



# **Our solutions for ERU Boilers**



Experts in repair and maintenance at your SERVICE  
*Pioneering Industrial Sustainability*

# Our experts are always ready to **GUIDE** you in choosing solutions

## WHAT ARE THE SELECTION CRITERIA?

First and foremost, the nature of the wear that a solution is being required for must be specifically identified. Although this identification often seems easy, the existence of vortexes, turbulence, aerodynamic ruptures, steam soot, granulated material, explosives, etc., tends to make understanding the phenomena more complicated. To identify actual wear, a thorough analysis of local conditions is required with the right questions being raised:

- > Flux corrosion, chlorine cycling (LV or HV), sulphation?
- > The wear from steam soot sweeps, granulated material?
  - > The temperature of pressurised water in panels, collectors, open pass tubes, etc..
  - > The temperature of steam in superheater, economiser and vaporiser tubes.
  - > Fume temperature
  - > Wear speed in the area being addressed.

We will review these points with you so that we can propose solutions consistent with your requirements. Providing precise answers will help us to accurately identify your wear phenomenon whereby we will be able to determine the most suitable solution for your specific situation.

## IS THE PROBLEM **CORROSION, EROSION OR ABRASION-RELATED?**

In the case of Energy Recovery boilers, corrosion wear is brought about by temperature (walls, screens, open pass tubes, unscrubbed superheaters) and is usually unrelated to any kind of mechanical action. Should the wear be caused by a mechanical action such as impact or shock waves, then this is considered erosion-corrosion (superheaters cleaned with steam cleaning, explosions, shot blasting). If the wear is similar to mechanical micro-machining, then this is referred to as abrasion.

But while abrasion is not likely to occur inside a boiler, it often does occur on the outside (extractors, conveyors, hoppers, screw conveyors). If there is no corrosion and solid particles strike a surface, this is referred to as erosion (fan).

Internal corrosion on Energy Recovery boilers tends to be more severe at some points than at others. The presence of sweeps, vortexes, flashings, different local temperature conditions, are just a few of the factors that affect the severity of this corrosion.

Listing them all in this document would be far too long and complicated, so let's talk about them!

As corrosion is caused by temperature, a higher than normal gas speed, for example in a constricted passage, will result in increased local heat transfer, and therefore more corrosion. Often misinterpreted as erosion, this phenomenon is strictly corrosion.

## CAN EROSIWE WEAR OCCUR UNDER SALTS?

If an erosive phenomenon causes wear, it will have first removed the salt layers that cover the walls. But this situation does not appear to occur inside Energy Recovery boilers. In most cases, a corrosion phenomenon occurs, such as a chlorine cycle that has been over-activated locally.



abrasion



erosion



corrosion

## **Solutions 1 and 3**

After rigorous sandblasting, our teams spray a 3-component metal solution which has the combined purpose of creating a 100% watertight surface, and of providing resistance to specific ERU boiler corrosion (chlorine cycle, sulphation).

## **Solutions 2 and 4**

FuseClad solutions are mostly applied at workshops. Touch-ups or small surface coatings can be performed on site.

