

CRAFTENGINE

PROVIDING RENEWABLE ENERGY AT A LOW COST



CRAFTENGINE™ POWERPACK – HEAT TO ELECTRICITY

- Waste Heat Recovery System with Power Output up to 40 kW_e +
- Renewable Power Generation from e.g. Biomass and Solar Thermal
- Industrial Engine Design by Viking Heat Engines and AVL Schrick
- Low Cost and High Reliability
- Heavy Duty Expander Design – Low Maintenance and Long Lifetime
- Cost-Effective – Competitive Energy Costs (typ. €5-10 cents/kWh)

The **CRAFTENGINE™ POWERPACK** accepts any available waste heat source with temperatures from ~90 °C (190 °F) and upwards to generate electricity, without the need to burn fuel. If sufficiently low cooling temperatures are provided, usage of even lower feed temperatures are possible.

The **CRAFTENGINE™ POWERPACK** can effectively utilize a variety of waste heat sources (exhaust, off-gases, steam and hot water) from diesel engines, gas engines, turbines, waste incinerators, metal smelters, food plants, dairy plants, chemical plants and more.

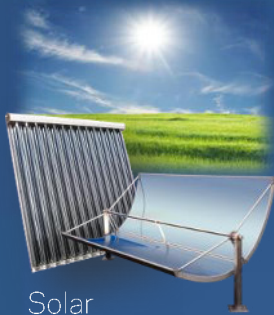
The **CRAFTENGINE™ POWERPACK** is also suitable for renewable heat sources such as geothermal, solar thermal systems and biomass boilers.

The **CRAFTENGINE™ POWERPACK** is ready for delivery and can be ordered today.

Renewable heat sources:



Geothermal



Solar



Biomass



CraftEngine expander

Field tests are presently ongoing and the CraftEngine PowerPack is now available for order for selected applications.



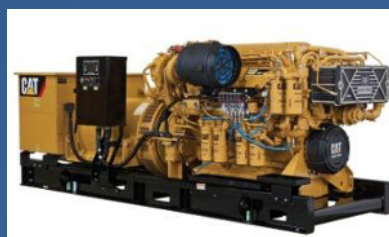
Some waste heat sources:



Natural & biogas engines



Cooling of metal products



Diesel generators



Cooling of aluminum smelters



Waste incinerators



Food, dairy and chemical plants



Detail design and manufacturing by AVL



SPECIFICATIONS

Note: all parameters may be subject to change without notice.



CRAFTENGINE™ POWERPACK Technical Specifications

Input temperature range*:	90 – 215 °C	(190 – 420 °F)
Output temperature range*:	20 – 85 °C	(70 – 185 °F)
Engine type:	Piston Organic Rankine Cycle	(4 x packaged piston expanders)
Engine speed range:	750 – 1500 RPM	
Electrical output power*:	10 – 40 kW**	
Electrical efficiency*:	6 – 10 %	
Input heat power*:	100 – 600 kW	(340 000 – 2 000 000 BTU/hr)
Maintenance interval (indicated):	Simple maintenance once a year, overhaul after five years (at full-time operation)	
System dimensions (mm / inches):	L	W H
A) Electrics Module:	560 / 22	1160 / 46 2190 / 86
B) Engine Module:	3200 / 126	1100 / 43¼ 2080 / 82
C) Process Module:	1070 / 42	2110 / 83 2070 / 81½



* depending on operating conditions - ranges are indicative

** in many case more than 40 kW at high source temperatures

Performance Example:

CRAFTENGINE™ POWERPACK

Boundary conditions:		Waste heat	
		Low Temperature	High Temperature
Source temp.	°C	100	200
Sink temp.	°C	20	20
Electrical power, net from CE	kW	36	45
Electrical power, grid output*	kW	30	40
Thermal efficiency	%	7-9	10-12
Electrical efficiency	%	6-8	9-11
Overall efficiency*	%	5-7	8-10
Heat supply	kW	100 – 600	100 – 500

*Grid power and efficiency also account for common parasitic losses (pumps, fans, electrics etc.)



CraftEngine in a real environment (Returkraft, Kristiansand, Norway)

The CRAFTENGINE™ Technology

The CraftEngine™ technology has been developed in a joint collaboration between Viking Heat Engines and AVL, where Viking has provided the technology foundation, and AVL provided the detailed technical expertise for engine and engine systems design.

Through this collaboration, a comprehensive, cost-effective and reliable ORC technology platform has been developed, which is suitable for many applications in the fields of energy recovery, renewable power generation and more.

The technology offers many solutions in addition to what is presented here, both in terms of applications and power ranges.

Please contact Viking Heat Engines AS or AVL Schrick for further dialogue on how we may be able to support your application.



Viking Heat Engines



Østre Strandgate 38
P.O. Box 22
N-4661 Kristiansand
NORWAY

Tel: +47 38 10 41 00
Fax: +47 38 02 08 40
E-mail: firmapost@vdg.no
www.vdg.no



Walter-Freitag-Str. 16
D-42899 Remscheid
GERMANY

Tel: +49 (0)2191 950 0
Fax: +49 (0)2191 950 19 140
E-mail: info@avl-schrick.com
www.avl-schrick.com