

# Rank.<sup>®</sup> HT1

## Product description

When it is possible to use heat sources above 150 °C, the Rank<sup>®</sup> HT1 machine is the most efficient option, with an electric generation of up to 30 kWe.

Heat recovered in the condenser can be transferred to water up to 50 °C and used in applications with thermal power below 200 kWt.



## A Rank<sup>®</sup> machine for every need

Whatever your need is, we have a Rank<sup>®</sup> machine that can be adapted to it, through a variety of products that cover a wide range of thermal and power applications.

LT1	MT1	HT1	HTC1
LT2	MT2	HT2	HTC2
LT3	MT3	HT3	HTC3
LT4	MT4	HT4	
90°C	120°C	150°C	180°C 210°C

## What is Rank<sup>®</sup>?

The Rank<sup>®</sup> equipment allows electrical energy and useful heat production using a low-temperature heat source, with economic and environmental benefits.



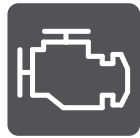
## Applications

Among the main applications of the Rank® ORC machines, we highlight the waste heat recovery and the use of renewable heat sources, with a special interest in cogeneration and trigeneration systems.

### Heat sources



Industrial Waste Heat



Engines



Biomass



Solar CHP



Waste



Geothermal

### Heat sinks



Cold Production



Heating

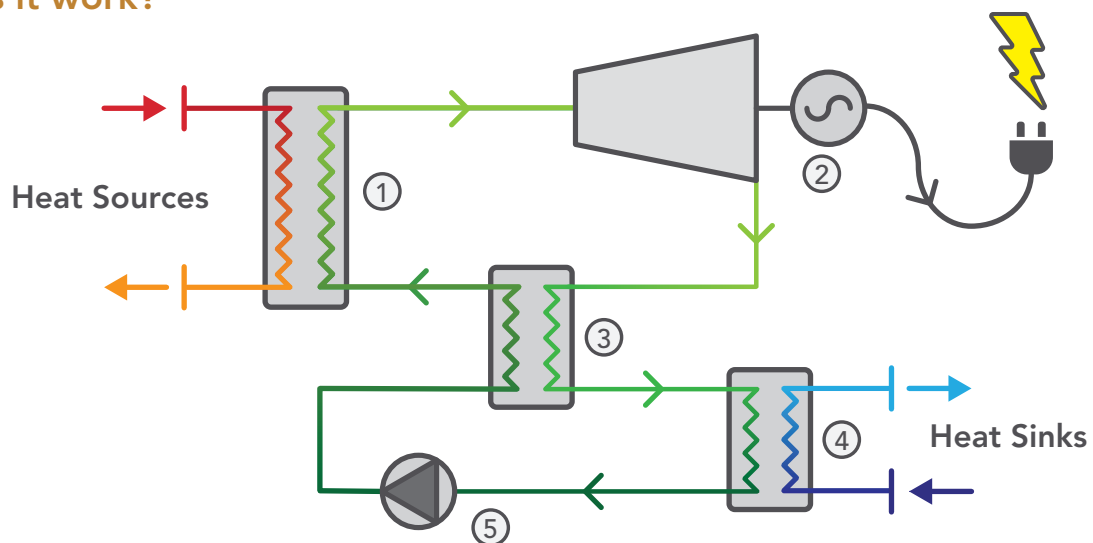


Industrial Processes



Drying

## How does it work?



- ① **Evaporator** A heat exchanger provides heat to the high-pressure working fluid and passes from subcooled liquid to superheated vapor (in the form of water or thermal oil).
- ② **Turbine** The expansion of the superheated vapor is used to generate clean electricity.
- ③ **Regenerator** The expanded working fluid is used to preheat the high-pressure liquid at the inlet of the evaporator To increase the efficiency of the system.
- ④ **Condenser** It produces useful heat (in the form of water) from the condensation of the working fluid at low pressure.
- ⑤ **Pump** The pressure of the working fluid is increased, and the ORC cycle is completed.

# Rank® HT1

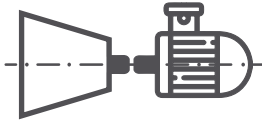
## Rank® Technology

The Rank® equipment is composed of high quality, robust and efficient components, which offer our customers the following advantages and benefits.



