diverter damper systems

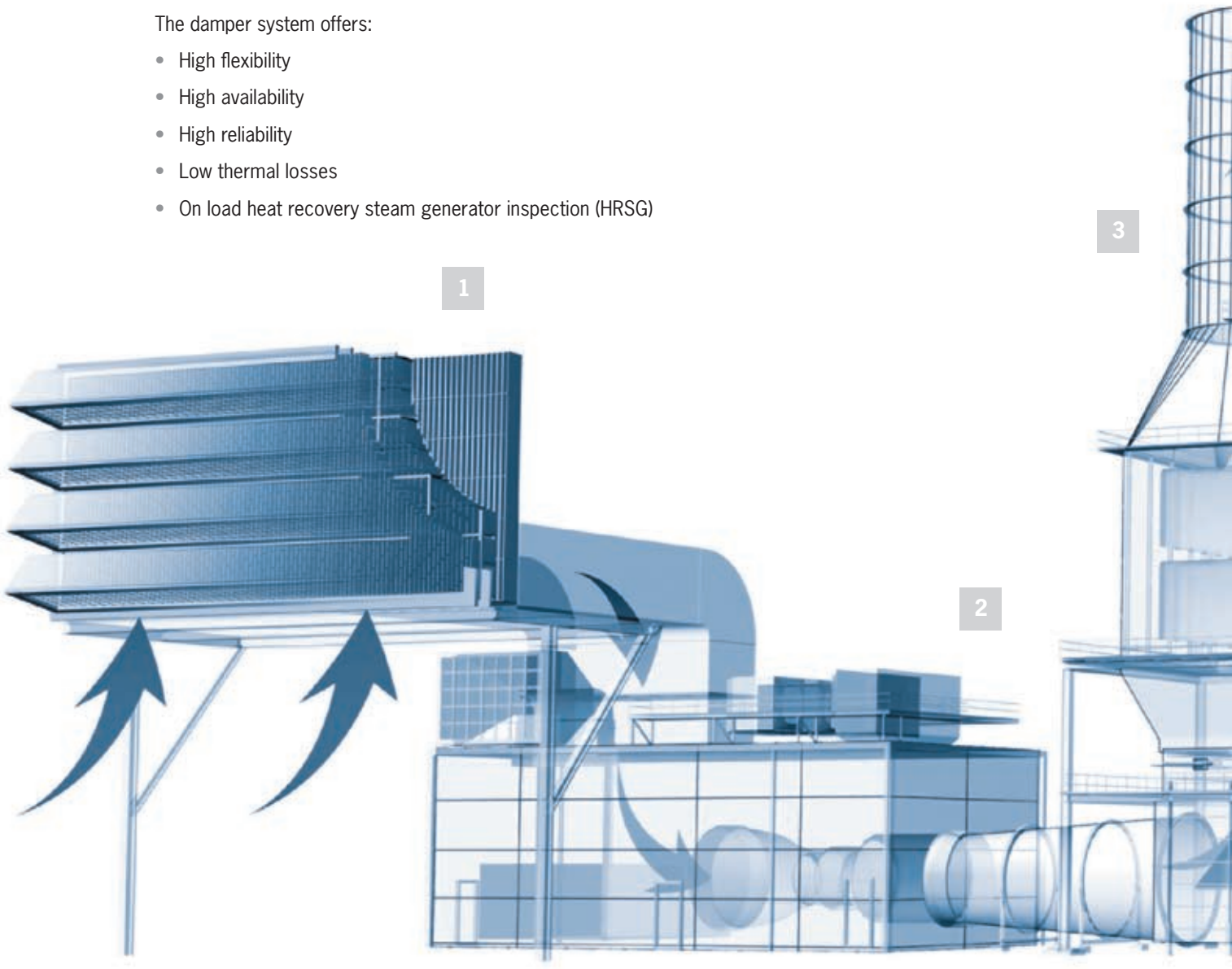
Camfil Farr Power Systems	Application brochure
Power Systems	
Camfil Farr - clean air solutions for turbomachinery	

Flexibility for gas turbine power plants

During the past three decades the need of gas turbine power plants has increased considerably. Reason for this is the short term built up and extreme flexibility with possible quick start up and shut down for ton demand power availability. To increase the flexibility of the power plants, diverter systems enable alternative use as single- or combined cycle system with connected heat recovery steam generator.

