Waste Heat Recovery
In small and medium-sized industrial processes

ACTE provides a very specific kind of annular-shaped heat exchangers dedicated to waste heat recovery from fumes and exhaust gas, especially in micro-processes.

When innovation Acts for savings
Heat recovery is a concern for many fields of activity.
In the industry, this concern gets various impacts.

"It is estimated that 20-50% of industrial energy usage is eventually released as waste heat."
TechNavio.com, Mars 2015
Waste heat doesn’t have to be just waste

Heat is needed in many industries. Waste heat from a process can become a resource for another one.
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Heat is needed in many industries. Waste heat from a process can become a resource for another one.
ACTE’s answer: allow the use of the heat in another process

Heat Source:
- Furnace
- Incinerator

Internal needs:
- Preheating
- Temperature keeping
- Drying
- Steam
- ....
- Heating system
ACTE answers to a combination of several needs in small and medium industries

GAP-TYPE HEAT RECUPERATOR

- Low space available
- Weight limitation
- 200 to 650°C and more
- Care for fouling
- Lifetime management
- Potential serial production suitable
Use of waste heat to preheat a gas furnace
Waste heat valorization: Many potential applications in the industry

- Use of waste heat to generate power (direct ORC)

Diagram showing a heat exchanger system with temperatures at 600°C, 200°C, 160°C, and 100°C.
Use of waste heat for space heating
Waste heat valorization: Many potential applications in the industry

- Use of waste heat for parts/space heating

Cooking furnace Fumes @350°C

- Plugged on heating boiler

Thermal Treatment Fumes @650°C

- Plugged on water air heater

175°C

90°C

230°C

90°C

90°C

35°C

60°C
Example: 1 specific application
Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts
Example: 1 specific application in the Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts

<table>
<thead>
<tr>
<th>Exhaust fumes features</th>
<th>Degrease bath features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td><strong>Temperature</strong></td>
</tr>
<tr>
<td>180°C</td>
<td>55°C</td>
</tr>
<tr>
<td><strong>Flow</strong></td>
<td><strong>Inlet Temperature</strong></td>
</tr>
<tr>
<td>4200 Nm³/h</td>
<td>Variable (60-70°C)</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td><strong>Total flow (5 baths)</strong></td>
</tr>
<tr>
<td>1,05 bar (a)</td>
<td>3600 Nm³/h</td>
</tr>
<tr>
<td><strong>Pressure drops</strong></td>
<td><strong>Pressure</strong></td>
</tr>
<tr>
<td>&lt;50 mbar</td>
<td>3 bars (a)</td>
</tr>
<tr>
<td><strong>Fumes type</strong></td>
<td><strong>Energy used</strong></td>
</tr>
<tr>
<td>Gaz Naturel/Air</td>
<td>Natural gas burners</td>
</tr>
</tbody>
</table>
Example: 1 specific application in the Automotive manufacturing

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Example: 1 specific application in the Automotive manufacturing

- Use of a furnace waste heat in order to degrease manufactured parts

\[
ROI = \frac{\text{Cost of the full system (2 loops)}}{0.03\, \text{€/kWh} \times \text{Recovered Energy} \times 120\, \text{h} \times 50\, \text{weeks}}
\]

2 years | 2.5 years | 3.5 years
To sum up... standardized solutions are available...

GAP-type
Industrial processes
Waste Heat Recovery
Steam Generation

Low impact on flows

Regeneration
Very high efficiency
... While it is also possible to get tailor-made solutions...

The objective here: to grow together with our customers needs

- Specification analysis
  - Preliminary study

- Adaptation to get the most suitable solution/configuration
  - First approach

- Need for a tailor-made solution
  - Development program

- Manufacturing unit/series
  - Industrialization
GAP-type recuperators: For whom, where, how?

Existing industries (small and medium sized)
- Ceramics
- Gypsum/Cement
- Food
- Textile
- Iron and steel
- Automotive
- Air space
- ...

High temperature heat sources (>200°C)
- Gas furnaces (parts melting, thermal treatment, ...)
- Incinerators (agro-food, biomass ...)
- Cogeneration units (with micro gas turbines or engines)

Many applications / valorizations:
- Preheating furnaces/products
- Drying parts
- Cooling baths for various products
- Steam/Vapor Treatment
- Heating system (local)
- Power generation (ORC cycles, turbines...)
Any questions?

Our experts will be pleased to answer

- Business development
- Customer specification
- Partnerships design

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- Thermo-dynamic design expertise
- Study, conception and innovation

Sebastien.dubois
@acte-sa.be

- General management
- Project follow-up from need to operations

Luc.prieels
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Thank you!

When innovation Acts for savings
How does the GAP type product work?

The Primary fluid (fumes/exhaust gas) flows in between the plates.

The secondary fluid goes inside the flat tube (combustion air, hot water, thermal oil, steam...).