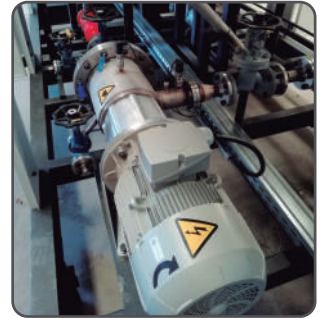
### Rank® low-rpm turbine

Operation at low revolutions reduces the noise level, lengthens the service life, and improves reliability.



### Rank® direct drive

Direct drive avoids the use of gears or pulleys, minimising the maintenance and increasing electrical efficiency.



### Zero leaks

Our hermetic components eliminate the leakage of the working fluid, reducing maintenance costs and downtime and being more environmentally friendly.



### Magnetic transmission

Magnetic transmission to ensure tightness and to reduce the possibility of leakage.



### Rank® easy-connect

Electronics-free connection to the electricity grid at the required electrical quality conditions.



### Flexible operation

Modular machines that can operate under a wide range of temperature and flow inlet and outlet conditions.



### Digitalisation through the Rank® control system

Our machines operate without the need for the human interface through an automatic, efficient managing system.



### Safety

It complies with all safety regulations and minimises the risk of accidents.









### Rank® service

Real-time remote monitoring and predictive control of the machines and automatically generated reports.

## Safety Regulations and Standards

- Low voltage Directive
- Machinery Directive
- Electromagnetic Compatibility Directive
- Pressurized Equipment Directive
- ENA ER G59/3
- ASME B31.1 – Power Piping Code, Mechanical
- ASME B31.3 – Process Piping Code
- ASME Boiler and Pressure Vessel Code Section VIII
- UL 508A- Control Panel Wiring
- EN/ISO 3744:2010

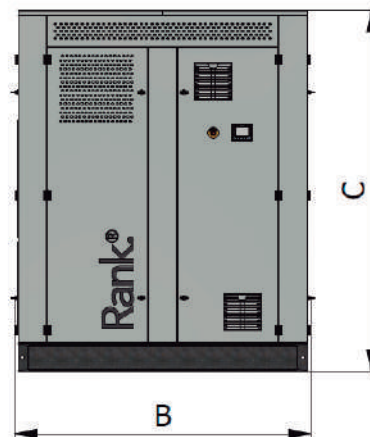
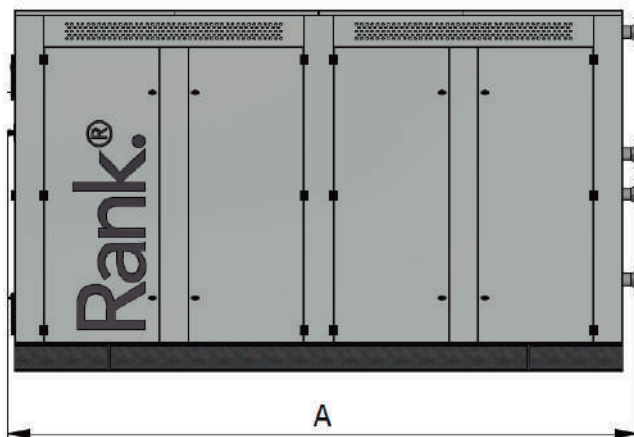
## Technical Data

		Heat source	Heat transfer fluid *	Thermal Oil	-
			Inlet temperature	150-180	°C
			Outlet temperature	110-140	°C
			Volumetric flow rate	13	m <sup>3</sup> /h
			Thermal power	200-300	kWt
			Connections diameter	DN65 PN16	-
			Pressure drop	100	kPa
Heat transfer fluid inner volume	20	L			
		Useful heat	Heat transfer fluid	Water	-
			Inlet temperature	20-40	°C
			Outlet temperature	30-50	°C
			Volumetric flow rate	17	m <sup>3</sup> /h
			Thermal power	150-200	kWt
			Connections diameter	DN65 PN16	-
			Pressure drop	125	kPa
Heat transfer fluid inner volume	15	L			
		Electricity	Gross power	20-30	kWe
			Net power	18-25	kWe
			Voltage	3 x 400	V
			Frequency	50/60	Hz
			Intensity	54	A
			Data Connection	RJ45	-
Container transport (optional)				DC 20'	

\* The heat transfer fluid can be water, steam, or thermal oil

DC (dry container)

## Dimensions



A = 3 350 mm  
 B = 1 550 mm  
 C = 2 200 mm  
 Weight 5 500 kg

# Rank.<sup>®</sup> HT2

## Product description

When it is possible to use heat sources above 150 °C, the Rank<sup>®</sup> HT2 machine is the most efficient option, with an electric generation of up to 65 kWe.

