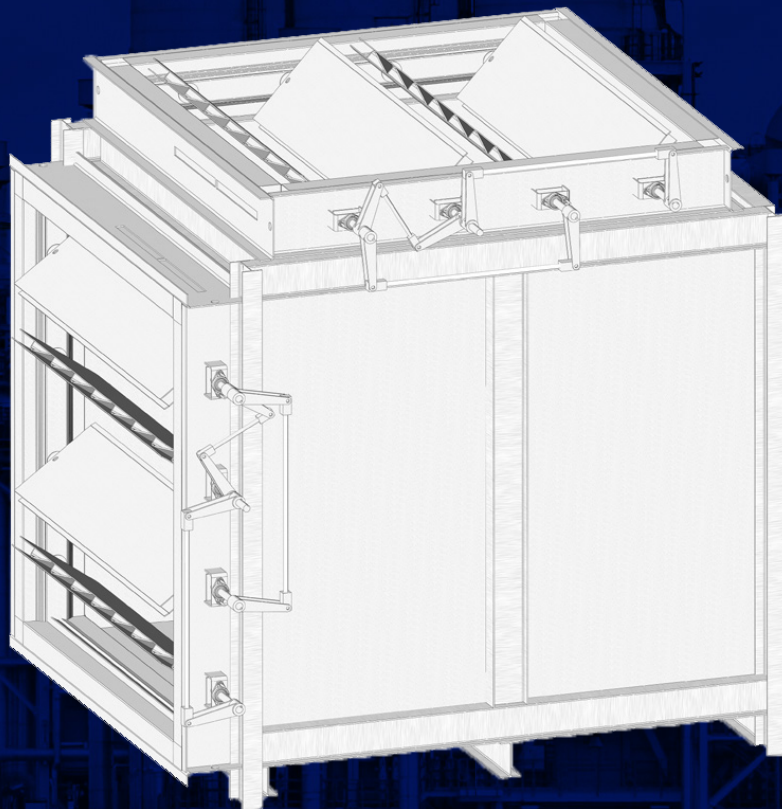




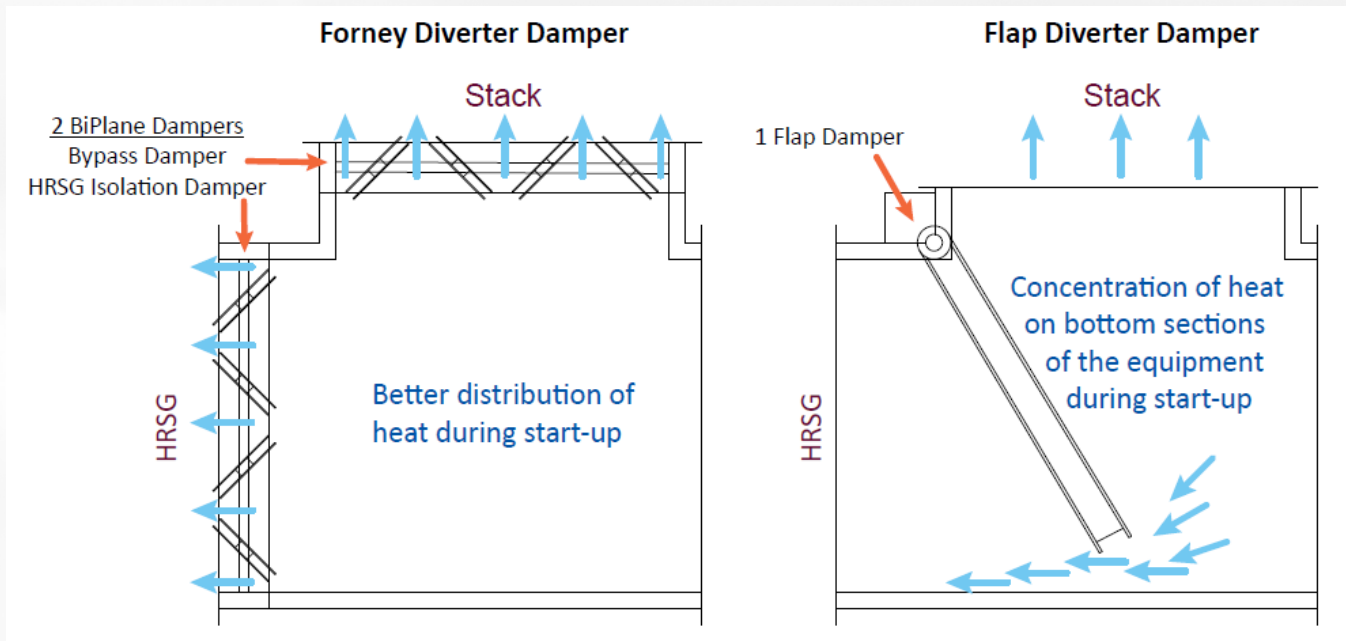
## HRSG Diverter Dampers

**For HRSG bypass applications, Forney provides a better, faster, cheaper alternative to a flap and guillotine damper arrangement.**



# PRODUCT OVERVIEW

Forney's HRSG Diverter Damper system is designed to offer maximum operational flexibility for combined cycle or CHP plants. It permits the HRSG to come on-line quickly by using the full duct area and can close rapidly capturing valuable heat in the HRSG.



