

Environmentally friendly energy saving

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eco-e tech - The ingenious solution for environmentally friendly, versatile,
and economical scrap preheating

Preface

If we continue to heat up the atmosphere, we will reap more droughts, storms, and floods.

Politicians have set targets for 2030 and 2050 that require each of us to make restrictions, adjustments, and rethink. Commitment, new ideas and solutions are required.

We have analysed the situation, have reconsidered the recycling of scrap and found a new ground-breaking concept on how untreated scrap can be preheated in an environmentally friendly, versatile and yet economical way.

Scrap preheating 1-2-3

Experts agree that scrap preheating is the best way to recover the energy escaping with the 'exhaust gas' and thereby reduce production costs. However, there are several ways to preheat scrap. There are concepts that promise a lot, but at the end of the day hardly deliver anything.

The scrap preheating is intended to **pre-heat the scrap, clean the off gas, and make the residual energy**, which can no longer be used for preheating due to insufficient heat, **usable for other purposes**, i.e., provide hot gas as dust-free as possible.

This is exactly what we offer at **eco-e** and **CLESID Lorber**. For the sake of the environment and the benefit of the steel plant.

The eco-e tech — a paradigm change

The electric steelworks have developed into a centre of excellence and performance that has lost all environmental friendliness. Heat recovery is more of a dirty word than an achievement.

The current climate situation requires a paradigm shift.

eco-e tech proposes such a change, a change from a convection arc furnace to a preheating arc furnace, from an inefficient shaft preheating to a two-chamber unit where the 'off-gas' can transfer all its energy to the scrap at low speed. A heat transfer without melting scrap that sticks to the base plate, without toxic or harmful combustion products, without off gas chilling and without energy waste.

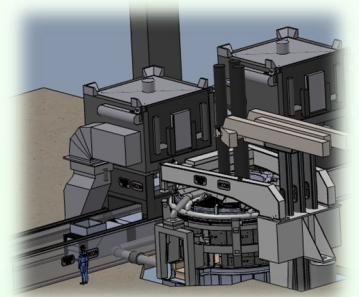
eco-e tech awakes your conscience and your curiosity—open up and let it flow.

Preparation

A common problem when preheating scrap is the melting of fine and thin scrap parts. If these melting drops stick to the bottom plate, the transport of the scrap can be disturbed or hindered. This cannot happen with **eco-e tech**, as slag builders are added as 'roll material'.

Scrap preheating 1

When scrap comes from the scrapyards, it contains pollutants and impurities. In the first step, this scrap is heated to a level where these pollutants evaporate or burn. The temperature reached at this time is about 450° C. The resulting combustion products are harmful and even toxic. A temperature increase to approx. 1000°C and a residence time of 2 seconds is required to burn these compounds. This state is reached after the off gas has flowed through the second compartment. The heated gases are used to further heat the scrap in the other compartment.



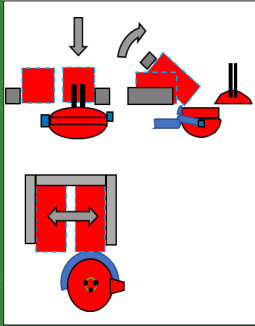
The off-gas dynamic

'Scrap preheating 1' benefits from the off gas, the post-combustion of CO, and the internal combustion of the pollutants. Measurements report a temperature rise to 450°C within around 4 minutes. Scrap preheating benefits from:

- The low gas velocity of the off gas (better thermal heat transfer),
- Natural convection through the scrap heap (gas inlet near the ground and gas outlet also near the ground).

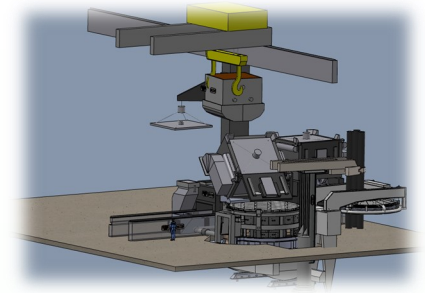
ECOFEEDER E (Revamping solution)

Can be mounted on almost any existing furnace, requires only minor changes on the furnace, melting process and off-gas duct. ECOFEEDER E replaces the post-combustion chamber and is located between the furnace and the off-gas duct.



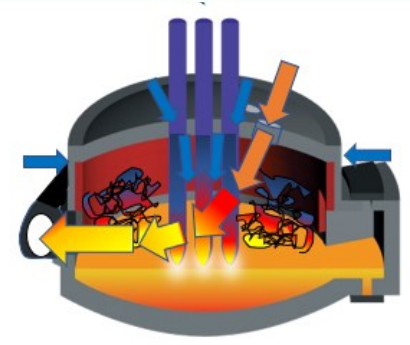
Scrap preheating 2

After the 'scrap preheating 1' is completed the containers change and the energy in the off gas is transferred to the cleaned hot scrap of the previous heating session. In this way, the final temperature is reached. After reaching the target temperature, the container moves over the open furnace and tips the hot scrap into the middle of the furnace.