Heat recovered in the condenser can be transferred to water up to 50 °C and used in applications with thermal power below 500 kWt.



## A Rank<sup>®</sup> machine for every need

Whatever your need is, we have a Rank<sup>®</sup> machine that can be adapted to it, through a variety of products that cover a wide range of thermal and power applications.

LT1	MT1	HT1	HTC1	
LT2	MT2	<b>HT2</b>	HTC2	
LT3	MT3	HT3	HTC3	
LT4	MT4	HT4		
90°C	120°C	150°C	180°C	210°C

## What is Rank<sup>®</sup>?

The Rank<sup>®</sup> equipment allows electrical energy and useful heat production using a low-temperature heat source, with economic and environmental benefits.



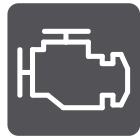
## Applications

Among the main applications of the Rank® ORC machines, we highlight the waste heat recovery and the use of renewable heat sources, with a special interest in cogeneration and trigeneration systems.

### Heat sources



Industrial Waste Heat



Engines



Biomass



Solar CHP



Waste



Geothermal

### Heat sinks



Cold Production



Heating

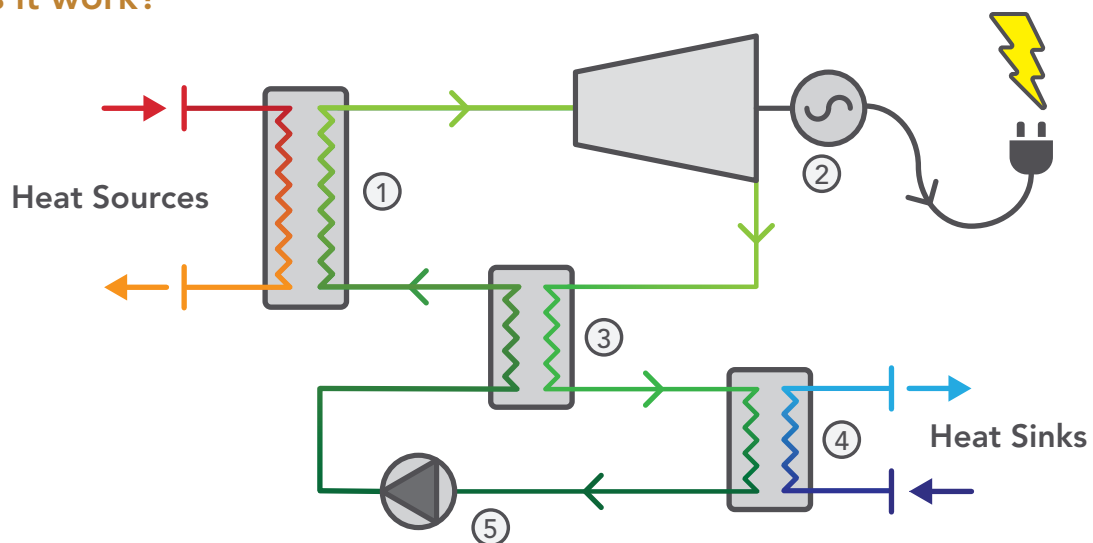


Industrial Processes



Drying

## How does it work?



- ① **Evaporator** A heat exchanger provides heat to the high-pressure working fluid and passes from subcooled liquid to superheated vapor (in the form of water or thermal oil).
- ② **Turbine** The expansion of the superheated vapor is used to generate clean electricity.
- ③ **Regenerator** The expanded working fluid is used to preheat the high-pressure liquid at the inlet of the evaporator To increase the efficiency of the system.
- ④ **Condenser** It produces useful heat (in the form of water) from the condensation of the working fluid at low pressure.
- ⑤ **Pump** The pressure of the working fluid is increased, and the ORC cycle is completed.



