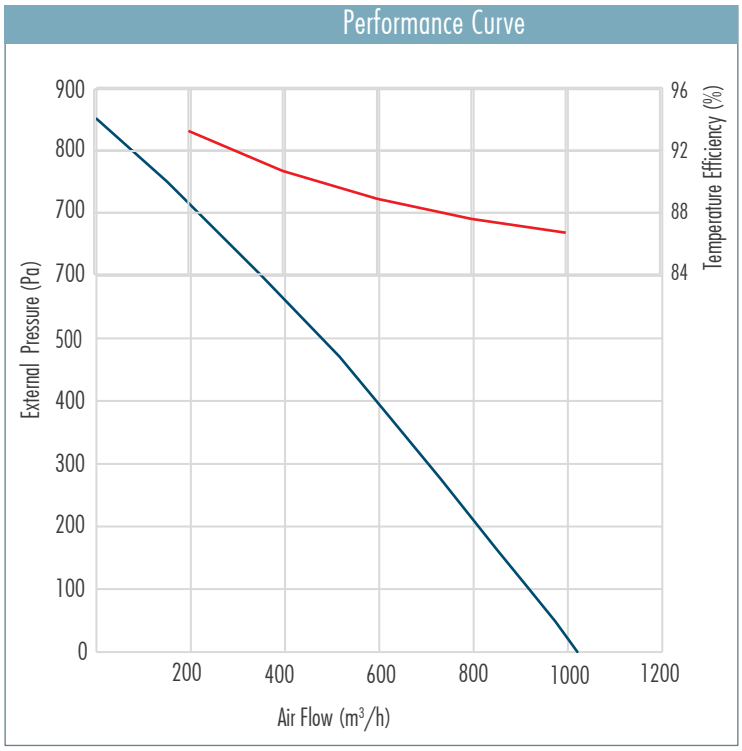
The fans in heat recovery units are equipped with innovative Electronically Commutated EC motor technology. EC motors have higher efficiency and simple speed control. Fan blades have high aerodynamic efficient backward curved design.Using the EC motors reduce the energy consumption and increase the energy efficiency of the unit. With EC Fans, maintenance costs are reduced as the fans are directly connected to the motors; the belt and pulley problems are eliminated.

Heat Recovery Exchanger

ESU 700 heat recovery ventilation units have aluminum counterflow, high efficient plate heat recovery exchangers. Plate heat recovery exchangers have plates that are produced improved surface areas to provide high efficient and leakage free design. With the optimization of exchanger heat transfer is increased and pressure drop is decreased. Heat recovery exchanger has Eurovent certification.

Performance Data

ESU 700



[1] EN 308 condition (OA = 5°C & 72%, RA = 25°C & 28%).

Unit Type			ESU 700
ERP			Yes
Heat Recovery		(EN 308)	Yes
Heat Recovery Efficiency	(%)	(EN 308)	>83,3
Heat Recovery Efficiency	(%)	(-5%80)	>83,3
Max. Air Flow Range	(m^3/h)	(at 0 Pa)	1020
Nominal Air Flow Range	(m^3/h)	(EN 308)	700
Nominal External Pressure	(Pa)		50
Unit Voltage	(V)		230
Sound Pressure 1,5 m (Q=2)	dB(A)		37
Key Points			1) Low Noise 2) Easy Service access 3) Compact structure 4)Continuously meets the need for fresh air inside 5)Elegant and modern design 6)Room type CO2 sensor 7)Integrated on/off preheater 8)Integrated proportional afterheater 9)Integrated DX/Changeover/heating/cooling coil 10)Integrated control system
Fan Motor			EC Fan
Fan Material			Composite
Heat Recovery Type			Counterflow Heat Exchanger
Configuration / Installation			For indoor use only
Bypass			%100 Proportional Bypass
Supply Air Filter			ISO ePM1 >50% (F7)
Exhaust Air Filter			ISO ePM10 >50% (M5)
Duct Connections			Round
Casing Material			Painted galvanized steel
Insulation Panel type			M1 Non-flammability class
Service access			With sliding rail solution
Accessories			See for accessories page.

