

# **CraftEngine**

## **Large Series**

**ORC piston engines for  
sustainable electricity  
production**



**Viking Heat Engines**

# Overview

The CraftEngine Large Series comprises several ORC engines currently under development by Viking Heat Engines. The series extends the technology range from the commercially available CE40 engine and includes different engine sizes with power outputs in the range from 100 to 400 kW<sub>el</sub>, and higher.

The engines can operate efficiently at temperatures from around 80 °C and upwards (in some cases even from 70 °C), providing a unique opportunity to utilize low-temperature waste heat currently not being used. They are also capable of combined heat and power (CHP) operation at input temperatures above 150 °C.

A number of innovative solutions enable fully automatic adjustments to temperature and heat input conditions without compromising on efficiency.

At the heart of the Large Series is the piston expander developed in collaboration with AVL, the world's largest independent engine design company. The expander is based on an industrial heavy duty piston machine design similar to that found in e.g. utility diesel generators, resulting in a long lifespan and minimum of maintenance. The design also allows for operation on all common refrigerants, including HFOs with a global warming potential (GWP) of less than 10.

**Disclaimer:**

The content in this document is subject to change without notice or obligations. Information contained herein should be confirmed before placing orders.

Copyright © 2018 Viking Heat Engines. All Rights Reserved.

# Key features

- Robust, proven design
- High performance on variable load
- Adaptable to different heat source capacities due to the flexible product range (e.g. from 2 to 12-cylinder expanders)
- High efficiency on both low-and high-temperature input (from 80 °C and upwards)
- Combined heat and power (CHP) system able to deliver hot water up to 110 °C
- 160,000 hours service life (20 years) at full load with minor overhaul after 40,000 hours and major overhaul after 80,000 hours
- Compatible with all 3<sup>rd</sup> and 4<sup>th</sup>-generation working fluids (e.g. HFCs and HFOs)
- Scalable from 100 to 400 kW<sub>eI</sub> (single units) and upwards (e.g. 10 units = 4,000 kW<sub>eI</sub>)
- Advanced variable valve timing
- Internal lubricant circuit with filter and preheater
- Water cooled generator with integrated thermal monitoring for very high temperature applications
- Remote access and monitoring of systems worldwide

# Usage examples

## **Diesel & gas generator sets**

The Large Series can lower the fuel consumption or increase power output of generator sets by up to 13%.

## **Marine vessels**

The Large Series can utilize waste heat from marine applications from below 80 °C and upwards, and drastically reduce fuel consumption from ship engines.

## **Geothermal wells**

The Large Series can utilize low-temperature geothermal heat from below 80 °C and upwards.

## **Incinerators**

Combined with small waste incinerators, the Large Series can provide power outputs in the range from 100 kW<sub>eI</sub> to several megawatts. The combined solutions can also be used as CHP systems.

## **Biomass boilers**

Combined with biomass boilers, the Large Series can provide power outputs in the range from 100 kW<sub>eI</sub> to several megawatts. The combined solutions can also be used as CHP systems.