The damper system offers:

- High flexibility
- High availability
- High reliability
- Low thermal losses
- On load heat recovery steam generator inspection (HRSG)



1. Inlet system

2. Enclosure

3. Exhaust

4. Diverter and Guillotine Damper

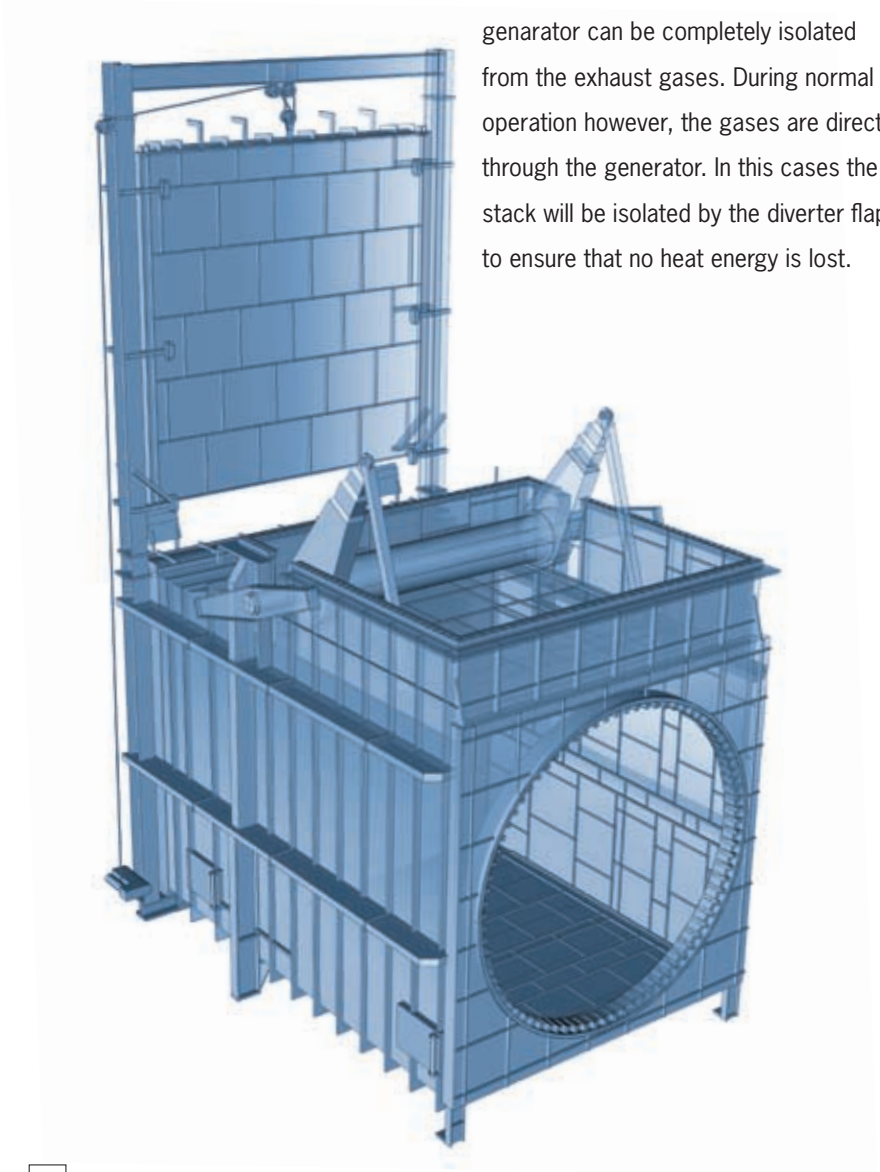
4

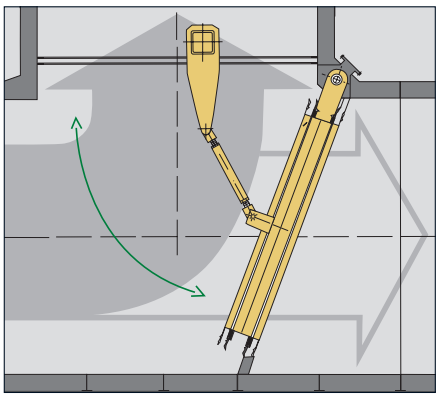
A smart and reliably construction

A diverter, as its name suggests, must divert or guide large amounts of exhaust gases emitted from a gas turbine during operation. This exhaust gas contains heat energy, which must be directed to a heat recovery steam generator.
When diverted through the stack the genarator can be completely isolated from the exhaust gases. During normal operation however, the gases are directed through the generator. In this cases the stack will be isolated by the diverter flap to ensure that no heat energy is lost.

Diverters

- toggle or pivot drive system
- internal or external insulated
- double skin blade for 100% tightness
- minimum seal air consumption
- optimised flow conditions
- low maintenance



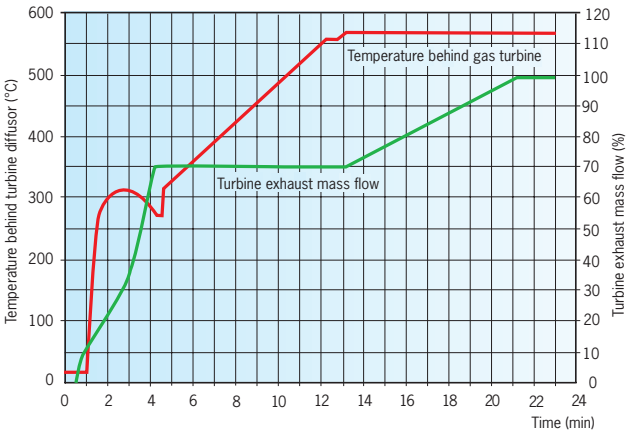


High reliability of components ensures a minimum of downtime for service

The design of Camfil Farr Power System incorporates high reliability components to ensure an absolute minimum of downtime for service. A sandwich-type flap, with independent expandable double skin blades, actuated by a toggle lever system and powered by double twin hydraulic drives controls the hot exhaust gases. All drive components within the diverter are located on the bypass side. This ensures an unrestricted gas flow to the heat recovery steam generator, maximizing energy recovery during normal operation.

