



# ON-LOAD CLEANING SOLUTIONS FOR THE MARINE INDUSTRY

Complete sootblower installations  
for all types of marine boilers





## On-load boiler cleaning on marine vessels



### Global centre of competence for on-load boiler cleaning for the marine industry

Clyde Bergemann Scotland (CBS) is the world's leading designer and supplier of sootblowing systems for the global marine industry and global centre of competence for the Clyde Bergemann Power Group (CBPG) marine division. CBS are experts in the field of on-load cleaning of heat exchange surfaces and, for over 70 years, we have been installing sootblowers onto marine vessels such as cruise liners, cargo ships, LNG carriers and naval ships.

We offer a range of equipment designed to reduce the level of fouling created on heat exchange surfaces as a result of burning fossil fuels. On a marine vessel, by-products from the combustion of residual fuel oils cause soot deposits on the heating surface of waste heat recovery and auxiliary boilers. This in turn reduces heat transfer and subsequently reduces boiler efficiency. It can also lead to the more serious problem of soot fires. Correct use of Clyde Bergemann sootblowers with air or steam as the blowing medium will minimise these levels of deposits and ensure a high boiler efficiency and elimination of soot fire potential. Also, maintaining clean boiler tubes using sootblowers means burning less fuel to achieve the required heat transfer thereby minimising environmental impact.

In order to encourage the ongoing efficiency of sootblowers Clyde Bergemann also offers a range of aftersales and services for all types of on-load cleaning technology.





## Experience around the world

### Recognised in ships worldwide

Clyde Bergemann has an extensive installed base of over 8,000 sootblowers on ships across the world. An abbreviated reference list illustrating the range of applications is shown below.

Ship Name	Ship Owner
<b>LNG Carriers</b>	
Tenaga Tiga	MISC
Tenaga Empat	MISC
Bonny	Shell International
Finima	Shell International
British Liberty	BP Shipping
<b>Very Large Crude Carriers (VLCC)</b>	
Marie	Maersk
Gjertrud	Maersk
Al Maqwa	Kuwait Oil Tanker
British Holly	BP Shipping
British Liberty	BP Shipping
<b>Cruise Ships</b>	
Queen Elizabeth 2	Cunard
Queen Mary 2	Cunard
Pacific Princess	Princess Cruises
Canberra	P&O Cruises

### Global leader in clean energy solutions

The Clyde Bergemann Power Group (CBPG) is an international acting group of companies with 25 facilities across the world and representation in over 40 countries. Years of experience in the global energy services market has positioned us as leaders in the fields of on-load cleaning technology, materials handling solutions, air pollution control, air combustion systems and energy recovery.

With an installed base in the power, petrochemical, marine, pulp and paper, energy recovery and industrial boiler markets around the world the CBPG has a wealth of knowledge and understanding of the markets and customer requirements.

Our state-of-the-art technologies are designed to ensure extended operating hours, maximum availability, reduced shut down times and general overall boiler plant efficiency. Our international workforce of experienced personnel provide a fast and efficient service to all our clients across the world.



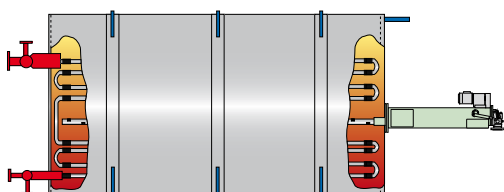
## Minimising fouling on marine boilers



The requirement of boilers on marine vessels is necessary in order to ensure the supply of steam for various processes. Fouling can occur on certain types of boiler as a result of particulates from the burning of heavy fuel oil. The main types of boilers where these problems lie are:

### Exhaust Gas Boilers (EGB's)

EGB's produce energy from the otherwise wasted heat from the exhaust gas of the diesel engine. Combustion of the diesel fuel leaves particulates on the exhaust gas boiler tubes which can, in effect, lead to reduced boiler availability, efficiency and increased risk of soot fires. Clyde Bergemann sootblowers are specially designed to reduce the level of fouling on the boiler tubes and subsequently increase heat transfer and efficiency.

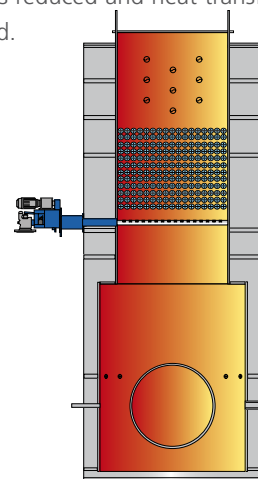


Typical exhaust gas boiler with FS sootblower

### Auxiliary Boilers

An auxiliary boiler is a closed vessel where steam is produced by heating water. These boilers tend to be used in or near port and has a number of purposes including heating residual fuel, hot water for passengers, generating fresh water and driving steam turbine pumps.

The combustion of the fuel oil burned in the auxiliary boiler leaves a similar particulate to that of the exhaust gas boiler so sootblowers are required to ensure the risk of soot fires is reduced and heat transfer and efficiency are maximised.