[1] EN 308 condition (OA = 5°C & 72%, RA = 25°C & 28%).

[2] Nominal airflow, outdoor (-5ºC/80% RH) and indoor conditions (20ºC/50%RH).

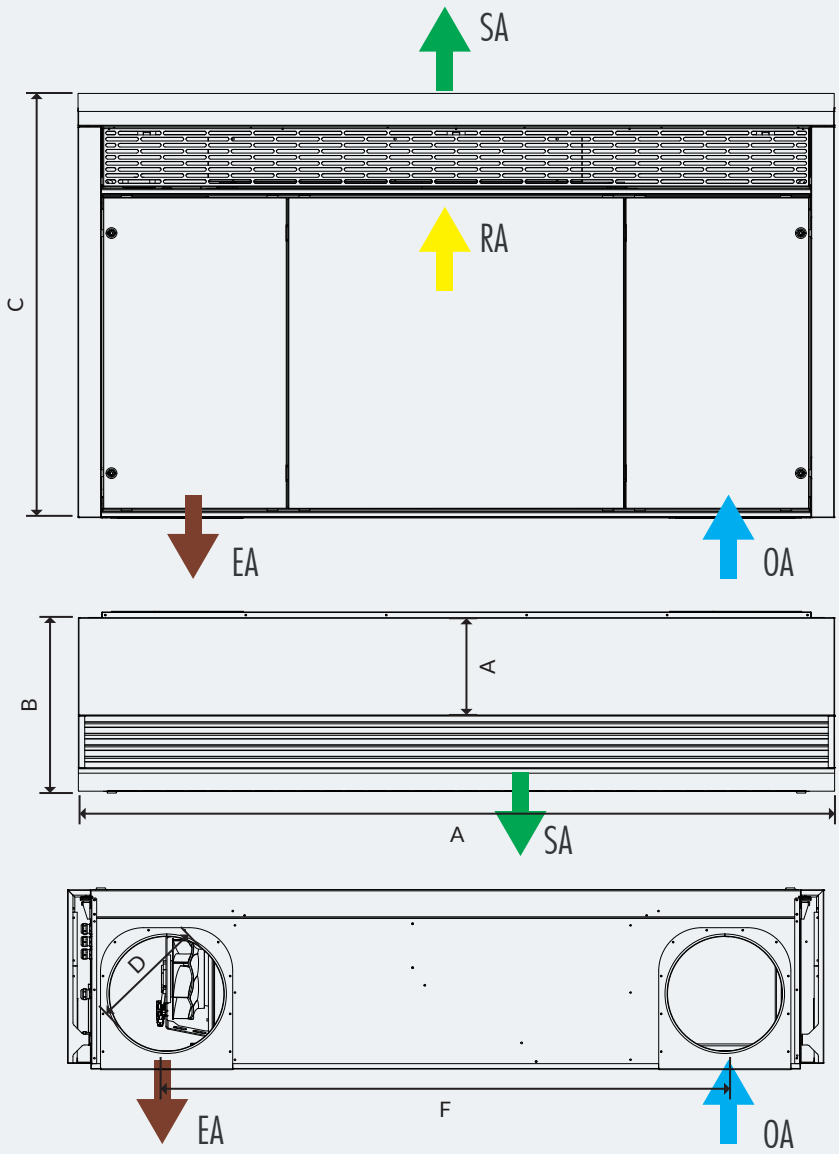
Sound Performance Data

Unit Model	30%	50 %	70%
700	26,80	26,98	36,99

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

Unit Dimensions

ESU 700 Unit Dimensions



	A	B	C	D	E	F	Unit Weight
ESU 700	2100	500	1180	(ø)315	1550	275	190

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

Automation Options		Control Card
Standard	Optional	Standard
Outdoor Air Temperature		✓
Return Air Temperature		✓
Supply Air Temperature		✓
Exhaust Air Temperature		✓
Frost Protection		✓
Supply Fan Proportional Control		✓
Extract Fan Proportional Control		✓ (ayrı ayrı)
Fan Alarm		✓
ByPass Damper Proportional Control		✓
Filter Protection (DPS)		✓
Fire Alarm		✓
External Low Speed		✓
External Normal Speed		✓
Modbus RTU		✓
MODBUS IP		✓
BACnet MSTP		✓
BACnet IP		✓
Web Browser (TCP/IP)		✓
		✓
	Filter Protection (Time)	✓
	Outdoor Damper On/Off Control	✓
	Constant Airflow	✓
	Constant Pressure Control	≡
	Humidity Control	
	CO2 Control	
	Heat Exchanger Freezing Pressure Control	⊗
	Water Cooling Coil Proportional Control	✓
	Water Cooling Coil On/Off Control	✓
	DX Alarm	✓
	DX Defrost Information	✓
	DX Coil Proportional Control	✓
	DX Heating-Cooling On/Off Control	✓
	Water Heating Coil Frost Temperature Information	✓
	Water Heating Coil Proportional Control	✓
	Water Heating Coil On/Off Control	✓
	Electric Heater High Temperature Alarm	✓
	Electric Reheater Proportional Control	✓
	Electric Reheater Stage 1 Start	✓
	Electric Reheater Stage 2 Start	✓
	Electric Preheater Stage 1 Start	✓
	DX Coil On/Off Control	✓

≡ Only one of them the 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 System

Panel Type	Panel Descriptions	Standard	Optional
	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability	✓	⊗
	Wall-mounted type hand panel, IP 30 protection class, Max:100 m communication ability	⊗	✓
	Differential Pressure Switch		
	CO_2 Sensor		
	Humidity Sensor		

*The sensor images are representative.

Selection of Electrical Cable Cross-Section

