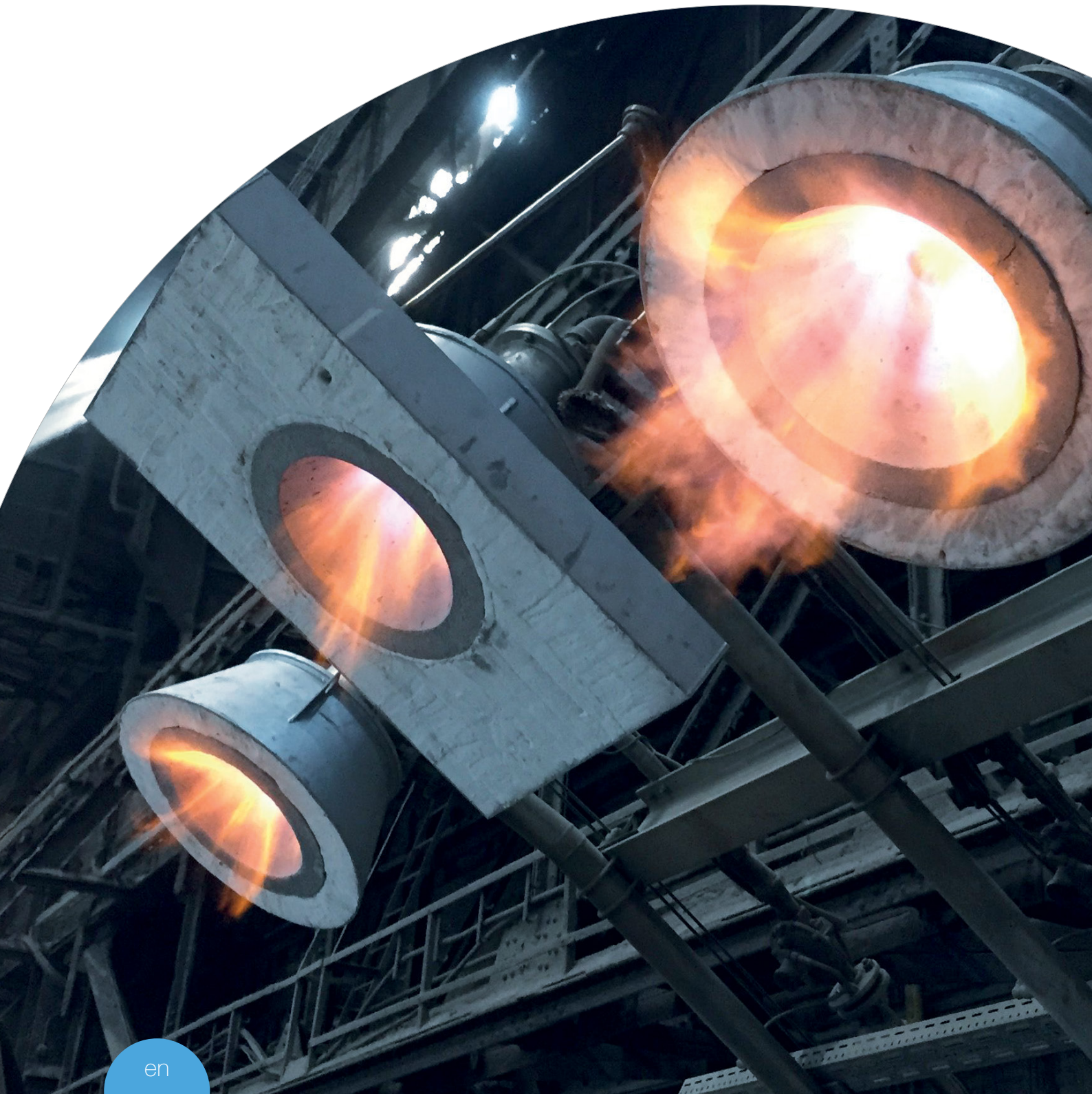


# PREHEATING

Continuous casting





Refractory linings which are in contact with liquid metal need to be initially dried and afterwards preheated to remove traces of water to prevent hydrogen explosions.

