It is in the nature of things that when certain metals are heated until they glow, they react with oxygen and oxidise. On the alloys, unwanted oxide layers can form that vary in colour depending on their thickness and composition. They are a blemish and can diminish the quality of the finished products. To ensure that atmospheric oxygen does not reach the material to be treated, the heat treatment is carried out under a protective gas atmosphere. In some cases it may be adequate to use nitrogen (N\textsubscript{2}) as a protective shield and prevent oxidation of the surface of the metal. Depending on the alloy and the task in hand, however, a reactive gas is usually also needed.

**Perfect oxidation protection thanks to hydrogen**

Hydrogen (H\textsubscript{2}) is the reducing agent of choice in metallurgy – for oxide-free annealing of non-corroding steels, recrystallisation of heat-resistant special steels, cleaning of metal surfaces or for imparting the required properties of non-ferrous alloys such as copper, bronze or brass. Nitrogen/hydrogen gas mixtures possess similar reducing properties at very favourable prices. The size of the H\textsubscript{2} part depends on the material in question and the purpose of the heat treatment.

Messer offers N\textsubscript{2}/H\textsubscript{2} gas mixtures in two fundamentally different ranges of concentration: the Neutrotherm trademark covers “hydrogen-poor” mixtures, with an H\textsubscript{2} content of up to four per cent by volume, which are suitable as protective gases in the heat treatment of iron, copper or aluminium alloys. The mixtures can be used safely at temperatures below 750 °C and are also not explosive at room temperature.

**Strong duo**

**Neutrotherm and Hydrotherm inert gas mixtures – perfect oxidation protection for all types of alloys**
The Hydrotherm trademark covers gas mixtures that contain up to 100 per cent of H₂ and are suitable as protective and reactive gases for chromium-rich alloys (heat treatment up to 1150 °C), thereby preventing a blemishing oxide layer on the surface of the material even at extremely high temperatures.

Your benefits at a glance
The Neutrotherm and Hydrotherm gas mixtures from Messer
- can be used individually and enable you to react quickly and flexibly to the most diverse range of requirements and tasks.
- will increase the efficiency of your furnace installation by virtue of their high heat capacity and thermal conductivity.
- will make you more productive and guarantee you workpieces of the highest quality.
- can be stored in a space-saving way and used in the established manner.

What the experts think
If you want to react to the demands of the market in a smooth, quick and flexible way, be highly productive and expand your product range in line with demand and without high investment costs, then Neutrotherm and Hydrotherm from Messer are the ideal choice: both groups of gas mixtures guarantee you first-class results combined with a favourable cost/benefit ratio.

Please do not hesitate to contact us if you have any questions regarding Neutrotherm and Hydrotherm gas mixtures or would like to arrange a personal consultation with our application experts.

Contacts in your country can be found at:
www.messergroup.com/de/Standorte

This and many other brochures can also be downloaded from the Internet in PDF format: www.messergroup.com