



# Exhaust Heat Recovery Systems

Boiler Economizer Systems • Gas & Diesel Cogeneration Systems • Fume Incineration Systems • Finned Tubing



The Cain Industries Family of Heat Recovery Systems



*“Manufacturing Waste Heat Transfer Products to Save Energy”*

[www.cainind.com](http://www.cainind.com)

# Cain Industries Overview

Cain Industries is the leading designer and manufacturer of exhaust waste heat recovery systems for the following markets: **gas & diesel cogeneration systems, boiler exhaust stack economizer systems, and fume incineration systems.**

Cain Industries has developed **over 3,450 industrial heat transfer models** within its **16 product lines**. These products integrate seamlessly into any boiler exhaust, cogeneration exhaust, or incineration exhaust system.

Cain Industries, Inc.  
Headquarters  
Germantown, WI  
USA



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# Cain Industries Product Markets

## Boiler Economizer Systems

An extensive line of boiler exhaust economizers designed to recover exhaust waste heat (BTU) typically lost through the stack to preheat boiler feedwater, makeup water, process water, etc. for boilers ranging from 200,000 BTU input - 150,000 PPH steam.

## Gas & Diesel Cogeneration Systems

Exhaust heat recovery for gas and diesel engines, gas turbines, and micro turbine generator retrofit applications from 30Kw-7Mw.

## Fume Incineration Systems

Packaged fully automatic exhaust steam generators recovering large volumes of clean exhaust combustion from 600°F-1600°F, producing primary and/or secondary steam source.

## Finned Tubing

An abundant range of custom-fabricated, industrial grade finned tubing, manufactured to meet stringent customer requirements.



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# Gas & Diesel Cogeneration Systems

**HRSA** Heat Recovery Silencer Axial



## DESIGN

- Stainless steel exterior
- Internal thermal expansion design
- Cylindrical heat transfer coil design
- Optional stainless steel internal bypass
- Sound attenuation
- Optional 1" factory insulation
- Optional circulating pump

## APPLICATION

**Combustion Sources:** Gas engines (reciprocating, turbo charged, naturally aspirated, and rotary), diesel engines, boilers

**Combustion Capacity:** 15 to 150 kw (20 to 200 scfm)

**Entering Gas Temps:** To 1250°F

**Heat Sink Types:** Engine jacket water, process water, boiler water, ethylene glycol



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# Gas & Diesel Cogeneration Systems

**HRSR** Heat Recovery Silencer Radial



## DESIGN

- Sound attenuation
- Optional temperature indicating control panel
- Factory insulation
- Internal thermal expansion design
- Horizontal/vertical exhaust flow connection
- Full exhaust bypass assembly
- Optional modulating damper actuator
- Optional exhaust transitions/expansion joints

## APPLICATION

**Combustion Sources:** Gas engines (reciprocating, turbo charged, naturally aspirated, and rotary), diesel engines, boilers

**Combustion Capacity:** 1200 to 4000 kw

**Entering Gas Temps:** To 1250°F

**Heat Sink Types:** Engine jacket water, process water, boiler water, ethylene glycol



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# Gas & Diesel Cogeneration Systems

UTR U-Tube Recovery



## DESIGN

- Stainless cylindrical heat transfer coil design
- Hardshell 10 ga. structural exterior
- Stainless steel interior
- 1" thickness factory insulation
- Condensation drain catch ring assembly
- Individual gas connection sizes and design
- Sound Attenuation
- Removable core assembly
- Header manifold for high liquid flow and low static head

## APPLICATION

**Combustion Sources:** Gas engines (reciprocating, turbo charged, naturally aspirated and rotary), diesel engines

**Combustion Capacity:** 15 to 300kw

**Entering Gas Temps:** To 1600°F

**Heat Sink Types:** Engine jacket water, process water, boiler water, ethylene glycol, thermal transfer fluids

# Gas & Diesel Cogeneration Systems

## UTR1 U-Tube Recovery 1



### DESIGN

- Internal thermal expansion design
- 2" thickness factory insulation
- Hardshell 10 ga. structural exterior
- Optional compression fitted tube to header attachment
- Removable core assembly
- Removable inspection door
- Header manifold for high liquid flow and low static head