# PREHEATING

## Continuous casting

**Refractory linings used in steel mill equipment come into contact with liquid metal and are required to be initially dried and afterwards preheated to remove any traces of water to prevent hydrogen explosions.**

It is also necessary to evenly dry and preheat the lining surface to avoid any chilling of the liquid metal which

would cause problems associated with running and feeding plus deterioration of the lining. GEGA provides a complete package of services from designing, manufacturing, assembly to commissioning of equipment, suited to the individual requirements of all kinds of steel mills.

## YOUR ADVANTAGES

- » Uniform flame distribution results in better heating effect
- » Automatic control for efficient use of fuel gas
- » Simple robust design for high operational availability
- » Longer service life of the lining
- » Simple operation
- » Free choice of fuel gas
- » Dryers/preheaters designed using same parameters

# PREHEATING STATION

**GEGA Preheating stations are designed to give the best performance in relation to heat-up time, refractory properties and media consumption.**

In the case of all refractories for steel making, preheating is extending the service life of the refractory lining. Crucial to the result of the preheating procedure is the actual preheating time. If the preheating time is too short, cracks can occur due to thermal shock. Excessive heating time promotes carbon oxidation which occurs between 550 °C and 950 °C.

Using GEGA preheating stations for optimum results calls additionally for a careful synchronization of the application in regard to:

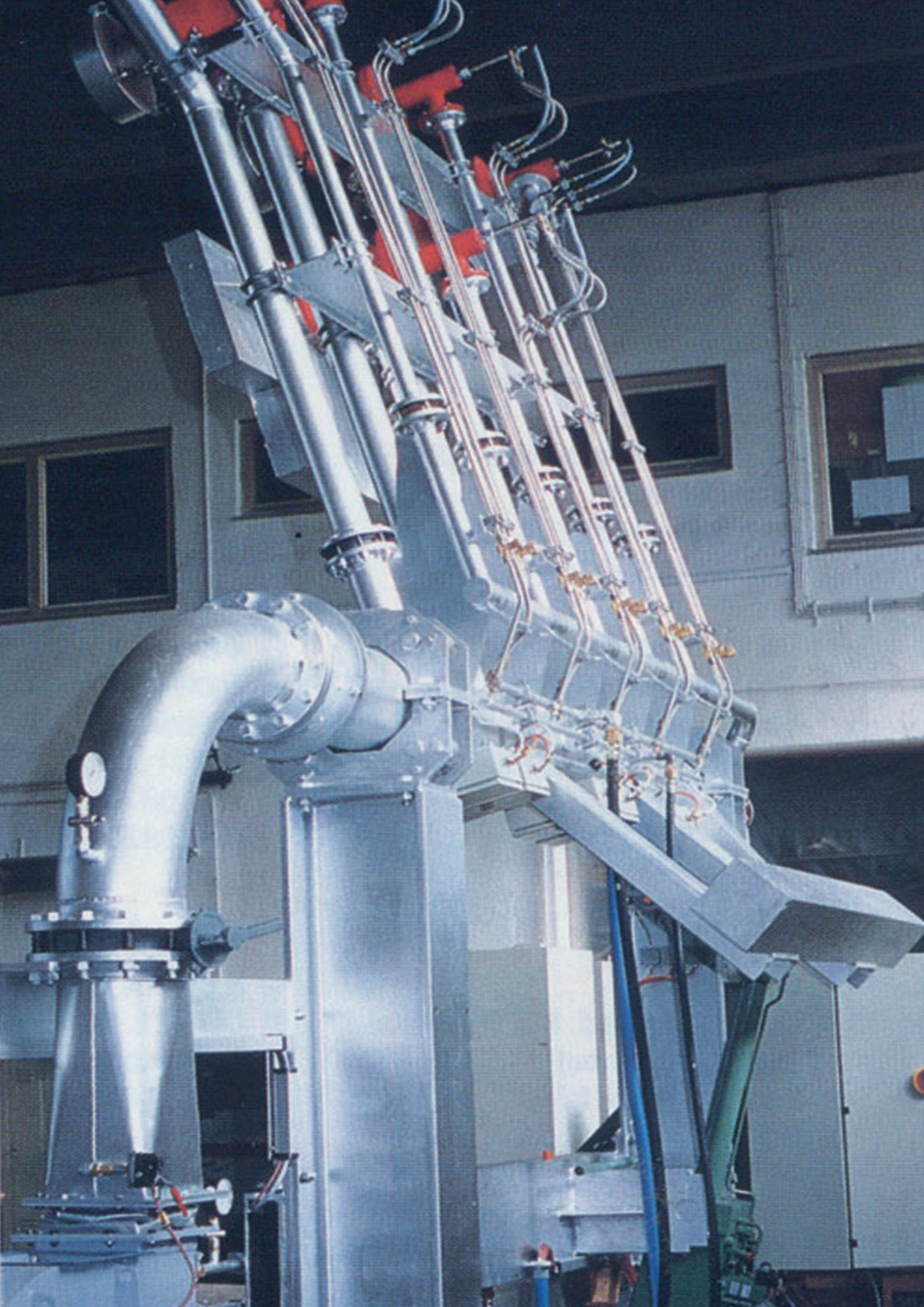
- » Vertical pivoting by electromechanical or hydraulic drives
- » Self-contained hydraulic pivoting drives with cylinder system
- » Horizontally moving systems using rail travelling
- » Stationary units for minimum maintenance