# Rank® HT2

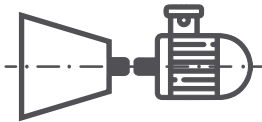
## Rank® Technology

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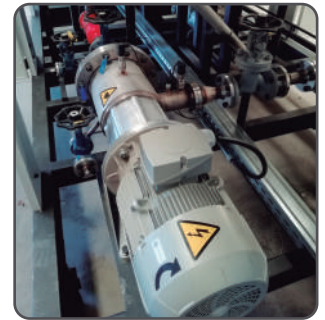
### Rank® low-rpm turbine

Operation at low revolutions reduces the noise level, lengthens the service life, and improves reliability.



### Rank® direct drive

Direct drive avoids the use of gears or pulleys, minimising the maintenance and increasing electrical efficiency.



### Zero leaks

Our hermetic components eliminate the leakage of the working fluid, reducing maintenance costs and downtime and being more environmentally friendly.



### Magnetic transmission

Magnetic transmission to ensure tightness and to reduce the possibility of leakage.



### Rank® easy-connect

Electronics-free connection to the electricity grid at the required electrical quality conditions.



### Flexible operation

Modular machines that can operate under a wide range of temperature and flow inlet and outlet conditions.



### Digitalisation through the Rank® control system

Our machines operate without the need for the human interface through an automatic, efficient managing system.



### Safety

It complies with all safety regulations and minimises the risk of accidents.






### Rank® service

Real-time remote monitoring and predictive control of the machines and automatically generated reports.

## Safety Regulations and Standards

- Low voltage Directive
- Machinery Directive
- Electromagnetic Compatibility Directive
- Pressurized Equipment Directive
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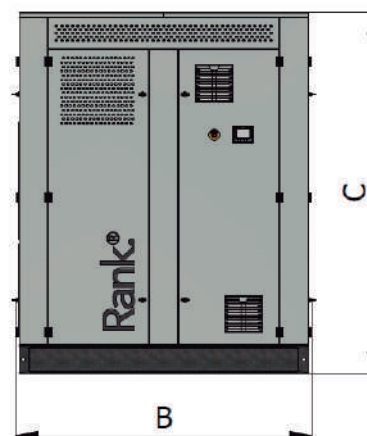
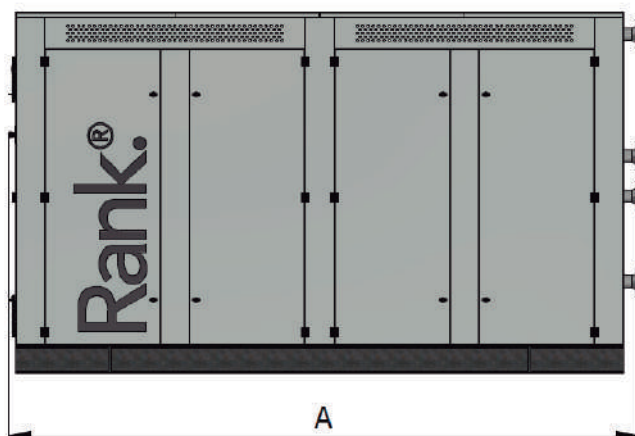
## Technical Data

	Heat source	Heat transfer fluid *	Thermal Oil	-
		Inlet temperature	150-180	°C
		Outlet temperature	110-140	°C
		Volumetric flow rate	26	m <sup>3</sup> /h
		Thermal power	400-600	kWt
		Connections diameter	DN65 PN16	-
		Pressure drop	100	kPa
		Heat transfer fluid inner volume	45	L
	Useful heat	Heat transfer fluid	Water	-
		Inlet temperature	20-40	°C
		Outlet temperature	30-50	°C
		Volumetric flow rate	36	m <sup>3</sup> /h
		Thermal power	300-450	kWt
		Connections diameter	DN65 PN16	-
		Pressure drop	125	kPa
		Heat transfer fluid inner volume	45	L
	Electricity	Gross power	40-65	kWe
		Net power	35-55	kWe
		Voltage	3 x 400	V
		Frequency	50/60	Hz
		Intensity	122	A
		Data Connection	RJ45	-
Container transport (optional)			HC 20'	

\* The heat transfer fluid can be water, steam, or thermal oil

HC (high cube)

## Dimensions



A = 4 850 mm  
 B = 2 050 mm  
 C = 2 500 mm  
 Weight 6 500 kg



# Rank.<sup>®</sup> HT3

## Product description

When it is possible to use heat sources above 150 °C, the Rank<sup>®</sup> HT3 machine is the most efficient option, with an electric generation of up to 140 kWe.