### APPLICATION

**Combustion Sources:** Incinerators, thermal oxidizers, catalytic converters, boilers, hot oil heaters

**Combustion Capacity:** 200 to 50,000 scfm

**Entering Gas Temps:** To 1600°F

**Heat Sink Types:** Process water, boiler feedwater, ethylene glycol, thermal transfer fluids

# Gas & Diesel Cogeneration Systems

## ESG1 Exhaust Steam Generator 1



### DESIGN

- Skid mounted packaged forced circulation watertube design
- Size ranges from 20 to 500 Boiler horsepower
- Operating steam pressures ranging from 3 psig to 450 psig
- 98% dry steam at saturated steam temperatures
- 5 minute startup to operating steam pressure
- Large steam flash drum assembly allowing for wide load fluctuations to prevent low water shut down
- 1/3 the weight of conventional waste heat boilers
- 1/2 the size of conventional waste heat boilers
- Component design requires no welding for ease of maintenance
- Stamped in accordance with ASME code and National Board
- Fully automatic for supplemental or primary steam output source
- 'Explosion proof' heat transfer exchanger within the exhaust gas
- Full modulating internal exhaust bypass designed to easily accept dual engine exhausts
- Lowest 'pinch point' (operating steam temperature to final leaving exhaust temperature) offering greater efficiency

### APPLICATION

**Combustion Sources:** Gas engines, diesel engines, incinerators, thermal oxidizers, catalytic oxidizers, hot oil heaters

**Combustion Capacity:** 1000 to 50,000 scfm

**Entering Gas Temps:** 600° - 1600°F

**Heat Sink Types:** Supplemental steam demand and/or primary steam source for steam heating or process steam

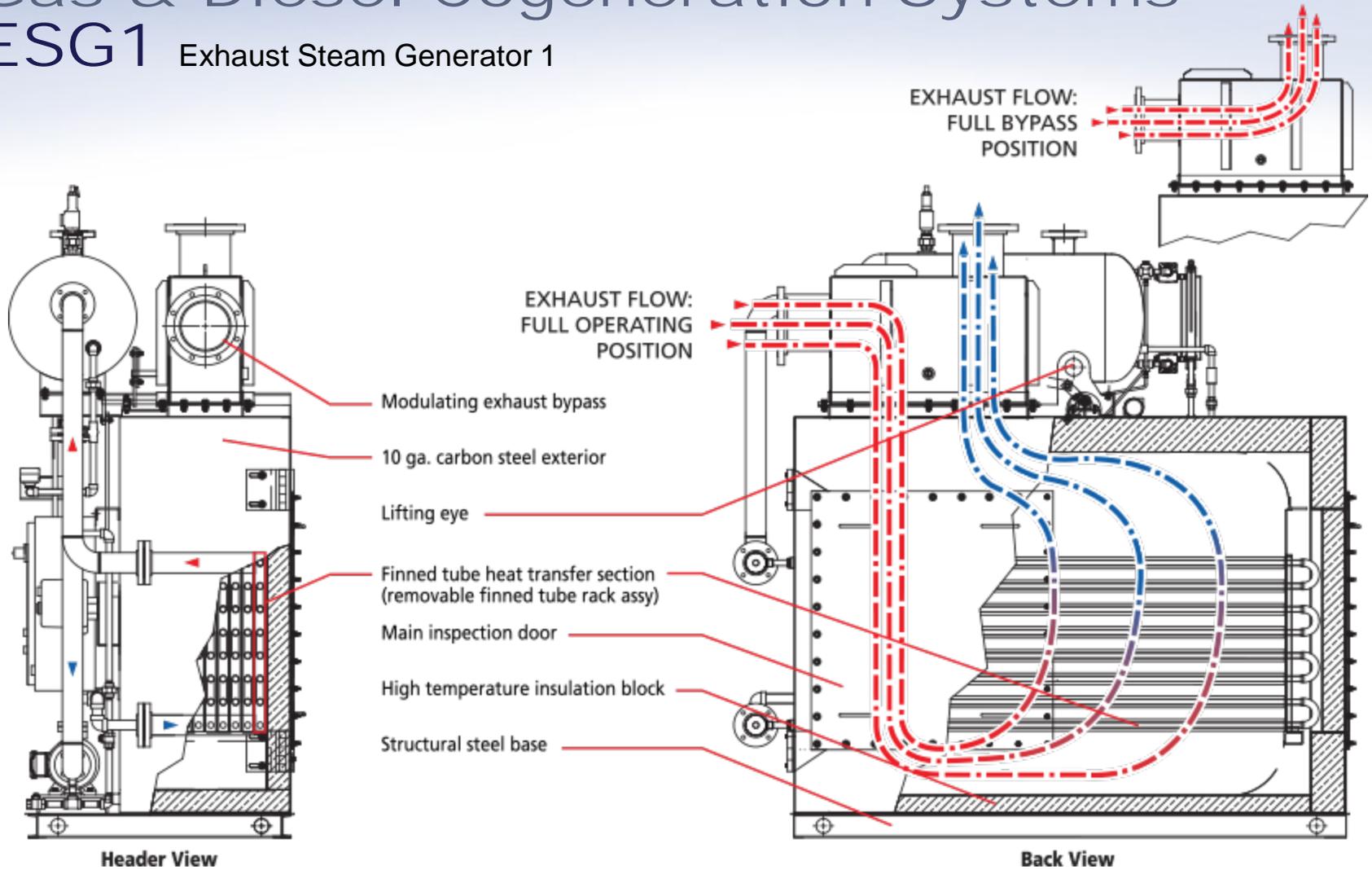
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# Gas & Diesel Cogeneration Systems