In view of economic and environmental challenges a steel plant is facing, GEGA provides fully automated energy efficient systems which are using all kinds of programmable controllers with different types of flame control e.g. fully proportional types usable for a whole variety of fuel gases. The temperature is controlled by thermocouples and basic controller or PLC.

Most applications require a vertically pivoting system to allow positioning of the refractory lined vessel by rail or overhead crane. The pivoting movement can be done by means of an electro mechanical drive with dampened stops or by a self contained hydraulic pivoting drive using a cylinder system with an attached pump. Counterweights are provided to reduce the forces required for movement to acceptable levels. Horizontally moving systems can also be supplied using a rail travelling moving chassis on to which the gas and air controls are mounted. Stationary units can also be supplied where simplicity or operating practices and minimum maintenance is advantageous.

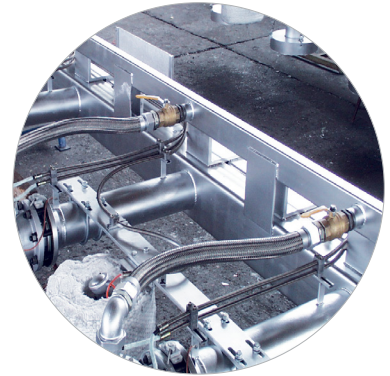
Flame failure devices are fitted for emergency shut-down. The gas/air ratios are automatically controlled to reduce toxic gas emissions and to ensure burner efficiency. Modern burner design with flame failure device and air regulation systems are available.





# GAS EQUIPMENT

To provide uniform heating of the refractory lined vessel, units may require more than one burner. Single or multiple burner designs passing through the dryer or heater fabricated hood with ceramic fibre insulation can be provided, complete with gas and air control. From single manual controls to fully automated energy efficient systems using all variations of programmable controllers are available. Flame control can be HIGH-LOW or fully proportional types usable for a variety of fuel gases. Ignition is achieved by using a pilot flame. Temperature control is provided using thermocouples.



# OPTIMIZED ENERGY EFFICIENCY

Increase of economic efficiency by using exhaust gas heat

» Version 1: Recuperative burner

The integrated heat exchanger heats the combustion air by making use of the exhaust gas heat. Thereby about 15 % energy can be saved.

» Version 2: Heat exchange recuperator

The hot exhaust gas created by heating the tundish is fed via the chimney into the recuperator. Using the principle of heat exchange the combustion air is heated within the recuperator and led to the torch. Thereby about 25 % energy can be saved.