Heat recovered in the condenser can be transferred to water up to 50 °C and used in applications with thermal power below 1000 kWt.



## A Rank<sup>®</sup> machine for every need

Whatever your need is, we have a Rank<sup>®</sup> machine that can be adapted to it, through a variety of products that cover a wide range of thermal and power applications.

LT1	MT1	HT1	HTC1	
LT2	MT2	HT2	HTC2	
LT3	MT3	<b>HT3</b>	HTC3	
LT4	MT4	HT4		
90°C	120°C	150°C	180°C	210°C

## What is Rank<sup>®</sup>?

The Rank<sup>®</sup> equipment allows electrical energy and useful heat production using a low-temperature heat source, with economic and environmental benefits.



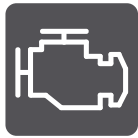
## Applications

Among the main applications of the Rank® ORC machines, we highlight the waste heat recovery and the use of renewable heat sources, with a special interest in cogeneration and trigeneration systems.

### Heat sources



Industrial Waste Heat



Engines



Biomass



Solar CHP



Waste



Geothermal

### Heat sinks



Cold Production



Heating

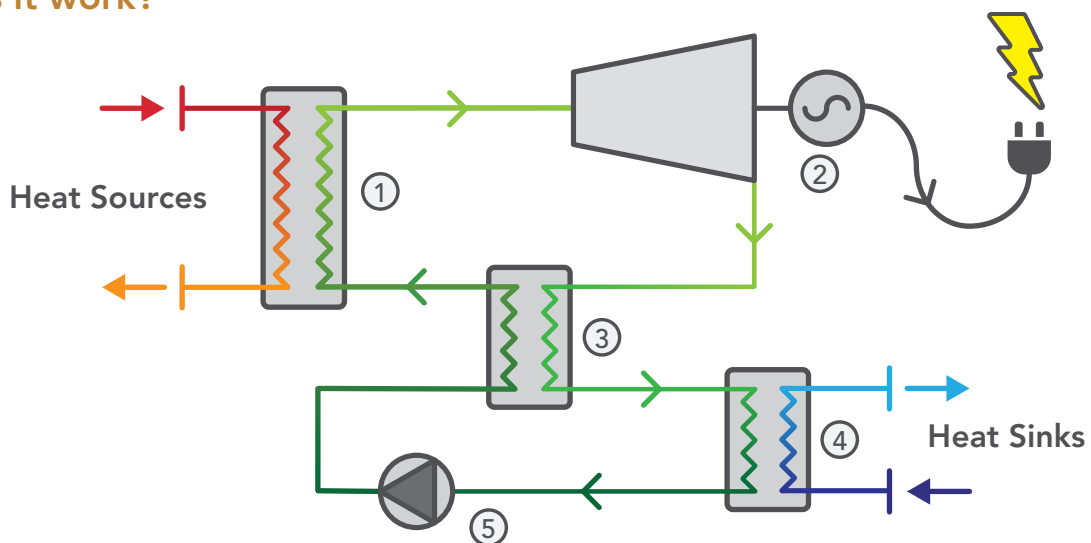


Industrial Processes



Drying

## How does it work?



- ① **Evaporator** A heat exchanger provides heat to the high-pressure working fluid and passes from subcooled liquid to superheated vapor (in the form of water or thermal oil).
- ② **Turbine** The expansion of the superheated vapor is used to generate clean electricity.
- ③ **Regenerator** The expanded working fluid is used to preheat the high-pressure liquid at the inlet of the evaporator To increase the efficiency of the system.
- ④ **Condenser** It produces useful heat (in the form of water) from the condensation of the working fluid at low pressure.
- ⑤ **Pump** The pressure of the working fluid is increased, and the ORC cycle is completed.

# Rank® HT3

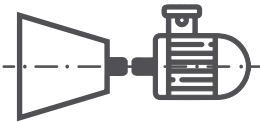
## Rank® Technology

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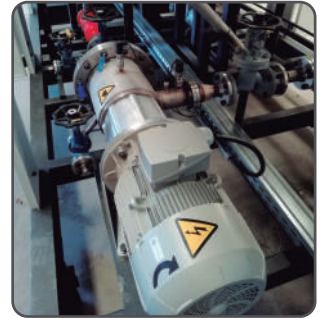
### Rank® low-rpm turbine

Operation at low revolutions reduces the noise level, lengthens the service life, and improves reliability.