Typical auxiliary boiler with D92 sootblower



## Our technologies for marine boilers

Our main products for marine boilers include:

### D92 - rotating multi-jet element sootblower

Clyde Bergemann's most commonly used product in the marine market is the D92 rotating multi-jet element sootblower which is designed for the confined spaces on marine vessels.

The rotating element ensures effective cleaning along the boiler tubes with a blowing radius of up to 1.5 metres. Its compact design is easy to install and over 800 models are in operation across the globe in the marine industry.

### FS - part retractable helical sootblower

Our newest model of sootblower for the marine industry is the FS part retractable helical sootblower which is specially designed for the reliable and effective removal of fouling deposits on finned tube economisers and exhaust gas boilers using low pressure steam.

The travel distance allows a reduced number of nozzles to be fitted giving more blowing medium mass flow per jet and thereby better cleaning.

#### Key D92 design features



- low maintenance design
- minimised spare parts stock
- emergency manual operation
- choice of wall boxes
- simple to soundproof

#### Operation data

blowing medium	steam or air
blowing medium pressure	typically 7 to 40 barg
typical steam consumption	3.4 kg/min per nozzle
blowing time	up to 56 secs
blowing arc	30° to 360°
approx. weight	120 kg

#### Key FS design features



- minimal maintenance
- blower mounts directly onto heater (no additional support)
- high blowing medium mass flow per jet
- fully enclosed rigid box section

#### Operation data

blowing medium	steam or air
blowing medium pressure	typically 7 to 40 barg
typical steam consumption	9.7 kg/min per nozzle
blowing time	118 seconds at 400V 3ph 50 Hz
blowing arc	360°
approx. weight	170 kg - 250 kg



## Modern systems and processes for quality and efficiency



We have been manufacturing and designing high quality products with over 70 years experience in our markets. From our base in Glasgow, we have recently modernised our 4000m<sup>2</sup> manufacturing facility, where we have fully integrated teams of engineers, designers, sales and service support, project management, supply chain and manufacturing staff.

These teams operate to the latest ISO9001 operating standards, and have fully documented business processes which enable our company to accurately and speedily process our customers orders.

Our business is driven by a fully operational and integrated SAP system, managing all aspects of our business from order entry through to customer dispatch.

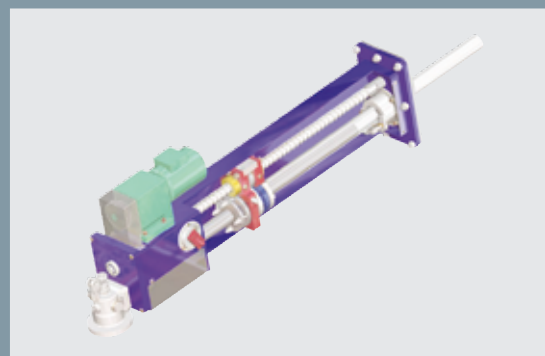
Our manufacturing teams are well established and have adopted the latest lean manufacturing philosophies.

Our fully skilled team of technicians have many years of experience in supporting our range of products and manufacture these to the latest technical and quality expectations.

Our business objective is to maintain our world leading position for the supply of boiler efficiency products to the marine market including services for marine waste heat recovery units and economiser tube refits.

### 3D modelling with Inventor design

- we utilise the latest technology within our design function using AutoCAD and Inventor 3D modelling design software
- 3D imagery can be created and the latest Finite Element Analysis (FEA) carried out in parallel with our thermodynamic modelling tools and mathematical system analysis
- all leading to the optimum design solutions for our customers



3D model of Clyde Bergemann's FS technology



## Maximising availability of your technology

### Our international service capabilities

Our team of experienced service engineers is available round the clock offering support and expertise for all types of on-load cleaning technology across the world. Our after sales portfolio ranges from on and off-site services, spare parts, overhauls and upgrades in order to optimise the availability of your installation.

We pride ourselves on our extensive knowledge of on-load cleaning technologies and our ability to provide a first-class service to our valuable customers. Our specialist team of engineers travel the globe to ensure our equipment is running to maximum performance.

We also hold an extensive inventory of spare parts at our manufacturing facility in Scotland. Regular check-ups, maintenance and replacement are necessary to extend the life of sootblowers and provide reliable operating systems to increase boiler efficiency.



### Our services include:

- installation, commissioning and start-up
- site surveys
- inspections
- maintenance and repair
- maintenance contracts
- control system upgrades
- on-load cleaning technology upgrades
- spare parts
- optimisation

### ⚙️ Your advantages

- increased availability
- optimised performance
- quick response time
- just-in-time delivery of spare parts
- spare parts and service for all type of on-load cleaning technology

Clyde Bergemann is represented in over 40 countries worldwide



- Clyde Bergemann Companies
- Clyde Bergemann Associates



### Clyde Bergemann Ltd

47 Broad Street  
Bridgeton  
Glasgow G40 2QR  
Scotland, UK  
Tel: +44 141 550 5400  
Fax: +44 141 550 5402

Web: [www.clydebergemann.co.uk](http://www.clydebergemann.co.uk)  
eMail: [info@clydebergemann.co.uk](mailto:info@clydebergemann.co.uk)

