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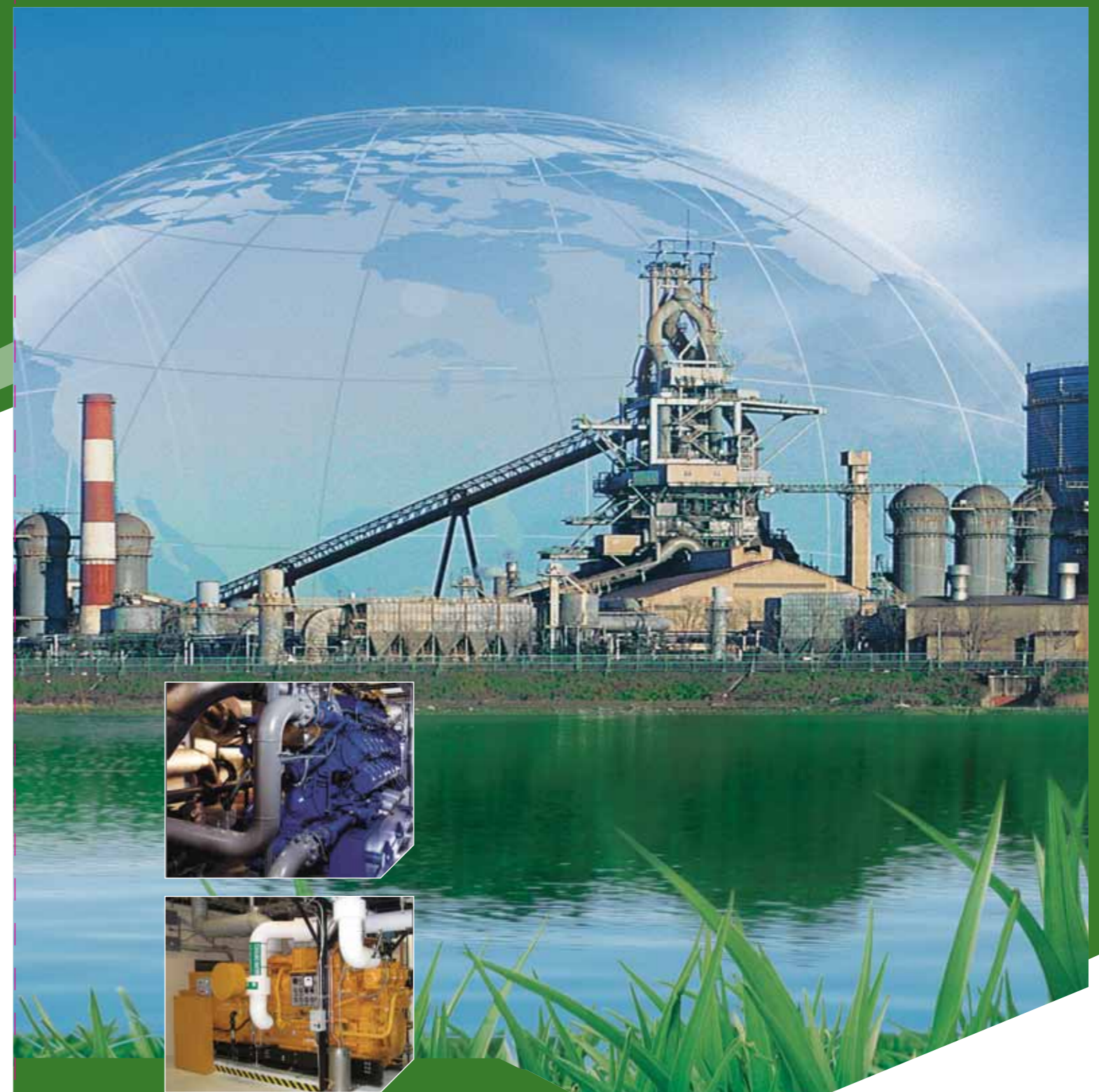
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**DRESSER-RAND**

Bringing energy and the environment into harmony.\*

Form 85220-10



**DRESSER-RAND**

Bringing energy and the environment into harmony.\*

**YOUR SAVINGS ON CHP WILL  
BE REFLECTED EVERYWHERE.**



CHP Solutions is a strategic business unit of Dresser-Rand. The company supports CHP projects through all stages of development, including:

- Initial concept design
- Feasibility studies and commercial analysis
- System selection, manufacture and testing
- Turnkey installations
- Guaranteed performance and availability
- Lifetime equipment maintenance
- On-board controls and monitoring system including local interconnect relay and synchronising switchgear
- 24-hour remote control monitoring

**RANGE OF TECHNOLOGIES**

The CHP solutions provided by Dresser-Rand incorporate a wide range of technologies. By matching a client’s energy requirements with the most efficient, flexible and effective CHP systems, Dresser-Rand is able to deliver total energy solutions that optimise operating efficiency and lower total lifecycle costs. From the selection of the prime mover to the design of the application interface, Dresser-Rand consistently helps clients achieve "added value" from their energy assets.

CHP systems range from approximately 100kWe to 2.5MWe (larger capacities available with the incorporation of multi-train systems).

**FUEL**

Systems can be designed to accommodate a wide range of fuels including natural gas, diesel, biogas, biodiesel and biomass.



.....  
*Mail processing supported by CHP four-nines system.*

**CHP - HOT WATER SYSTEMS**

These CHP packaged systems provide electrical power and hot water from a single high-quality, high-performance package by using waste heat from the gas engine's jacket water-cooling circuit and exhaust system.

Each CHP package is enclosed in a weather-proof panel system that offers noise attenuation for both indoor and outdoor locations. All packages are designed to maximize electrical and thermal efficiency and offer flexibility depending on site demand.



.....  
*Nimbus 300 unit at the factory.*

**CHP - STEAM SYSTEMS**

In applications where the thermal output requirement from a CHP system is steam, a number of packaged or site-built system configurations are available.

The precise configuration and selection of a suitable heat recovery steam generator (HRSG) / boiler depends upon the exact steam conditions required and the site steam demand profile.



.....  
*Steam application for water treatment facility.*

Transform Pharmaceutical (J&J Company)  
located in Lexington, MA, a 250kWe -80  
USRT Trigeneration system.



### TRIGENERATION OR CCHP

Trigeneration, or CCHP, is the simultaneous production of useful power, heat and cooling from a gas engine (cogeneration - or CHP - deals with only heat and power, not cooling). Dresser-Rand trigeneration systems are designed to precisely match client requirements for

electricity, heating and cooling.

#### How does trigeneration work?

Cooling is achieved using the heat from a CHP system, carefully matched and close-coupled to an absorption chiller to ensure optimum plant efficiency. The chiller is assembled with all necessary pumps, heat exchangers and controls in an engineered package of the same construction as the matched CHP unit. Cooling of the absorption chiller package and engine system is provided by a separate closed circuit cooling water system controlled by the integrated trigeneration control system.

of security. With approximately 25% of mission critical power consumed to meet air conditioning needs, the CCP system will significantly reduce peak power demand whilst delivering cost effective supplies of electricity and chilled water.

### TURNKEY CHP

Dresser-Rand offer a single source, high-quality engineered solution matched precisely to a client's needs.

Existing sites can benefit from Dresser-Rand CHP and CCP technologies supplemented by a wider range of conventional energy equipment and can give an efficient and reliable long-term solution for centralised energy plant. The solution can be packaged and modularised with facilities for future expansion, or can be custom built into an existing (or new) building. All equipment is factory tested and can be client witnessed and verified before shipment, if requested.