## ESG1 Exhaust Steam Generator 1

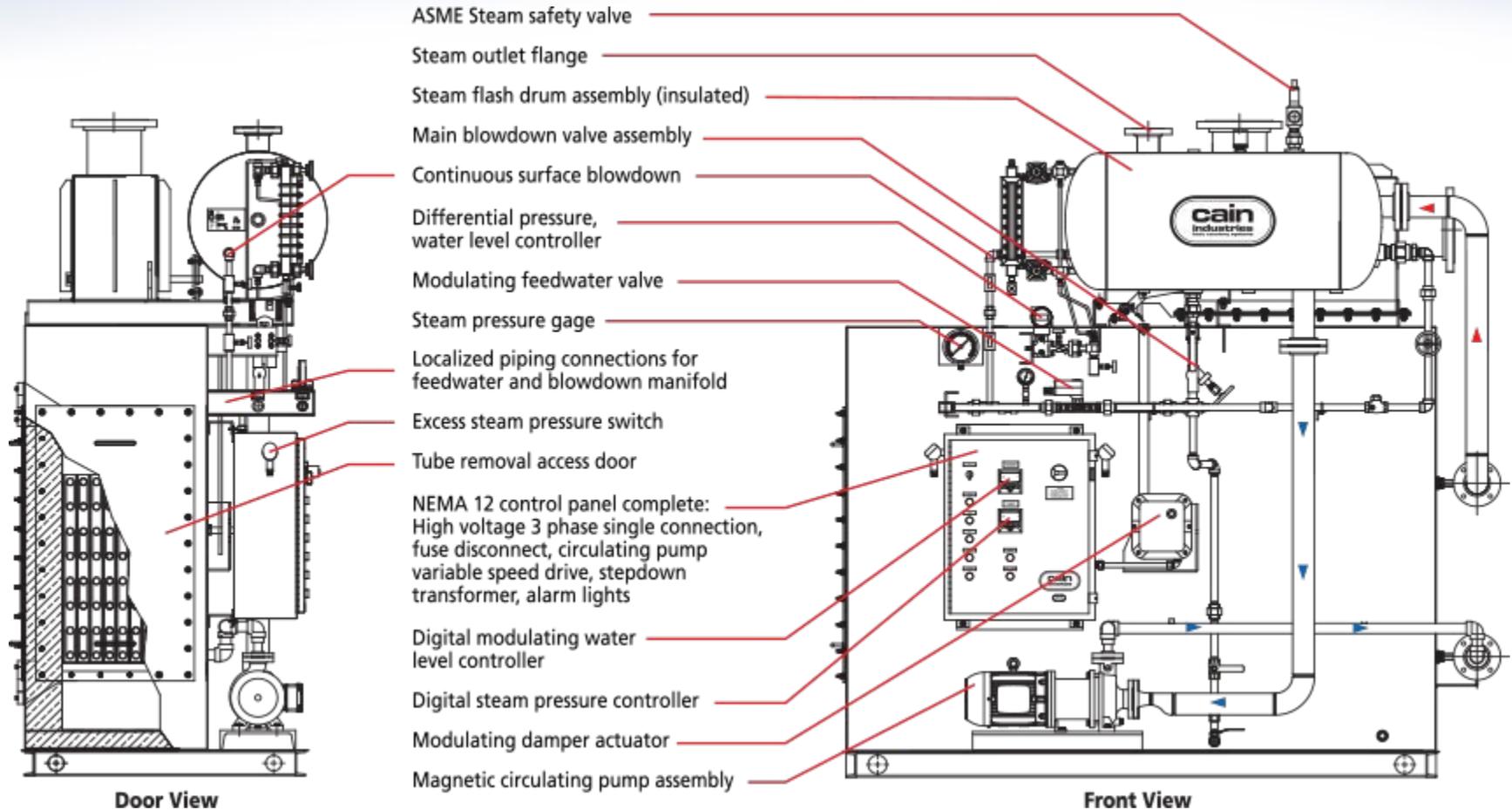


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# Gas & Diesel Cogeneration Systems

## ESG1 Exhaust Steam Generator 1



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# HRSR Proposal Process

## Savings Analysis Study

### 1. Complete Form:

Simple Application Data Form  
available at [www.cainind.com](http://www.cainind.com):