The complete diverter unit is manufactured from materials, which can effortlessly withstand the exhaust gas environment. The design is such that heat induced material-stress within the diverter is kept to a minimum. This is basically achieved by a sophisticated design, which will allow unrestricted thermal expansion of all components including the casing itself. Elaborated thermal insulation ensures that temperature loss is minimized and the outer casing of the diverter is kept cool during operation.

Typical start up and load diagram at ISO ambient conditions



Sandwich blade

Forged shafts

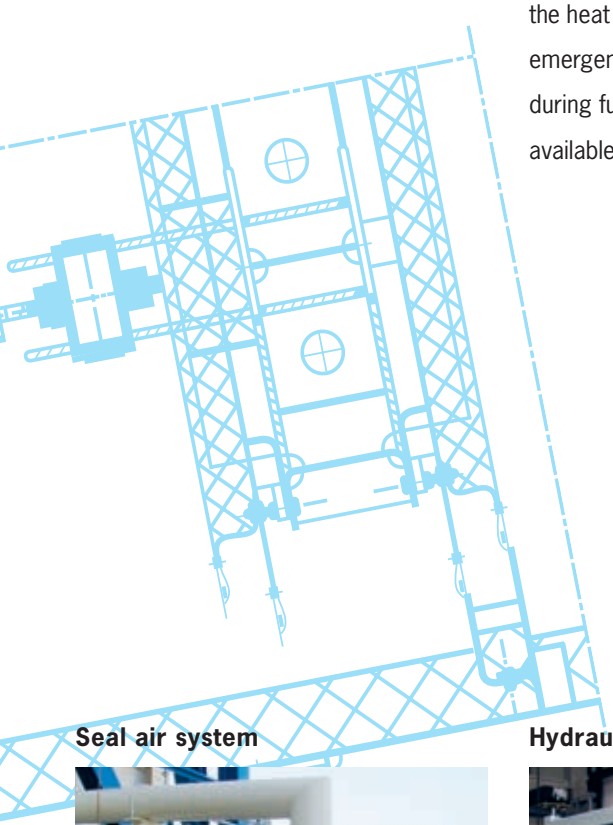
Diverter damper components

The advantage of diverter dampers from Camfil Farr Power Systems is the flexible operation possibility with multi function hydraulic units. Ouick start of the gas turbine via bypass, then regulated slow heating of the heat recovery steam generator and emergency opening to bypass operation during full load of the gas turbine are available.

The position of the flap itself is infinitely controllable. Besides completely shut, the blade can be positioned into preferred intermediate positions.

The drive system can completely open and shut the flap within 60 seconds or 20 seconds in emergency case. It is then possible to mechanically lock the flap in this position.

A seal air system with 100% standby completely leakage of exhaust gases, allowing also inspection of the heat recovery steam generator even during the continued operation of the gas turbine to bypass.



Seal air system

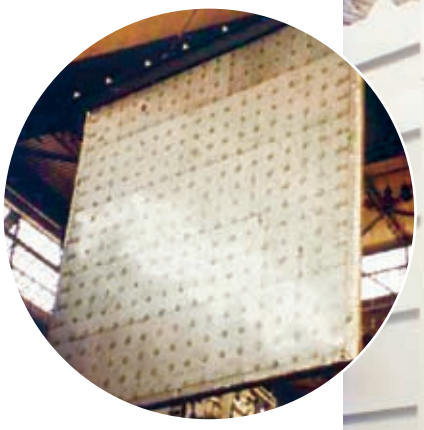
Hydraulic power unit

Instrumentation box

A safe blanking plate system ensures 100% tightness to HRSG

For inspection of the heat recovery steam generator additional safety isolation is often requested. The Camfil Farr Power System blanking plate system is operated by electrical winch and inserted through an opening cover with automatic pressure release.

A thermal insulation on the blanking plate minimises temperature transfer. During operation of the blanking plate system, the diverter operation is mechanically blocked.



On world standards...

...Camfil Farr is the leader in clean air technology and air filter production.
Camfil Farr conducts its own product development and R&D, and has worldwide local representation.
Our overall quality goal is to develop, produce and market top-quality products and services that always exceed our customers´ expectations.
We see our activities and products as an expression of our quality.

To achieve overall high quality, it is necessary to establish an internal work environment where all Camfil Farr's employees can succeed together. This means an environment characterised by openness, confidence and always doing what's right for our customers.

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