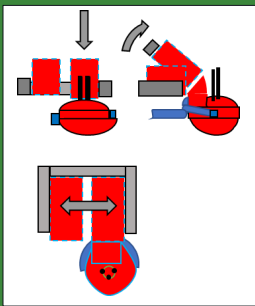
Scrap preheating 3

The third and final preheating takes place in the furnace itself. While the traditional arc furnace design is less suitable for energy saving, the CORE EAF, invented and developed by Tello Abia, is best suited for ultimate energy savings. Since the off-gas flow in the CORE EAF flows from top to bottom, it brings the energy right over the slag-scrap interface, there where melting happens.



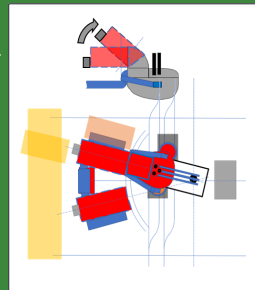
ECOFEEDER MC (Container mover)

The 'shaft' solution. New design, only minor changes to furnace and furnace roof, melting process and off-gas duct. Replaces the post-combustion chamber.



ECOFEEDER MF (Furnace mover)

The versatile and space optimized solution for a new melt shop. Suitable for all kind of pouring systems (EBT, OBT, CT) as well as continuous addition of DRI.



Simple and steelworks-friendly

'No mechanical elements near the furnace' is the goal we have set ourselves. With the **eco-e tech** concept, we have fulfilled this goal. Even though we propose a shaft in some versions, this 'shaft' is only intended for scrap supply and not for off gas. In addition, we replace the slag door, we eliminate the 4th hole (chimney), and we make off-gas analysis reliable and continuous without dust deposits and false air. For scrap densities from 0.6 to 1.4 t/m³. Ideal for continuous DRI supply.

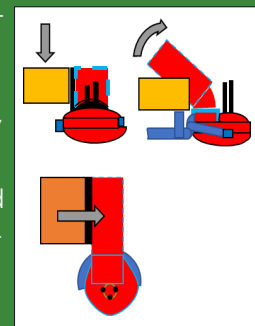
Conclusion: eco-e tech at the glance

- Maximum energy savings and economic benefits
- Maximum reduction of CO₂ emissions
- Direct metallurgical benefits
- Maintenance benefits
- No harmful and toxic emissions in the off gas
- Controlled furnace atmosphere and off-gas composition
- Less dust waste.
- Less heat emissions to the environment

For the sake of the environment ...

ECOFEEDER P (Pusher)

The appropriate solution for small halls and constricted situations. After charging the scrap into the arc furnace, lift-off empty container, push container with preheated scrap, place container with new scrap, continue melting.

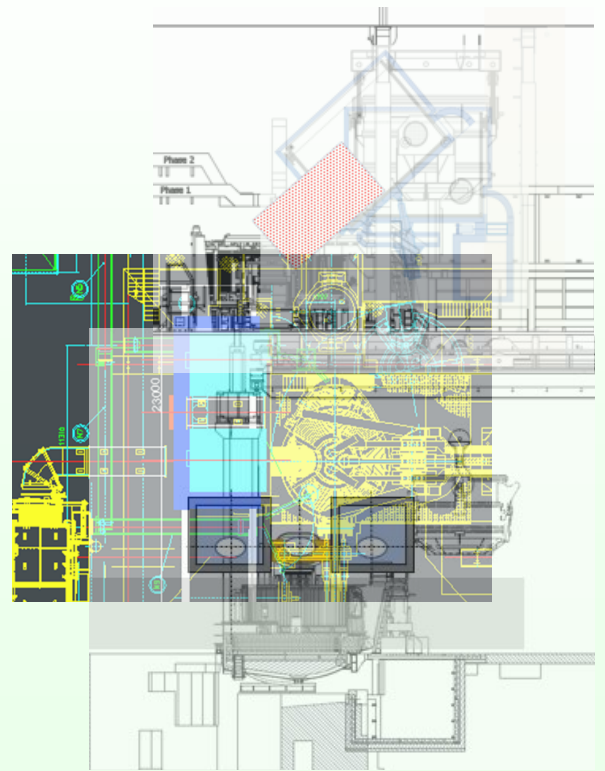


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Challenging the limits and making the 'impossible' possible is a quality that usually turns things upside down and sometimes meets with incomprehension, but ultimately leads to success.

We would be pleased to analyze the situation at your steel plant. Based on this analysis we would then work out a realization plan. In such a way you would be best prepared for upcoming discussions regarding energy savings and CO₂ emissions in combination with emission reduced steel, some call it GreenSteel.

Such a realisation study also enables us to make a tailor-made offer for a soft revamp of your existing installations. An in-depth comparison between the different scrap preheating systems is also included and shall give you maximal overview over the scene and enable you to choose the most appropriate solution for the future of your steel plant.



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