**cain industries** COMBUSTION EXHAUST HEAT EXCHANGERS  
*Manufacturing Waste Heat Transfer Products To Save Energy*

Request For Quote

GENERAL APPLICATION DATA

Fuel Supply

Proposed To

1. Exhaust Gas Inlet Temperature

2. Exhaust Gas Inlet Flow Rate

3. Exhaust Gas Inlet Pressure

4. Exhaust Gas Inlet Humidity

5. Exhaust Gas Inlet Velocity

6. Exhaust Gas Inlet Composition

7. Exhaust Gas Inlet Sulfur Content

8. Exhaust Gas Inlet Particulate Content

9. Exhaust Gas Inlet Dust Content

10. Exhaust Gas Inlet Ash Content

11. Exhaust Gas Inlet Chlorine Content

12. Exhaust Gas Inlet Fluorine Content

13. Exhaust Gas Inlet Nitrogen Content

14. Exhaust Gas Inlet Oxygen Content

15. Exhaust Gas Inlet Carbon Content

16. Exhaust Gas Inlet Hydrogen Content

17. Exhaust Gas Inlet Sulfur Dioxide Content

18. Exhaust Gas Inlet Nitrogen Dioxide Content

19. Exhaust Gas Inlet Carbon Monoxide Content

20. Exhaust Gas Inlet Hydrogen Sulfide Content

21. Exhaust Gas Inlet Ammonia Content

22. Exhaust Gas Inlet Silica Content

23. Exhaust Gas Inlet Phosphorus Content

24. Exhaust Gas Inlet Potassium Content

25. Exhaust Gas Inlet Sodium Content

26. Exhaust Gas Inlet Calcium Content

27. Exhaust Gas Inlet Magnesium Content

28. Exhaust Gas Inlet Aluminum Content

29. Exhaust Gas Inlet Iron Content

30. Exhaust Gas Inlet Zinc Content

31. Exhaust Gas Inlet Lead Content

32. Exhaust Gas Inlet Cadmium Content