### Rank® direct drive

Direct drive avoids the use of gears or pulleys, minimising the maintenance and increasing electrical efficiency.



### Zero leaks

Our hermetic components eliminate the leakage of the working fluid, reducing maintenance costs and downtime and being more environmentally friendly.



### Magnetic transmission

Magnetic transmission to ensure tightness and to reduce the possibility of leakage.



### Rank® easy-connect

Electronics-free connection to the electricity grid at the required electrical quality conditions.



### Flexible operation

Modular machines that can operate under a wide range of temperature and flow inlet and outlet conditions.



### Digitalisation through the Rank® control system

Our machines operate without the need for the human interface through an automatic, efficient managing system.



### Safety

It complies with all safety regulations and minimises the risk of accidents.



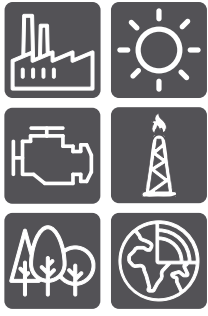





### Rank® service

Real-time remote monitoring and predictive control of the machines and automatically generated reports.

## Safety Regulations and Standards

- Low voltage Directive
- Machinery Directive
- Electromagnetic Compatibility Directive
- Pressurized Equipment Directive
- ENA ER G59/3
- ASME B31.1 – Power Piping Code, Mechanical
- ASME B31.3 – Process Piping Code
- ASME Boiler and Pressure Vessel Code Section VIII
- UL 508A- Control Panel Wiring
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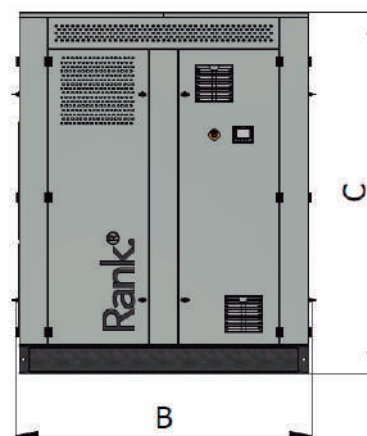
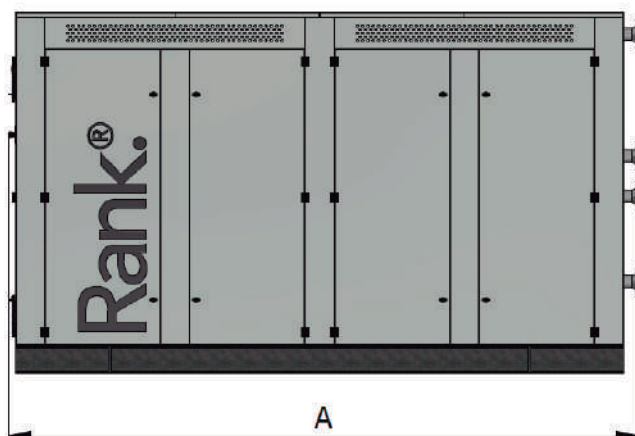
## Technical Data

		Heat source	Heat transfer fluid *	Thermal Oil	-
			Inlet temperature	150-180	°C
			Outlet temperature	110-140	°C
			Volumetric flow rate	56	m <sup>3</sup> /h
			Thermal power	850-1 350	kWt
			Connections diameter	DN100 PN16	-
			Pressure drop	100	kPa
			Heat transfer fluid inner volume	100	L
		Useful heat	Heat transfer fluid	Water	-
			Inlet temperature	20-40	°C
			Outlet temperature	30-50	°C
			Volumetric flow rate	77	m <sup>3</sup> /h
			Thermal power	600-950	kWt
			Connections diameter	DN150 PN16	-
			Pressure drop	125	kPa
			Heat transfer fluid inner volume	100	L
		Electricity	Gross power	90-140	kWe
			Net power	80-120	kWe
			Voltage	3 x 400	V
			Frequency	50/60	Hz
			Intensity	220	A
			Data Connection	RJ45	-
Container transport (optional)				HC 20'	

\* The heat transfer fluid can be water, steam, or thermal oil

HC (high cube)

## Dimensions



A = 5 500 mm  
 B = 2 250 mm  
 C = 2 500 mm  
 Weight 8 000 kg

# Rank.<sup>®</sup> HT4

## Product description

When it is possible to use heat sources above 150 °C, the Rank<sup>®</sup> HT4 machine is the most efficient option, with an electric generation of up to 280 kWe.