HIGH EFFICIENCY  
BURNER



AIR RECUPERATOR  
HEATING BURNER

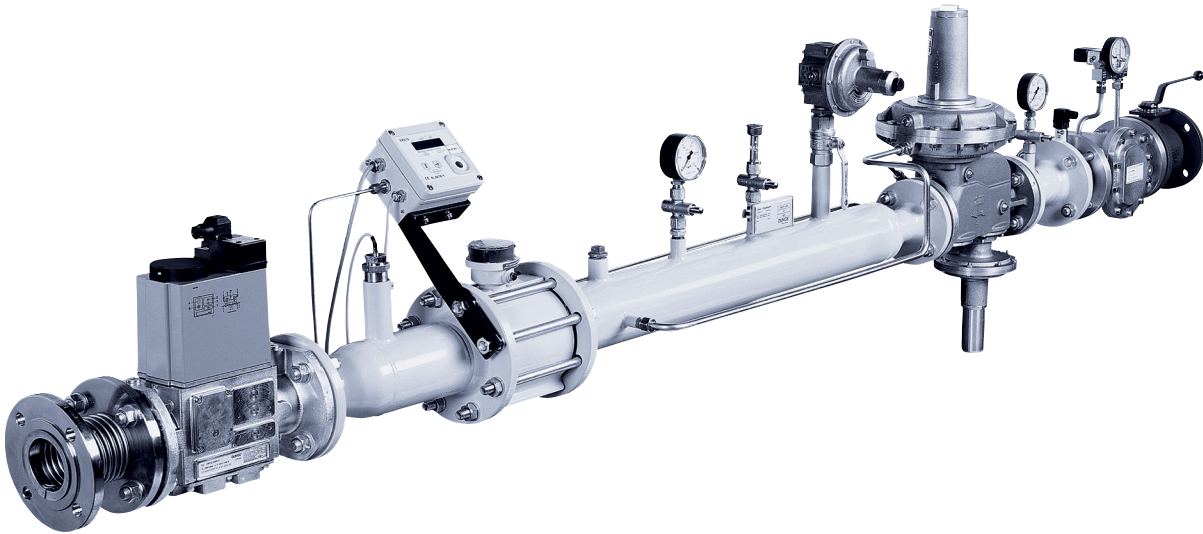


LADLE SHROUD  
PREHEATING UNIT

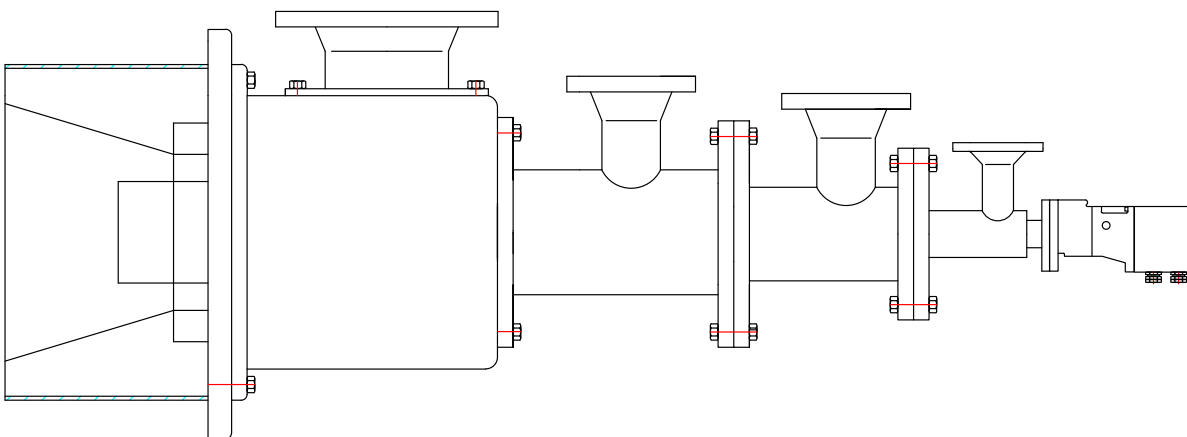
# COMBINED DRYING / PREHEATING

As a new development the drying/pre-heating stations have been designed for pre-heating the cold tundishes but can also be used as drying equipment for tundish linings.

Modern gas regulation equipment (DIN EN 746)



Multiple burners



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