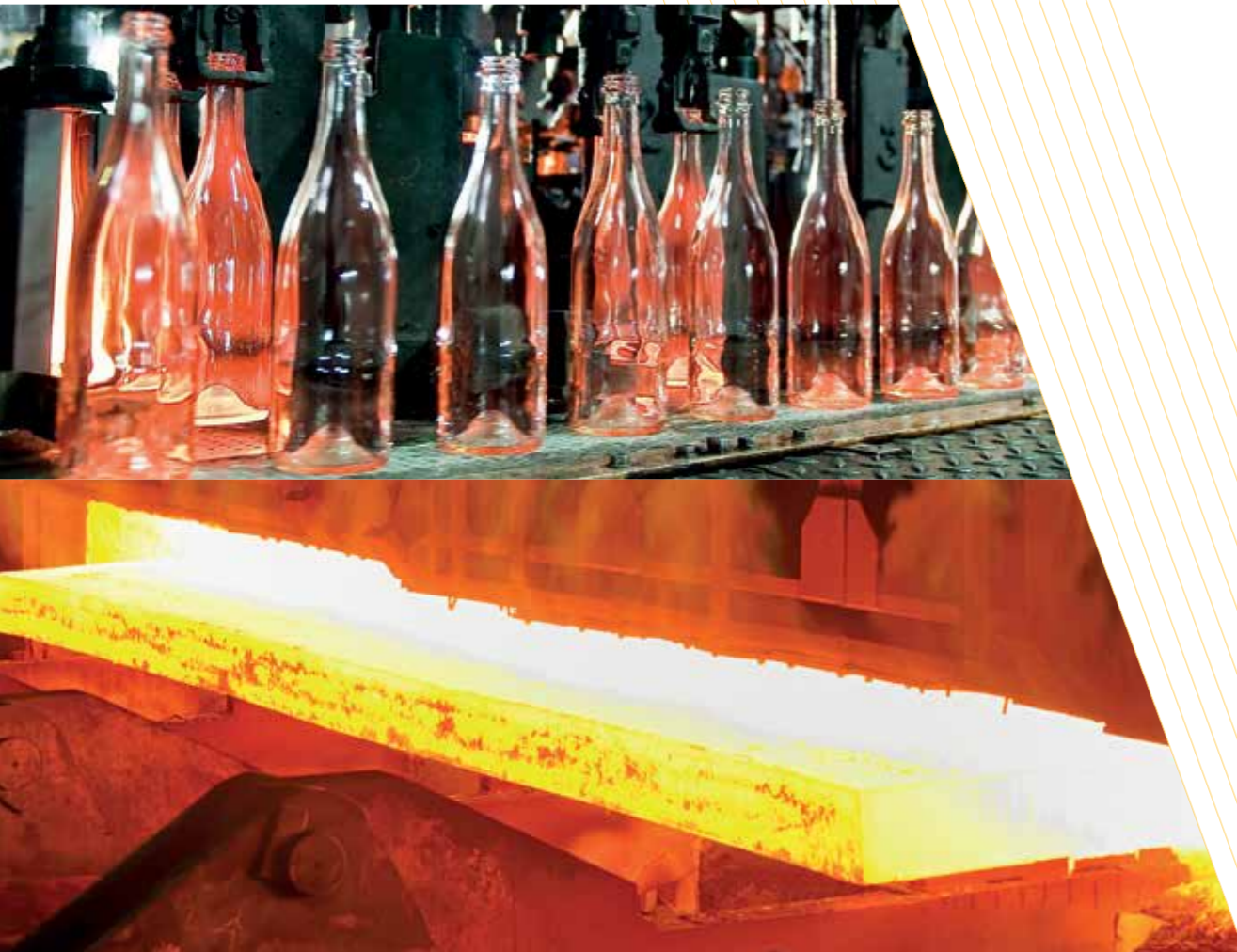


DeVeTec



DeVeTec

DeVeTec GmbH
Im Schiffelland 9
66386 St. Ingbert
Tel.: +49 6894 89595 0
Fax: +49 6894 89595 12
E-Mail: info@devetec.de

www.devetec.de

WASTE HEAT POWER PLANTS

CONVERSION OF WASTE HEAT TO
COMPRESSED AIR, ELECTRICITY,
REFRIGERATION AND USEFUL HEAT



THE DEVETEC ORC-TECHNOLOGY

The DeVeTec-ORC method is a classic vapour cycle process. Instead of using water like conventional processes, the ORC-process runs with the organic medium bioethanol. As a working machine, a **Piston-based Vapour Expansion Engine** is used.

