Metallurgy – High temperature processes and glass manufacture

Can you believe that technical oxygen is often cheaper than apparently free air? Incredible, but true – at least for many industrial furnace systems. The reason is simple: air is not as free as it seems. It has to be compressed and preheated in order to reach adequate combustion temperatures and efficiency. And the greater part of the air, consisting of 4/5 nitrogen, is of absolutely no value for combustion. This nitrogen ballast is inevitably heated up too, leading to an unnecessary increase in exhaust gas volumes and, as a result, in heat losses. On top of that, nitrogen forms undesirable nitrogen oxides at high temperatures, which are very difficult to remove from the exhaust gas. This is just one example of many, showing that first appearances do not always indicate the ecologically and economically correct results.

Oxygen saves money

Oxygen technology is indispensable today for melting processes in shaft or rotary furnaces. For the melting of glass in tank furnaces, oxygen as the oxidation medium, supplied through special oxy-fuel burners, also has a number of advantages. Oxygen saves primary energy and reduces emissions of pollutants.

Where new investments have to be made in furnaces, use of the oxygen technologies now developed can save considerable investment resources.

Using energy otherwise lost

In the production of steel in electric arc furnaces, oxygen helps to raise the smelting performance through the use of special burners, shortening cycle times and increasing productivity. At the same time, the installation of injection lances for the post combustion of carbon monoxide appreciably reduces specific energy consumption.

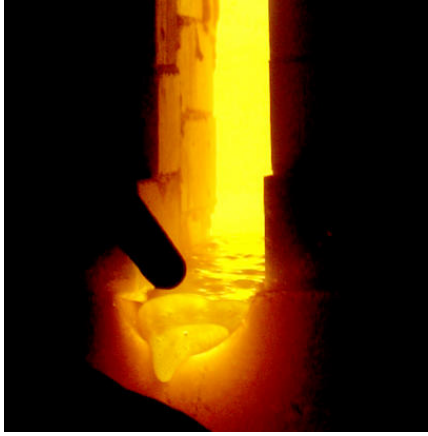
Gases and hot metals

For the refining of metals, oxygen is equally indispensable, for example for steel refining in arc furnaces or converters. For the cleaning, homogenisation and degassing of the melt, argon is also required as an inert purging gas. But non-ferrous metals can also be treated beneficially with inert gases.

In the manufacture of float glass, a nitrogen-hydrogen mixture protects the bath of molten tin on which the "floating" sheets of glass set.

Tapping a steel melt from an electric arc furnace.

Oxipyr® P-burner



Oxipyr© G-burner.

Application:	**Know-how from Messer:**	**Advantages:**
High temperature processes		
Smelting in shaft furnaces for the manufacture of lead, zinc, cast iron and mineral insulating materials	Oxygen enrichment of the blast air, direct supersonic oxygen injection	Increased smelting performance and temperature, shorter warm-up time, less dust emission
Smelting in rotary and hearth furnaces for the manufacture of iron, aluminium, copper, lead, enamel and ceramics	Process optimisation through use of Oxipyr® burners, incl. furnace pressure regulation, door sealing and process control	Reduced fuel consumption and exhaust gas volume, improved smelting performance and exhaust gas quality
Smelting of steel in electric arc furnace	Use of special burners and lances	Higher smelting performance, shorter smelting times, substitution of electrical power by primary energy plus oxygen
Refining in electric arc furnace	Injection of oxygen with lances	Rapid and precise adjustment of carbon content
Glass manufacture		
Oxygen injection	Under-shooting of the flame with oxygen and injection into the flame	Performance increase, greater flexibility, longer tank dwell time
Oxy-fuel technology	Operation with Oxipyr® P-LON burners	Lower fuel consumption, compliance with NO_x limits and low volumes of dust and exhaust gas
Fire polishing of glass	Oxy-fuel burner	Higher quality

Oxipyr® SVNR-burner