**1****COMBUSTION CHAMBER SURFACING**

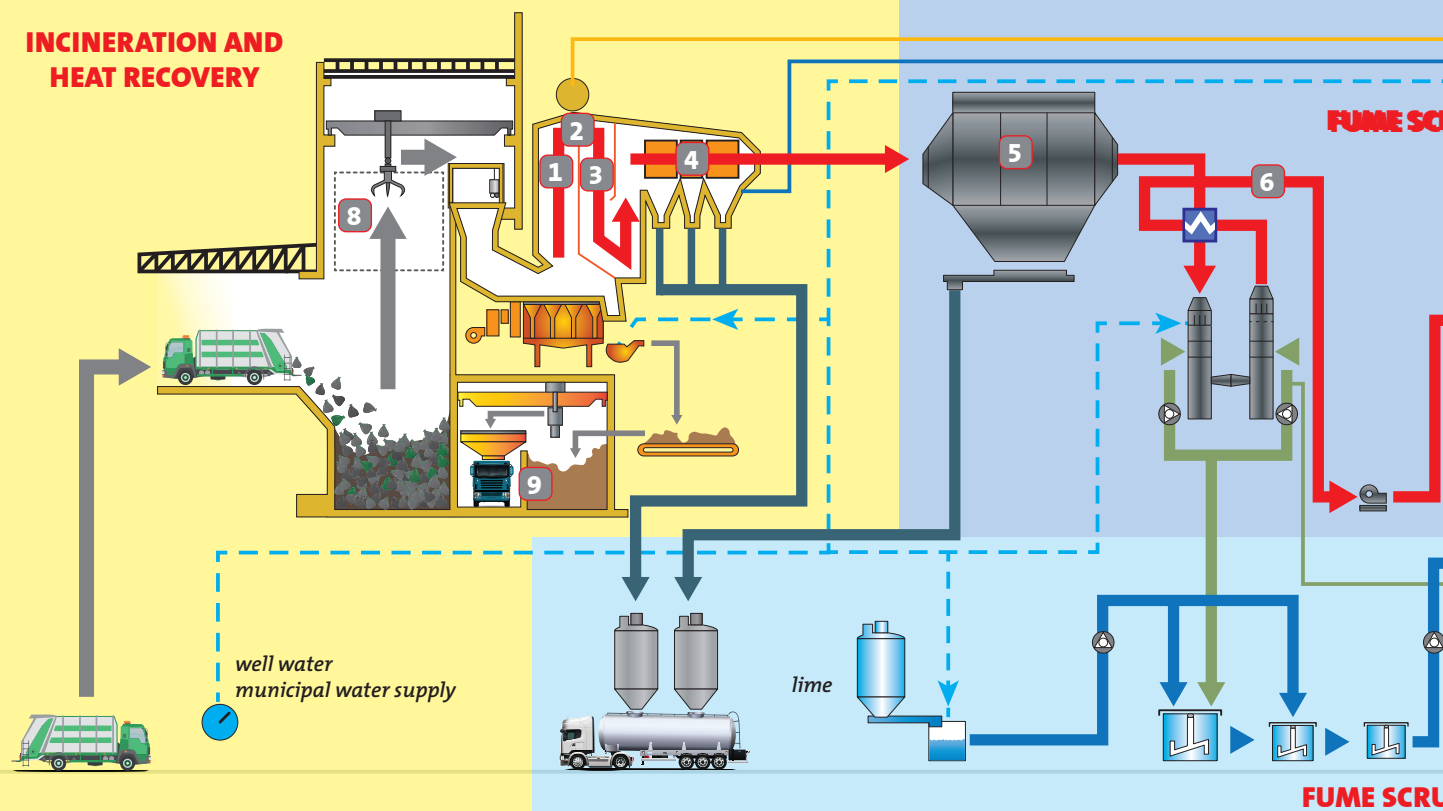
- > Top of tube 1 : **ChromeClad XC surfacing (on site)**
- > Bottom of tube 1 : **FuseClad X268\* (Workshop)**

The choice of solution is based on the corrosion rate.

**2****OPEN PASS TUBES**

- > High corrosion S: **FuseClad X268\* (Workshop)**
- > Standard corrosion S: **FuseClad 56 (Workshop)**

Emergency action: ChromeClad XC surfacing (on site)

**INCINERATION AND HEAT RECOVERY****5****ELECTROSTATIC FILTER**

- > Interior walls of the filter: **MeCaCorr 780\* (Si T<240°C)**

**6****FUME DUCTS**

- > Interior walls of the ducts: **MeCaCorr 780\* (Si T<240°C)**

**7****WET PROCESSING**

- > Interior walls: **MeCaCorr 780\* (Si T<180°C)**

**8****GRAPPLE CLAWS, PREVENTIVE OR CORRECTIVE ACTION**

- > CDP® wear plates
- > Wear-resistant surfacing or welding repairs

**9****WASTE CRUSHERS**

- > Hammers and rotor: **On-site actions to perform repairs or apply welded wear-resistant surfacing**
- > CDP® wear plates (sidewalls and shredder feed)