- // **Bioethanol is safe and inexpensive.**
- // **In combination with the piston-based vapour expansion engine, bioethanol exhibits excellent process engineering characteristics.**
- » **The waste heat can be converted to useful heat with flow temperatures of 90°C (and higher) and can be used for:**
 - generating heating-circuit water and hot water
 - drying products
 - preheating reactants flows
 - refrigeration
- » **Compared to other processes, the waste heat can be exploited to a distinctly higher degree.**
 - The waste heat source can be cooled down to a very large extent; thus, more energy is available for utilisation.
 - The piston-based vapour expansion engine is able to utilise the energy provided in a highly efficient manner.

EFFICIENT UTILISATION OF WASTE HEAT

Constantly rising energy costs, legal requirements regarding energy saving as well as our dependency on energy and raw material imports confront us with major challenges. These challenges can only be addressed through new forms of energy generation – primarily renewable energy and higher energy efficiency. As every single kilowatt hour which is not consumed represents the most economical and ecological method of handling energy, DeVeTec GmbH have developed a heat recovery system enabling a highly efficient utilisation of waste heat for conversion into electricity, compressed air or refrigeration as well as useful heat.

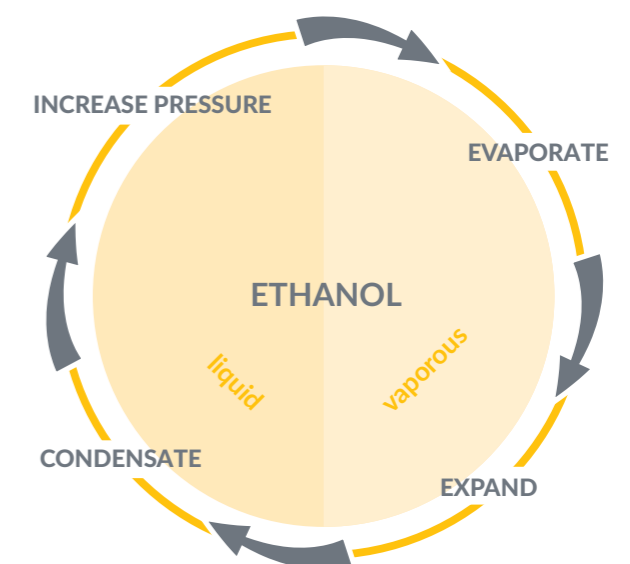
All advantages at a glance:

- /// **Generation of compressed air, electricity or refrigeration without application of primary energy, directly from your waste heat**
- // **Saves fuel and energy costs**
- // **Improvement of the CO₂ and energy balance of your company**
- // **High availability due to the use of high-quality components**
- // **Unparalleled performance under partial loads for maximum runtimes also in case of discontinuous waste heat (30 to 110 % of the nominal load)**
- // **High efficiency thanks to the development of the piston-based vapour expansion engine**
- // **Useful heat at temperatures as needed for heating, pre-heating or drying purposes**
- // **Fully automatic operation suitable for telemonitoring**

DEVETEC-OCR-PROCESS

- The feeding pump compresses the working medium.
- The working medium is evaporated and overheated with the energy provided by the waste heat source.
- In the engine, thermodynamic energy is converted to mechanical rotation energy. The engine is able to drive various machines producing electricity, compressed air or refrigeration.
- Useful heat is provided through condensation of the steam.

The cycle always proceeds under the same conditions:



HEAT 2X



COMPRESSED AIR
ELECTRICITY
REFRIGERATION

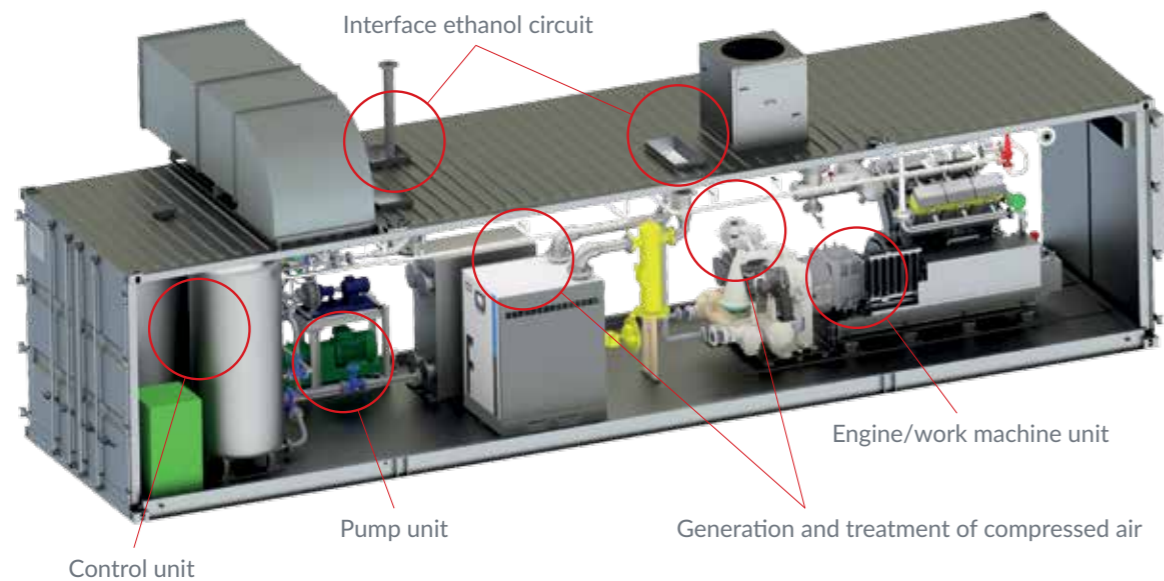
HIGHLY EFFICIENT CONVERSION OF WASTE HEAT

DeVeTec waste heat power plants are equipped with a product family of ORC (OrganicRankineCycle)-piston-based vapour expansion engines and are able to use industrial waste heat (temperature >250°C, heat >600 kW) for the production of compressed air, electricity, refrigeration and useful heat in a highly efficient and commercially profitable manner.

The centrepiece of a DeVeTec-waste heat power plant is the piston-based vapour expansion engine (piston expander), which has been specifically developed by DeVeTec to enable efficient conversion of heat into operating energy and which has proven its high reliability in several applications under long-term loading conditions. The ability to use the waste heat for the production of compressed air or refrigeration directly, without prior generation of electricity, represents a unique selling point of the DeVeTec-technology.

THE DEVETEC WASTE HEAT POWER PLANT

All components required for operation and the generation of the desired energy types are integrated into one container for easy maintenance and service



WASTE HEAT produced by:

- » The glass industry
- » The steel industry
- » The ceramics and brick industry
- » The cement, lime and gypsum industry
- » The chemical industry
- » Energy generation

converted – with a high degree of efficiency – to:

// COMPRESSED AIR



// REFRIGERATION



// ELECTRICITY



INNOVATION AWARD

Award granted 2016/17 by the Donors' Association

The possibility offered by the DeVeTec waste heat power plant to use waste heat for the production of compressed air or refrigeration directly, without prior generation of electricity, represents a unique selling point of the DeVeTec-technology

PRODUCT OVERVIEW

TECHNOLOGICAL SPECIFICATIONS

WASTE HEAT

Medium	Exhaust gas, exhaust air, thermal oil
Temperature	250°C min.
Quality	Dust and chemical loads are possible

WASTE HEAT POWER PLANT

Work medium	Bioethanol
Plant operation	Fully automatic and telemonitored
Noise emissions	less than 65 dB(A)
Dimension (L*H*W)	12m * 3m * 3m
Weight	30 - 35 t

PERFORMANCE DATA

		V8	V12	V16
Thermal Input	[kW _{thermal}]	960	1440	1920
Power generation, net	[kW _{electrical}]	135	204	272
Compressed air generation 7.5bar	[Nm ³ /h]	1520	2280	3040
Refrigeration 6°C / 12°C	[kW _{thermal}]	700	1050	1400
Useful heat up to 90°C	[kW _{thermal}]	613	921	1228
Optional absorption cooling	[kW _{thermal}]	520	780	1040



OUR SERVICES

DeVeTec – your competent partner in all phases of project development and implementation!

Our service offer includes all engineering services required for the implementation of projects, but also the design of financing or contracting solutions.

Our Services at a Glance:

- // Development of the heat utilisation concept
- // Development of concepts for project implementation
- // Assistance with the grant of subsidies
- // Engineering services regarding the integration of the waste heat power plant into the existing plant
- // Manufacturing of the power plant at our site in Sankt Ingbert
- // Mounting, commissioning tuned to the conditions at the site
- // Maintenance, service, repair
- // Telemonitoring, accompanying process optimisation

PISTON-BASED VAPOUR EXPANSION ENGINE DEV-V12

