MICROSOLV

Frits and Sparging Stones Sintering Atmosphere - INTERNAL ONLY

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INTERNAL ONLY

Sintering Atmosphere

The process of sintering with atmospheric pressure **requires a protective gas** such as **hydrogen, nitrogen, or carbon monoxide**. Almost all metals interact with the gases in their immediate environment and this interaction intensifies when exposed to elevated temperatures. A basic function of a sintering atmosphere is to protect metal parts from the effects of contact with air.

The primary purpose of employing specific sintering atmospheres is to preserve sintered metal powders from oxidation and subsequent re-oxidation.

A sintering atmosphere can affect the fundamental sintering process in numerous ways. For instance, it can generate highly mobile metal atoms by reducing the oxides. Furnace atmospheres affect the sintering process and the material being treated, **sintering is never performed in air or in an oxygen-rich atmosphere**.

Gas atoms of the sintering atmosphere can enter the sintering compact via interconnected pores. They may later get trapped in closed pores, thus hindering their shrinkage. Gas atoms of the sintering atmosphere may also diffuse into the metal. At times these atoms might also alloy with the metal. In the following sections the details of different sintering atmospheres are given.

Reducing atmospheres are, by far, most commonly used for sintering metal parts. Pure hydrogen is an excellent reducing gas, but it is not economical except in case of high valued products. Hydrogen is very flammable, having an extremely high rate of flame propagation. Because of its high flame propagation, hydrogen burns with a short, hot flame immediately upon contact with air. The flame is an almost colourless blue. Hydrogen is the lightest element; its specific gravity being only 0.069 as compared to 1.0 for air. It is easily displaced by air, and rushes out the top of the furnace door openings rapidly when free to do so.

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