**3****TUBE 2 AND TUBE 3**

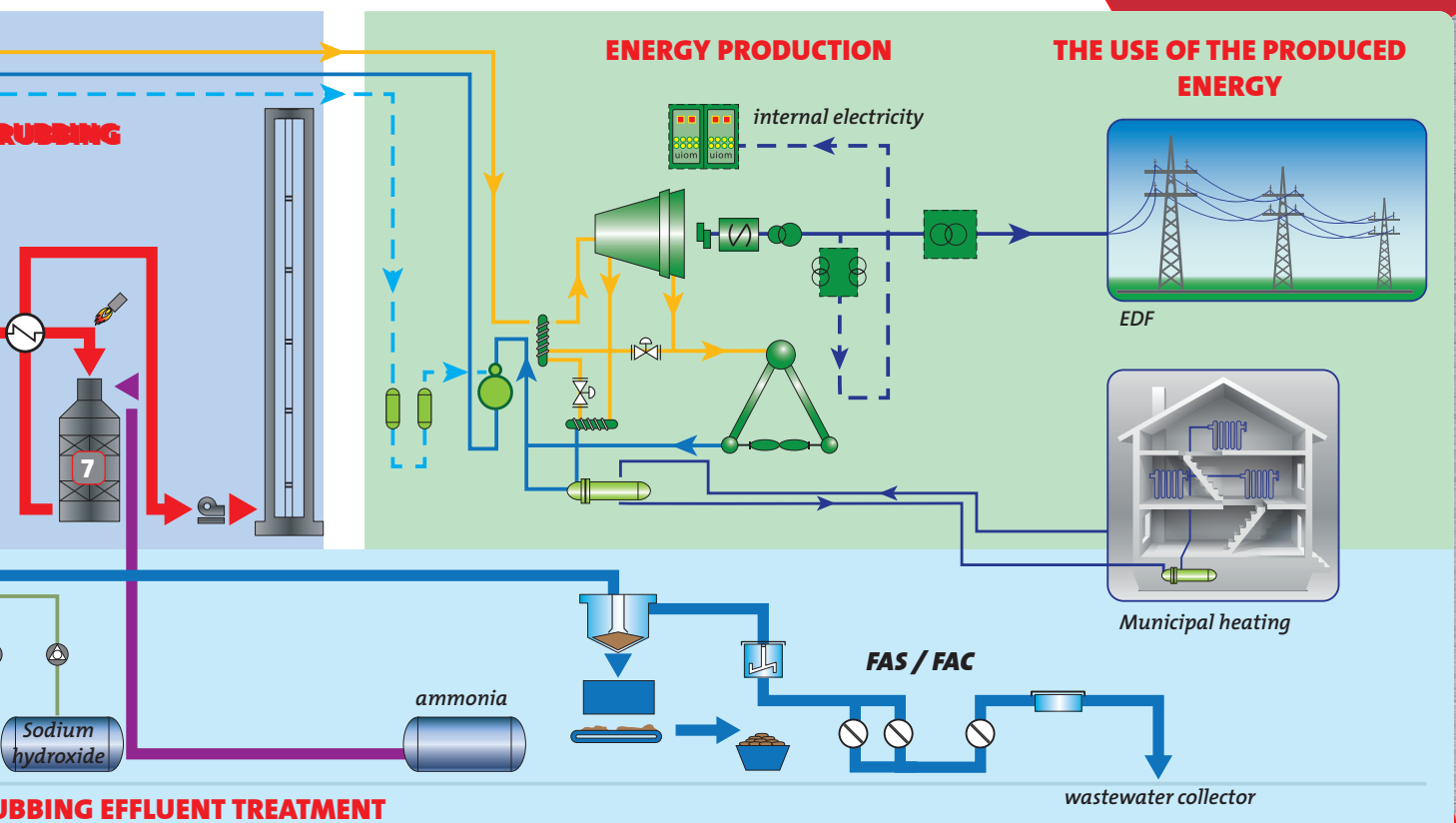
- > Walls and screen walls: **ChromeClad XC (on site)**
- > Ceiling: **ChromeClad XC (on site)**

The choice of solution is based on the corrosion rate.