Unit Model ESU 700	Unit Voltage (V)	Unit Power Input (kW)	Current (A)	Fuse (A)	Cable Cross-Section (mm^2) for 50M and PF=0.8
ESU 700	230	0.47	3.8	2x6	1

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

Cable Cross-Section Formulas

1

$$I_{current} = \frac{P}{U.CosQ}$$

$$I_{cable} > I_{current}$$

2

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

$$\%e = \%3$$

3

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

Cable Cross-Section S = Max (S1, S2, S3, 1.5mm^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 kW **L** : 50m
U : 230V **%e** : %3
PF: CosQ : 0.8 **k** : 56m / Ω

1

$$I_{current} = \frac{1000\ W}{230.0,8} = 5.43\ A$$

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 "$I_{current}$" value.

S1 = 1.5 mm^2

2

%e = %3

$$S = \frac{100.1000.50}{56.3.230^2} = 0.56\ mm^2$$

S2 ≥ 0.56 mm^2 ≥ 0.75 mm^2

S2 = 0.75 mm^2

3

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

I_{cable} > 10A ≥ 5.43A

"I_{fuse}"which will be higher than "$I_{current}$", 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_{fuse}" value.

I_{cable} = 24A

S3 = 1.5 mm^2

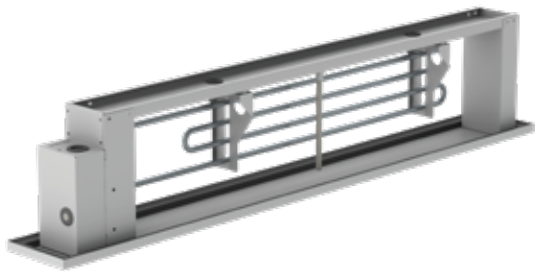
Cable cross-section S = Max (S1, S2, S3, 1.5 mm^2)

S = Max (1.5, 0.75, 1.5, 1.5)

S = 1.5 mm^2

Electrical Heaters

Pre heater



After-heater

Electric heaters are optionally supplied in cold climates for supply air and in extreme climates for both supply and outdoor air sides against freezing. Electric heaters are manufactured according to circular or rectangular duct systems.
Standard types are produced of stainless steel heating elements and galvanized metal casing. Stainless steel casing is also avaliable. Electric heaters are equipped with two circuit cutting thermostats. Factory setting for the automatically operating one is 70 °C and for the manual operating 110 °C.
Electric heaters capacity can be controlled up to 3 steps with control panel according to the set temperature from the room control panel and room (or supply air) temperature. Speed controls shall not be used with Electric heater installations. Eneko electric heaters are connected in Delta connection in standard models.