Forney's unique approach utilizes two (2) BiPlane™ dampers, instead of one large flap damper. Forney provides one damper on the inlet to the HRSG and the other damper isolating the stack. Forney's HRSG Isolation Damper allows exhaust to enter the HRSG while the Bypass Damper is closed, and upon closing the HRSG Isolation Damper and opening the Bypass Damper, forces the exhaust gases up the bypass stack. Forney can provide dual actuators (one on each damper) with a mechanical interlock that prevents both dampers from closing simultaneously or a single actuator with connecting linkage.

At start-up, a flap diverter damper system directs exhaust into the HRSG at the bottom section of the inlet duct, creating a thermal gradient across the duct and HRSG. This poor air flow from a slightly open flap damper blade causes a high temperature difference inducing stress in the structure which shortens equipment life.



## Better

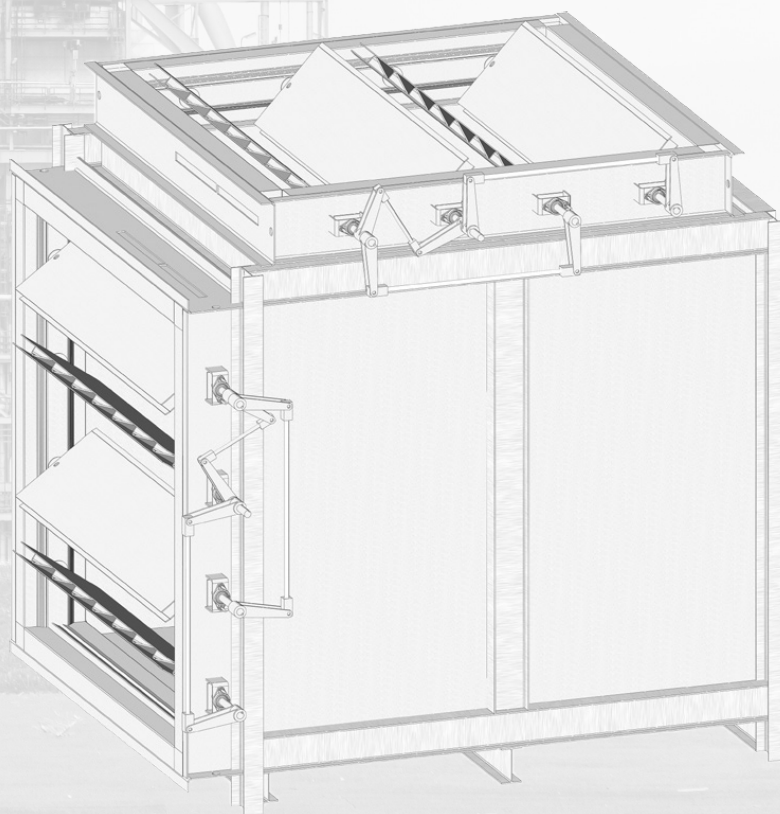
- Soft start flow distribution.
- Control capability.
- Safety - mechanical interlock prevents both dampers from closing simultaneously, reducing risk at inspection and maintenance.
- Sealing performance - Dual set of seals provides two layers of protection for personnel working in HRSG.

## Faster

- Reduced time to open and close.
- Permits the HRSG to come online quickly and close rapidly to capture the heat in the HRSG.

## Cheaper

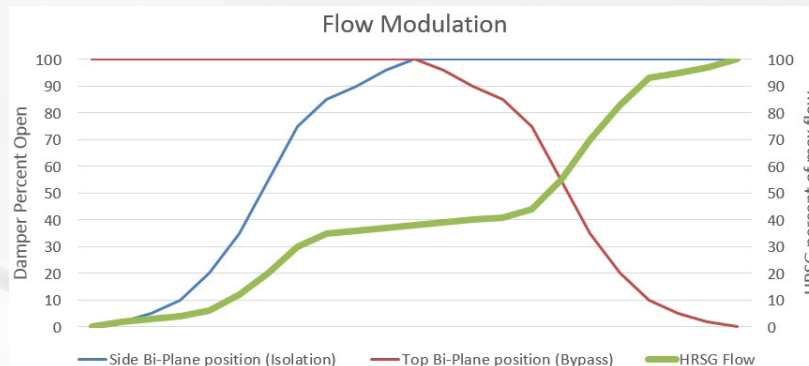
- Eliminates the need for a Guillotine Damper.
- Multiple center pivoting damper blades mean smaller actuators with more control.
- Easier installation and repair due to modular design.