**4****SUPERHEATERS**

- > Steam temp. >380°C: **FuseClad X268\***
- > Steam temp. <380°C: **FuseClad 53**
- > Steam temp. <350°C AND steam soot: **FuseClad 89**

There are various solutions depending on the steam temperature, fumes temperature and if there is soot removal.

**10****HOPPERS, CONVEYORS**

- > Conveyor screws: **CDP® and/or surfacing**
- > Vibrating channels: **CDP®**
- > Chain conveyors: **CDP® and/or surfacing**
- > CastoTubes, for air flow transfer (ash, incinerator bottom ash, granulated material transport)
- > Hopper manufacturing or protection: **CDP®**

**11****MACHINERY**

- > Surfaced loader blades
- > Loader buckets: **CDP® and/or surfacing**
- > Repairs to cracks or special welds

**12****MISCELLANEOUS**

- > Repairs to extensions on rotating parts (cold-forming and machining)

**13****MISCELLANEOUS**

- > Crack repairs on site or at the workshop

Custom CDP

### BUCKETS, BLADES



### GRAPPLE CLAWS

CDP plate



CastoTubes®

### AIR DUCTS



### HOPPERS, CHUTES, SCREW, CHAIN CONVEYOR

CDP plates

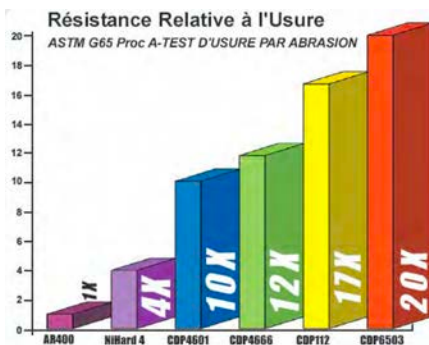


Hardfacing

### WASTE CRUSHERS



### CRACK REPAIRS



THE WEAR RESISTANCE OF CASTOTUBES®

# Castolin Eutectic is your partner in innovation.

BASED ON INTERNAL RESEARCH RESOURCES AND ITS UNIVERSITY NETWORK, CASTOLIN EUTECTIC HAS ACQUIRED RECOGNISED EXPERTISE IN THE SPECIFIC WEAR PATTERNS OF VARIOUS TYPES OF ENERGY RECOVERY BOILERS, THEREBY ABLE TO PROVIDE ADAPTED SOLUTIONS:

- > Corrosion using the chlorine cycle or sulphation (ChromeClad XC, FuseClad 53, LaserClad (new), X268\*)
- > Erosion-corrosion (FuseClad 89)
- > Abrasion (CDP® wear plates)
- > Wet and dry corrosion (MeCaCorr 780)

Research has resulted in the development of a patented undercoat, which improves the performance of the ChromeClad XC surfacing.

Another avenue of research resulted in the discovery of the X268 alloy. This blocks all chlorine cycle corrosion, sulphation and reduces the fluxing rate.

LASER surfacing: In 2019, Castolin Eutectic added LaserClad technology to its range of superheater tube surfacing solutions.

## ABRASION, EROSION AND IMPACT ARE ADDRESSED USING WEAR PLATES AND CASTOTUBES®.

The CastoTubes® range consists of soft steel tubes which have received an internal welded surface using TeroMaTec 4666 (excellent abrasion and erosion resistance) and CastoTube® NANO (better erosion and impact resistance) alloys.

Both types of wear resistant alloys have been certified through standard wear tests. They perform exceptionally well. The graph below provides an overview of the results of the G65 tests performed on various materials including CastoTube®.

### THIS PERFORMANCE IS THE RESULT OF:

- > The chemical composition of the surfacing alloys used.
- > The manufacturing process which results in a composite structure consisting of ultra-hard phases in an extremely resistant matrix.



CDP  
Diamond Plates

*Pioneering  
Industrial  
Sustainability*

**Castolin  
Eutectic  
Services**



*Your resource for protection, repair and joining solutions*

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