### SECURE CCP

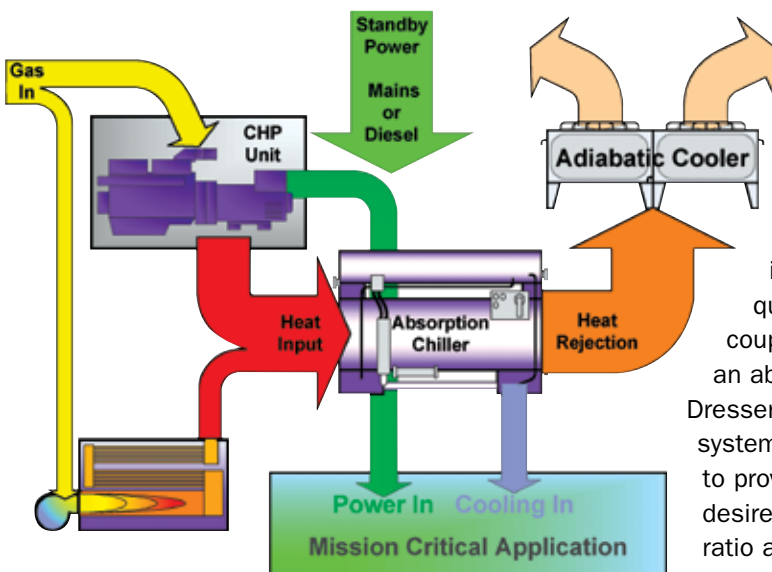
Combined cooling and power (CCP) is a packaged cogeneration concept designed to supply electrical energy and cooling for mission critical applications such as telecommunications and data centres.

Typically these facilities require very secure supplies of power and cooling in almost equal quantities. By close-coupling a CHP set with an absorption chiller, the Dresser-Rand secure CCP system can be configured to provide precisely the desired power and cooling ratio at exceptional levels

Process CHP solutions provided on a turnkey basis include full integration into the existing process. The scope of the turnkey project can include full mechanical and electrical design, procurement and supply, civil and building work, and integration with client mechanical, electrical and control interfaces.



Industrial CHP unit at Airbus UK.



CCP schematic

## AIRCOGEN™

The Aircogen system is a unique, small-scale form of CHP, which directly heats air by using the latent and generated heat from the power generation CHP package.

### How does the Aircogen system work?

The technology used is similar to that of a modular packaged CHP plant, but the packaged equipment includes the heated air stream as well as integral heat exchangers and air handling equipment. At peak performance, the Aircogen system can achieve 95% efficiency. Suitable applications include distribution warehouses, process drying applications,

space heating, and other applications where hot air is required on a continued basis.

The prime movers used by the Aircogen system in most applications are reciprocating natural gas or fuel oil engines. This approach ensures the high efficiency of energy conversion and improved flexibility by displacing a number of separate items of the plant.

A typical Aircogen installation consists of one or more units and provides electricity to the site distribution system and heated air for the conditioned space. Few buildings require only air heat; therefore, the package is designed to convert

a proportion of the waste heat to hot water. Cooling can also be provided through the use of close-coupled absorption chillers, giving a totally flexible and highly energy efficient air conditioning package.

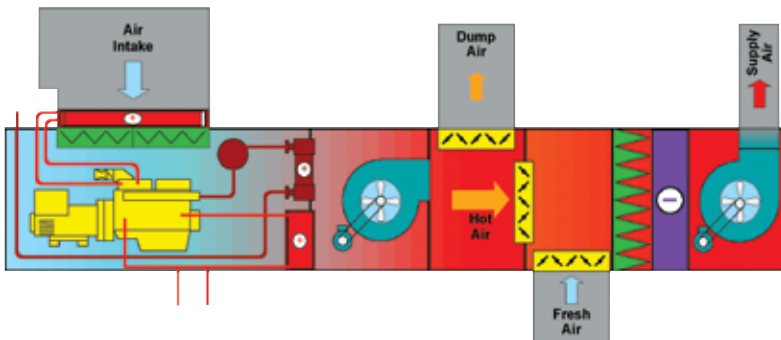
## INDUSTRIAL AIRCOGEN SYSTEMS

The Aircogen system can be used for a variety of industrial processes, because it provides electricity generation with air heat recovery.

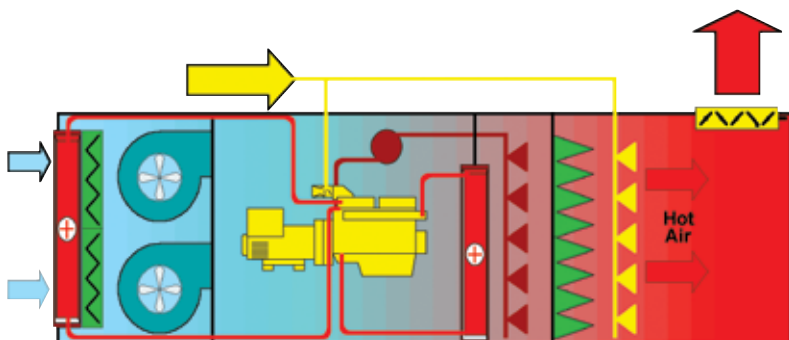
Industrial Aircogen systems are custom designed for each individual application, from providing pre-heated air to industrial burners, hot air supply to drying processes and process air conditioning. All available heat from the engine surfaces, intercooler, jacket water cooling circuit, and exhaust gas is used. The system is designed to provide air continually to the process at the required flow, temperature and quality and is supplied as a packaged unit.