### ● Europe

Clyde Bergemann GmbH  
Wesel / Germany  
Tel: +49 281 815-0  
eMail: [sales@cbw.de](mailto:sales@cbw.de)

Clyde Bergemann  
Materials Handling Ltd  
Doncaster / England  
Tel: +44 1302 552200  
eMail: [powersales@cbmh.co.uk](mailto:powersales@cbmh.co.uk)

Clyde Bergemann Ltd  
Glasgow / Scotland  
Tel: +44 141 550 5400  
eMail: [info@clydebergemann.co.uk](mailto:info@clydebergemann.co.uk)

Clyde Bergemann Forest SA  
Wauthier / Belgium  
Tel: +32 2 367 8860  
eMail: [cbfsales@cbw.de](mailto:cbfsales@cbw.de)

Clyde Bergemann  
Service GmbH  
Grevenbroich / Germany  
Tel: +49 2181 164809  
eMail: [sales@clydebergemann.de](mailto:sales@clydebergemann.de)

Clyde Bergemann Eesti AS  
Tallinn / Estonia  
Tel: +372 625 9570  
eMail: [cbesales@cbw.de](mailto:cbesales@cbw.de)

Clyde Bergemann  
DRYCON GmbH  
Wesel / Germany  
Tel: +49 281 815-0  
eMail: [sales@cbw.de](mailto:sales@cbw.de)

Clyde Bergemann  
Scandinavia Oy  
Espoo / Finland  
Tel: +358 9 8330 0600  
eMail: [scandinavia@clydebergemann.fi](mailto:scandinavia@clydebergemann.fi)

Clyde Bergemann  
Polska Sp. z o.o.  
Tychy / Poland  
Tel: +48 32 216 8412  
eMail: [biuro@clydebergemann.com.pl](mailto:biuro@clydebergemann.com.pl)

Endat Oy  
Espoo / Finland  
Tel: +358 9 2517 2519  
eMail: [info@endat.fi](mailto:info@endat.fi)

Clyde Bergemann  
TERMOTEC GmbH  
Wilnsdorf / Germany  
Tel: +49 2739 807-0  
eMail: [info@termotec.de](mailto:info@termotec.de)

Clyde Bergemann EP Tech S.r.l.  
Battipaglia / Italy  
Tel: +39 0828 305 421  
eMail: [ept@ep-tech.it](mailto:ept@ep-tech.it)

### ● Americas

Clyde Bergemann Inc.  
Atlanta / GA-USA  
Tel: +1 770 557 3600  
eMail: [info@clydebergemann.com](mailto:info@clydebergemann.com)

Clyde Bergemann EEC  
Baltimore / MD-USA  
Tel: +1 410 368 7000  
eMail: [info@cbeec1.com](mailto:info@cbeec1.com)

Clyde Bergemann  
Delta Ducon Inc.  
Malvern / PA-USA  
Tel: +1 610 695 9700  
eMail: [sales@deltaducon.com](mailto:sales@deltaducon.com)

Clyde Bergemann Canada Ltd  
Cambridge, Ontario / Canada  
Tel: +1 800 267 3068 toll free  
eMail: [csc@clydebergemann.com](mailto:csc@clydebergemann.com)

Clyde Bergemann  
Anthony Ross Company  
Beaverton / Oregon  
Tel: +1 503 641 0545  
eMail: [sales@anthonyross.com](mailto:sales@anthonyross.com)

Clyde Bergemann do Brasil Ltda  
Mogi Guacu / Brazil  
Tel: +55 19 3841 5086  
eMail: [contato@clydebergemann.com.br](mailto:contato@clydebergemann.com.br)

### ● Asia

Shanghai Clyde Bergemann  
Machinery Co., Ltd  
Shanghai / China  
Tel: +86 21 65396385  
eMail: [sales@scbmc.com](mailto:sales@scbmc.com)

Clyde Bergemann Huatong Ltd  
Materials Handling Company Ltd  
Beijing / China  
Tel: +86 10 58561956  
eMail: [sales@cbh.net.cn](mailto:sales@cbh.net.cn)

Clyde Bergemann Energy &  
Environmental Technology  
(Beijing) Co., Ltd  
Beijing / China  
Tel: +86 10 65305881  
eMail: [general@cbbeijing.com](mailto:general@cbbeijing.com)

Clyde Bergemann India Pvt. Ltd  
New Delhi / India  
Tel: +91 11 4301 4300  
eMail: [dsinha@clydebergemann.in](mailto:dsinha@clydebergemann.in)

Macawber Beekay Ltd  
New Delhi / India  
Tel: +91 11 619 5563  
eMail: [rohith@bsbkgroup.com](mailto:rohith@bsbkgroup.com)

### ● Australia

Clyde Bergemann Senior Thermal  
Pty Ltd  
Wetherill Park / Australia  
Tel: +61 2 9757 7400  
eMail: [sales@cbst.com.au](mailto:sales@cbst.com.au)

### ● Africa

Clyde Bergemann Africa Pty Ltd  
Kya Sands / South Africa  
Tel: +27 11 704 0580  
eMail: [enquiry@cbz.co.za](mailto:enquiry@cbz.co.za)