# FORNEY HRSG DIVERTER DAMPERS

## Soft start flow distribution

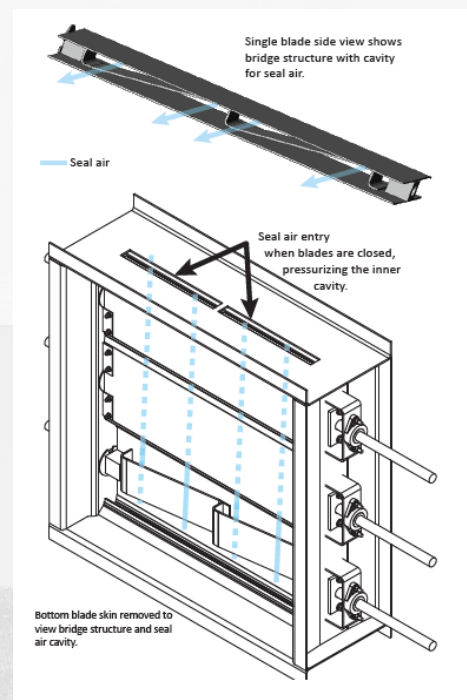
With an independent actuator on each damper, Forney's dual BiPlane damper configuration allows the flue gas to enter the HRSG with a more evenly distributed flow pattern, greatly reducing the temperature gradient across the structure. Forney's HRSG Diverter Dampers allow for a 'soft start,' a gradual transfer of turbine exhaust from the bypass stack to the HRSG, which significantly reduces the thermal shock. Less stress means longer equipment life and reduced maintenance costs.



## Sealing performance

The flap diverter damper design, with its shaft mounted at one end, is very difficult to maintain a straight blade for proper sealing. Due to the lack of reliability of the flap diverter damper, a guillotine damper is then required behind the flap damper to insure safety when personnel are servicing the HRSG. In addition, the poor seal of the flap allows heat to escape into the stack when the HRSG is in service, lowering overall efficiency.

Forney's design eliminates these flap design challenges by utilizing BiPlane dampers. With the BiPlane design, the damper blade itself is a truss design (or bridge structure) that creates a cavity for the air seal system. The air seal system pressurizes the blade cavity higher than the exhaust pressure, creating an air curtain, which provides dual seals - creating two layers of protection for personnel working in HRSG.



The air seal system is designed to maintain temperatures below OSHA requirements for confined spaces. Two (2) 200% capacity fans (one primary, one backup) help maintain the seal air to the damper when in the closed position. Plus to reduce seal air requirements, Forney's damper uses a flexible seal pack to provide sealing between the blade tips.



## Safety

Forney's two (2) actuator configuration prevents simultaneous closing of the HRSG inlet and the bypass damper, by mechanically tying the two dampers together. The design ensures the turbine exhaust will never be completely blocked. The robust mechanical interlock is part of the damper's linkage and sized for 200% of the stall torque of the actuators. This linkage also allows for padlock protection for maintenance personnel.

## Sample Specs

The table below shows sample specs for an HRSG Diverter Damper system that is 120" x 120" (305cm x 305cm). Forney builds custom systems that range from 36" x 36" (91cm x 91cm) to 420" x 420" (1067cm x 1067 cm).

Gas Path Dimensions	120" x 120" (305cm x 305cm)
Inlet Flange to HRSG Diverter Outlet Flange	187" (475 cm)
Design Temperature	1100°F (593°C)
Structural Design Pressure	35" w.c. (87 mbar)
Design Pressure for Actuator and Seal Air Sizing	20" w.c. (50 mbar)
Performance Data	
Pressure Drop to HRSG	<0.11" w.c. (0.27 mbar)
Pressure Drop to By-Pass	0.15" w.c. (0.37 mbar)
Opening/Closing Time	30 sec
Leakage without seal air @ 12" w.c. (30mbar)	974 ACFM (1655 AM3/HR)

Materials of Construction	
Frame Material	A36 Carbon Steel
Blade Material	A387 Grade 22 Chrome moly
Drive Shaft Material	17-4 PH® Stainless Steel
Blade Seals	C-276 Hastelloy / 625 Inconel
Bearing Type	1000°F (538°C) High Temp Flg brg
Insulation Material	8 lbs Density, ceramic fiber
Frame Insulation	6" (15cm) thick
Blade Insulation	1" (2.5cm) thick
Insulation Cover Material	11 GA (3.2mm) 409 Stainless steel

Actuation	
Type	Electric
Model	SAR 10.2 - 108B/GS160.3- 218:1
Seal Air System	
Fan Quantity	2
Fan Power	40 HP
Isolation Valves Quantity	4
Isolation Valves Type	Step Seat
Isolation Valves Actuator	Electric

Contact your local Forney sales representative today about your specific application.