# Technical data

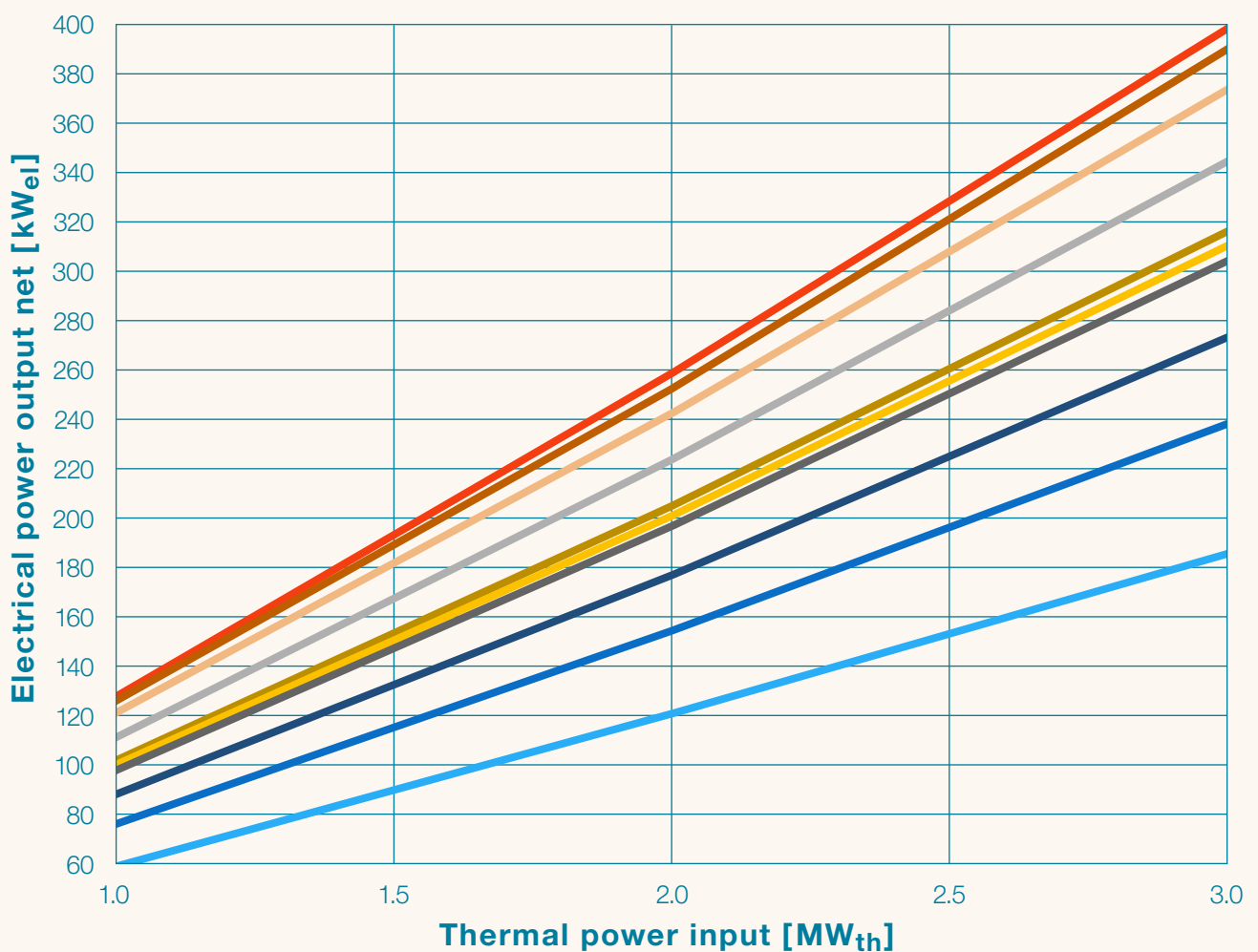
## Expander

Size range	2 to 12 cylinders
Type	Reciprocating (Piston)
Power regulation	Continuous

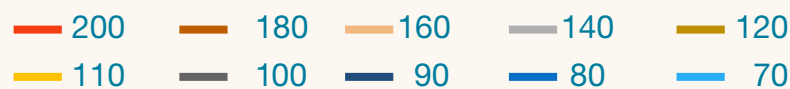
## Operation

Working fluids	HFCs and HFOs
Thermal power input range	1,000-8,000 kW <sub>th</sub>
Electrical power output nominal (gross)	120-480 kW <sub>el</sub>
Electrical power output nominal (net)	100-400 kW <sub>el</sub>

# Large Series performance overview



## Inlet temperatures (°C)

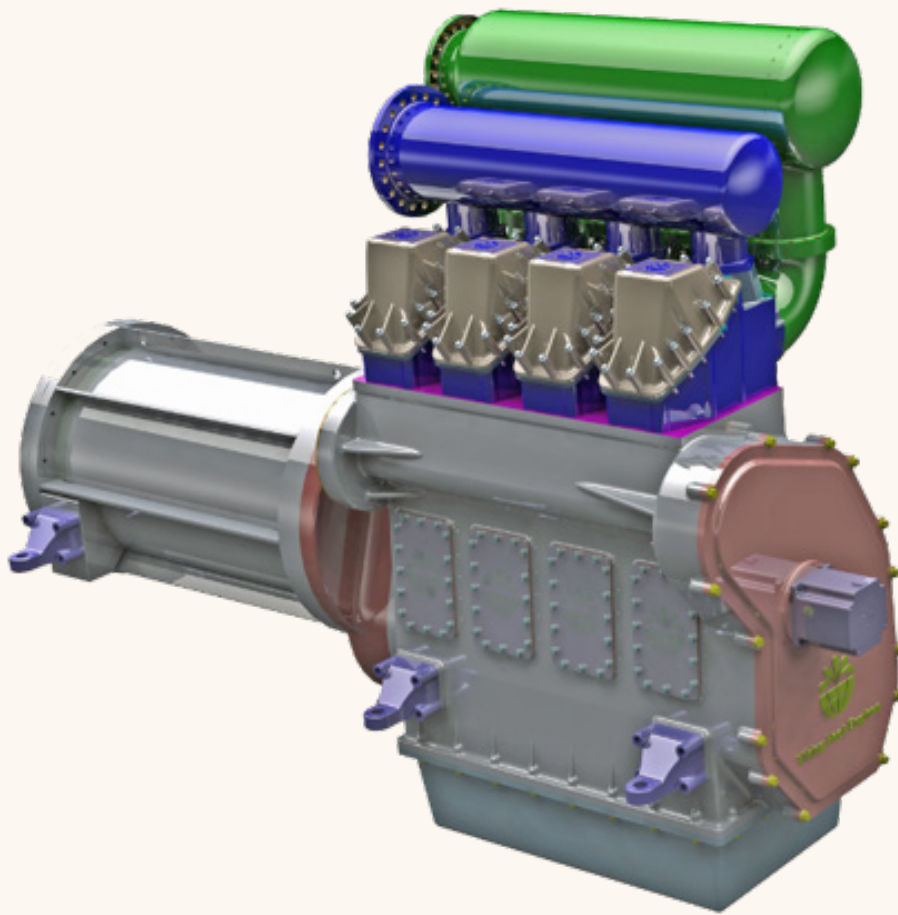


## Performance conditions in the graph above:

Inlet heat below 100 °C typically requires a temperate climate.

The difference between the inlet and outlet heat source temperature amounts to 10 °C.

# Concept design



Viking Heat Engines AS  
Østre Strandgate 38  
4661 Kristiansand  
Norway  
Tel: +47 38 10 41 00  
[norway@vikingheatengines.com](mailto:norway@vikingheatengines.com)

Viking Heat Engines Germany GmbH  
Walter-Freitag-Str.1  
42899 Remscheid  
Deutschland  
Tel: +49 2191 44895 00  
[germany@vikingheatengines.com](mailto:germany@vikingheatengines.com)