Gas engine-driven industrial Aircogen units reach a maximum temperature of 120°C (248°F) as an indirect system and 150°C (302°F) as a direct heating system. Additional gas can be burned in the oxygen-rich air-stream to introduce higher air temperatures into the process.

An enhanced level of site power security can be reached when provided in conjunction with the Dresser-Rand power delivery control (PDC) system.



(Above) Aircogen schematic. (Below) Industrial Aircogen schematic.



## CHP OPERATION AND MAINTENANCE

Dresser-Rand offers full service, providing monitoring and maintenance on all CHP systems supplied.

Continuous monitoring and appropriate maintenance is essential for the reliable and efficient operation of a CHP system.

All CHP systems are supported by:

- Remote 24-hour monitoring
- Monthly reports (produced for each system monitored) that provide details on electrical and heating performance

- Aftermarket support designed to meet client requirements.

Inclusive maintenance contracts are available and provide full service of CHP systems for both scheduled and unscheduled outages. All necessary engineering and consumable spare parts are included within the contract, and the Dresser-Rand operating and reporting process ensures minimum cost for all maintenance activities. Service agreements provide availability guarantees to which penalty and bonus schemes may be attached.

## CHP RECOVERY

CHP is by no means a new concept. In many instances, site operations are very different today than they were when the CHP system was designed and implemented, in which case the CHP is not operating at full potential to help the client reduce energy costs. Dresser-Rand offer a comprehensive

system recovery service or "get well plan" comprising three simple steps:

**1) Investigation Report** - For a small consultation fee, Dresser-Rand performs a detailed investigation of your CHP system, its current feasibility of operation and its potential for improvement.

**2) Rehabilitation Proposal** - If the improvement in feasibility identified in the investigation report is of interest, Dresser-Rand completes a more detailed costing and design exercise and provides a fixed price for system upgrades and improvements. There is no charge for this service, provided the proposal proceeds to implementation.

**3) Project Implementation** - Our engineering teams perform and manage the upgrade of your CHP system and hand over a fully commissioned and performance tested plant, complete with options for ongoing service and maintenance.



.....  
*UK facilities - operational  
24 hours a day, seven days a week.*

## Total energy solutions

Dresser-Rand's combined heat and power (CHP) systems reduce on-site energy costs and greenhouse gas emissions.



### WHAT IS CHP?

Combined heat and power is the simultaneous generation of both heat and power from a single fuel source.

CHP, or cogeneration systems, eliminate dependence on a grid connection, reduce CO<sub>2</sub> emissions and increase fuel efficiency by providing electrical and thermal outputs at the point of use.

### WHERE CAN CHP SYSTEMS BE USED?

CHP is ideal for the following industries and applications:

- Large office complexes, warehouses and commercial complexes
- Colleges and universities
- Shopping centres
- Data centres
- Hospitals
- Pharmaceutical and biotechnical manufacturing
- Chemical
- Textiles and manufacturing
- Food processing

- Rubber and plastics
- Engineering
- Agriculture / horticulture
- Waste treatment
- Recycling

### WHAT ARE THE BENEFITS OF CHP SYSTEMS?

- Yield annual savings from the production of both electricity and heating from one fuel source.
- Provide guaranteed power availability to the client, even in the event of an electrical power outage.
- Significantly reduce the emission levels of carbon dioxide and greenhouse gases when compared to conventional means of power and heat generation.

Dresser-Rand offers a range of CHP systems designed to meet clients' requirements for maximum energy efficiency and lower costs from the energy input to your building or process.



Installation of CHP unit at Royal Mail Oxford.

CHP units during the assembly process.

**DRESSER-RAND**