Heating Capacity Calculation

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

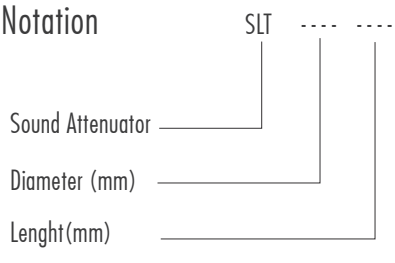
Q : Heating Capacity (W)
V : Air Flow through electric heater (m^3/h)
T_1 : Air temperature before the heater (°C)
T_2 : Air temperature after the heater (°C)

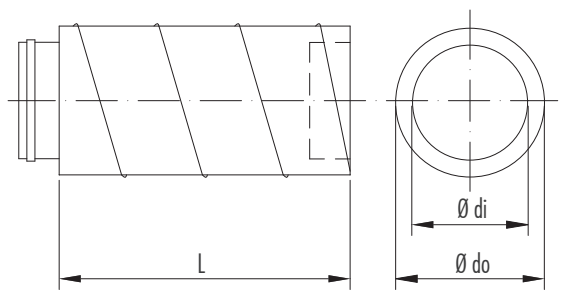
Electrical Heater Capacity		
Unit Model	Pre Heater	After Heater
ESU 700	1,6	2,3

Sound Attenuator For Circular Ducts

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

Notation





Sound Attenuator Capacity [dB]

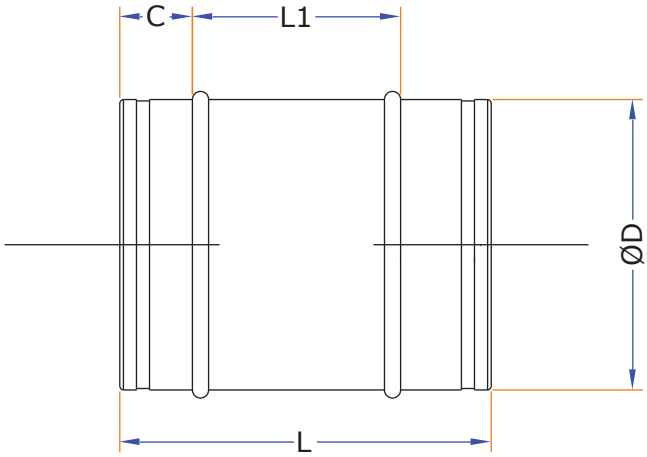
UNIT MODEL		SLT	63	125	250	500	1k	2k	4k	8k
ESU	700	300-600	1	3	6	7	13	15	17	19

Sound Attenuator Dimensions [mm]

UNIT MODEL		SLT	Uzunluk (L)	Ø di	Ø do
ESU	500	300-600	600	300	360

*All measurement values are mm.

Duct Type Circular External Damper



Unit Model		ØD	L	L1	C
ESU	700	313	360	230	65

Unit Model		Aeff(m2)	Qmin(m3/h)	Qmax(m3/h)
ESU	700	0,078	421	2524

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

Duct Type Heating Coil/Cooling Coil


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 Cooling Coil

		7C/12C Water		
Unit Model ESU	Air Flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
700	700	15,9	2,3	27,1

Duct Type Heating Coil

		90C/70C Water			80C/60C Water		
Unit Model ESU	Air Flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
700	700	10,5	4,9	7,1	10,4	4,0	4,9

		70C/50C Water			60C/40C Water		
Unit Model ESU	Air Flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
700	700	10,3	3,0	3,0	10,1	2,0	1,5

Duct Type DX Coil

		R32,7C/48C		
Unit Model ESU	Air Flow (m^3/h)	Air side pressure drop (Pa)	Capacity (kW)	Fluid side pressure drop (kPa)
700	700	16,0	1,5	29,9

General Terms and Conditions of Sale

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 an 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.

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.

Notes

Notes

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