33. Exhaust Gas Inlet Mercury Content

34. Exhaust Gas Inlet Bismuth Content

35. Exhaust Gas Inlet Tin Content

36. Exhaust Gas Inlet Antimony Content

37. Exhaust Gas Inlet Arsenic Content

38. Exhaust Gas Inlet Selenium Content

39. Exhaust Gas Inlet Tellurium Content

40. Exhaust Gas Inlet Barium Content

41. Exhaust Gas Inlet Strontium Content

42. Exhaust Gas Inlet Yttrium Content

43. Exhaust Gas Inlet Zirconium Content

44. Exhaust Gas Inlet Niobium Content

45. Exhaust Gas Inlet Molybdenum Content

46. Exhaust Gas Inlet Technetium Content

47. Exhaust Gas Inlet Ruthenium Content

48. Exhaust Gas Inlet Rhodium Content

49. Exhaust Gas Inlet Palladium Content

50. Exhaust Gas Inlet Silver Content

51. Exhaust Gas Inlet Cadmium Content

52. Exhaust Gas Inlet Indium Content

53. Exhaust Gas Inlet Tin Content

54. Exhaust Gas Inlet Lead Content

55. Exhaust Gas Inlet Bismuth Content

56. Exhaust Gas Inlet Thallium Content

57. Exhaust Gas Inlet Lead Content

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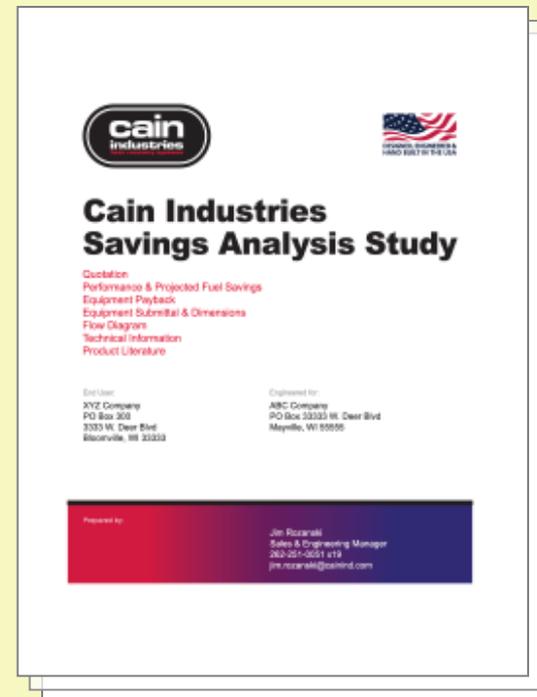
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### 2. Receive Proposal:

Within 48 hours, receive detailed proposal



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# ESG1 Proposal Process

## Savings Analysis Study

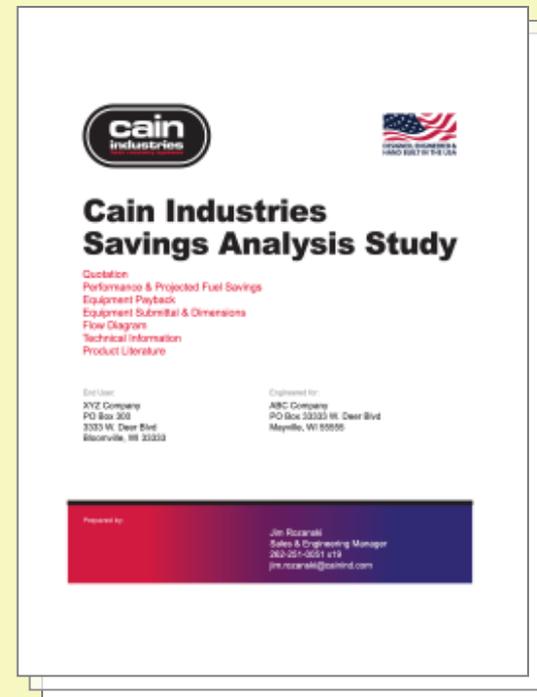
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