Heat recovered in the condenser can be transferred to water up to 50 °C and used in applications with thermal power below 1 900 kWt.



## A Rank<sup>®</sup> machine for every need

Whatever your need is, we have a Rank<sup>®</sup> machine that can be adapted to it, through a variety of products that cover a wide range of thermal and power applications.

LT1	MT1	HT1	HTC1	
LT2	MT2	HT2	HTC2	
LT3	MT3	HT3	HTC3	
LT4	MT4	<b>HT4</b>		
90°C	120°C	150°C	180°C	210°C

## What is Rank<sup>®</sup>?

The Rank<sup>®</sup> equipment allows electrical energy and useful heat production using a low-temperature heat source, with economic and environmental benefits.



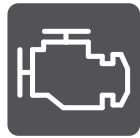
## Applications

Among the main applications of the Rank® ORC machines, we highlight the waste heat recovery and the use of renewable heat sources, with a special interest in cogeneration and trigeneration systems.

### Heat sources



Industrial Waste Heat



Engines



Biomass



Solar CHP



Waste



Geothermal

### Heat sinks



Cold Production



Heating

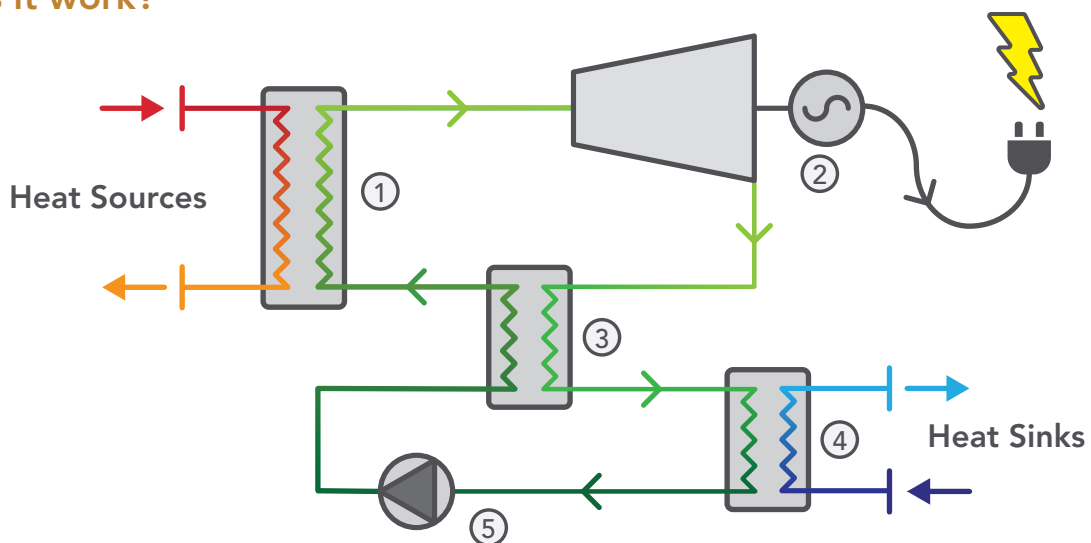


Industrial Processes



Drying

## How does it work?



- ① **Evaporator** A heat exchanger provides heat to the high-pressure working fluid and passes from subcooled liquid to superheated vapor (in the form of water or thermal oil).
- ② **Turbine** The expansion of the superheated vapor is used to generate clean electricity.
- ③ **Regenerator** The expanded working fluid is used to preheat the high-pressure liquid at the inlet of the evaporator To increase the efficiency of the system.
- ④ **Condenser** It produces useful heat (in the form of water) from the condensation of the working fluid at low pressure.
- ⑤ **Pump** The pressure of the working fluid is increased, and the ORC cycle is completed.



