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## E-RATIONAL ORC-1000

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BEP Europe (Burke E. Porter, [www.bepco.com](http://www.bepco.com)) - through its Energy & Infrastructure Division – “E-Rational” ([www.e-rational.net](http://www.e-rational.net)) is delivering a cost-effective solution to convert low temperature heat into clean energy power without emissions. Our state-of-the-art Organic Rankine Cycle (ORC) technology combined with the usage of industrial grade components makes E-Rational’s ORCs user-friendly, robust and economically viable.

E-Rational’s ORC machine has been designed for a maximized combined uptime and efficiency with a minimized operational and maintenance cost. This resulted in a skid-mounted modular machine, CE-compliant, with plug-and-play connections for easy installation.

The ORC-1000 machine absorbs up to 1,000 kW (3.4 MMBTU/h) thermal heat in a temperature range between 80°C and 150°C (176 °F – 302 °F). The ORC units are heat powered by hot water, thermal oil or low pressure steam coming from:

- Waste heat flows from industrial processes, e.g. cooling cycles from chemical plants, glass-, steel- & food- industry, power plants, etc.
- Unused heat in District Heating networks
- Biomass furnaces and CHP/COGEN or biogas installations
- Geothermal wells

Depending on the operating conditions, E-Rational’s ORC-1000 series are offered with different types of expander-generator sets with typical outputs ranging from 55 kWe to 132 kWe.



ORC-1000		Skid mounted modular Organic Rankine Cyclemachine	
Generator type Generator Power Range Expander		Asynchronous, 2 pole, 3 phase, 400V, 50-60 Hz 55kWe - 75kWe - 90kWe - 110kWe - 132kWe E-Rational (single screw, radial inflow)	
Heat Exchangers		Plate heat exchangers	
Applied EG-Norms: Machine directive EMC Directive Low voltage directive Pressure Equipment Directive		2006/42/EG 2004/108 EG 2006/95/EG 97/23/EG	
Electrical Enclosures		IP55	
Control system		PLC, Web Based Remote Monitoring	
Dimensions (L x W x H)		2,933 mm x 1,856 mm x 2,530 mm	9'6" x 6'1" x 7' 5"
Operating Mass (kg)		±3,800 kg	±8,378 Lbs
Operating Conditions (ambient temperature)		-20°C to +50°C	-4 °F to 122 °F
Temperature Heat input		80°C – 150°C	176 °F – 302 °F
Maximum heat input		1,000 kWth	3.4 MMBTU/h
Heat source		Hot water Thermal oil Low Pressure steam	
ORC working Fluid (depending on conditions)		Honeywell r245fa® Solkatherm SES36®	
Hydraulic connection heat source		2 Flanges DN150 PN16	
Hydraulic connection cooling		2 Flanges DN150 PN16	
Cooling system		Cold water Cooling tower Air cooler	
Housing		Suited for indoor installation	
Noise level		<70 dB at 10 m	
Emissions		No Emission No fuel consumption	

## TYPICAL PERFORMANCES

HEAT SOURCE: Hot water 1,000 kWth - 43m<sup>3</sup>/h (3.4 MMBT U/h - 189 GPM)  
COOLING: Cold water

Temperature heat source		Gross power production	
		Cold water out 20°C (68 °F)	Cold water out 30°C (86 °F)
90°C	194 °F	72 kWe	65 kWe
100°C	212 °F	84 kWe	74 kWe
110°C	230 °F	91 kWe	81 kWe
120°C	248 °F	101 kWe	91 kWe
130°C	266 °F	111 kWe	101 kWe
140°C	284 °F	121 kWe	112 kWe

HEAT SOURCE: Low Pressure Steam 1,000 kWth - 1.53 Tons/h - 0.43 kg/s (3.4 MMBTU /h - 3,373 Lbs/h)  
COOLING: Cold water out 20°C (68°F)

Steam Pressure		Saturated Steam Temperature		Gross power production
1.5 bara	21.76 psi	111°C	232 °F	99 kWe
2.0 bara	29.01 psi	120°C	248 °F	109 kWe
2.8 bara	40.61 psi	131°C	268 °F	117 kWe
4.0 bara	58.02 psi	143°C	289 °F	124 kWe

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