# Rank® HT4

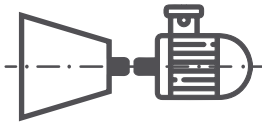
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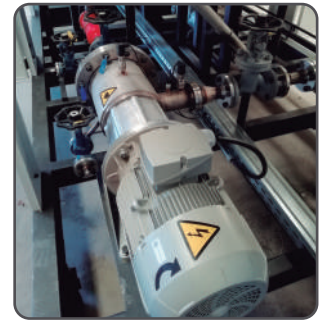
### Rank® low-rpm turbine

Operation at low revolutions reduces the noise level, lengthens the service life, and improves reliability.



### Rank® direct drive

Direct drive avoids the use of gears or pulleys, minimising the maintenance and increasing electrical efficiency.



### Zero leaks

Our hermetic components eliminate the leakage of the working fluid, reducing maintenance costs and downtime and being more environmentally friendly.



### Magnetic transmission

Magnetic transmission to ensure tightness and to reduce the possibility of leakage.



### Rank® easy-connect

Electronics-free connection to the electricity grid at the required electrical quality conditions.



### Flexible operation

Modular machines that can operate under a wide range of temperature and flow inlet and outlet conditions.



### Digitalisation through the Rank® control system

Our machines operate without the need for the human interface through an automatic, efficient managing system.



### Safety

It complies with all safety regulations and minimises the risk of accidents.



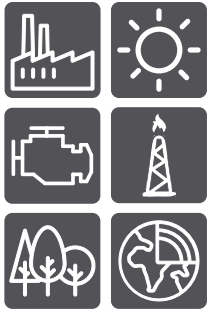


### Rank® service

Real-time remote monitoring and predictive control of the machines and automatically generated reports.c

## Safety Regulations and Standards

- Low voltage Directive
- Machinery Directive
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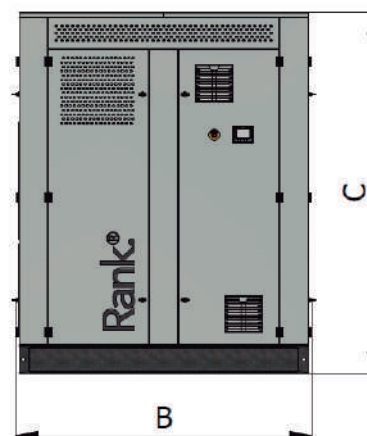
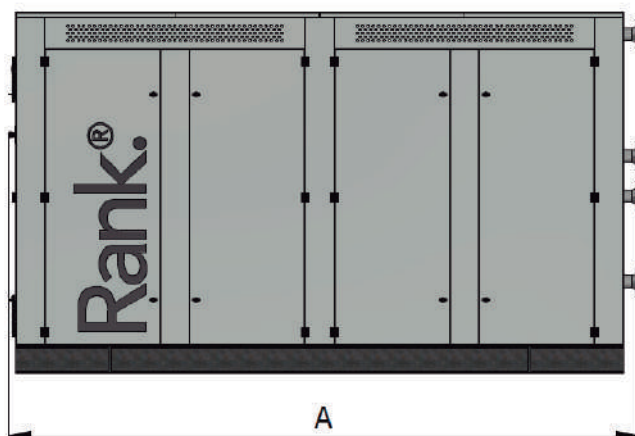
## Technical Data

 <p>Heat source</p>	Heat transfer fluid *	Thermal Oil	-
	Inlet temperature	150-180	°C
	Outlet temperature	110-140	°C
	Volumetric flow rate	112	m <sup>3</sup> /h
	Thermal power	1 700-2 700	kWt
	Connections diameter	DN150 PN16	-
	Pressure drop	125	kPa
Heat transfer fluid inner volume		160	L
 <p>Useful heat</p>	Heat transfer fluid	Water	-
	Inlet temperature	20-40	°C
	Outlet temperature	30-50	°C
	Volumetric flow rate	154	m <sup>3</sup> /h
	Thermal power	1 200-1 900	kWt
	Connections diameter	DN150 PN16	-
	Pressure drop	125	kPa
Heat transfer fluid inner volume		160	L
 <p>Electricity</p>	Gross power	180-280	kWe
	Net power	160-240	kWe
	Voltage	3 x 400	V
	Frequency	50/60	Hz
	Intensity	440	A
	Data Connection	RJ45	-
Container transport (optional)		HC 20'	

\* The heat transfer fluid can be water, steam, or thermal oil

HC (high cube)

## Dimensions



A = 6 000 mm  
 B = 2 250 mm  
 C = 2 500 mm  
 Weight 10 000 kg