

ABSTRACT

The present application provides a method for controlling the atmosphere in a furnace wherein the pressure of the furnace comprises one atmosphere and wherein no oxygen or oxygen-containing gases is added, the method comprising the steps of: treating a metal part in a one atmosphere pressure furnace and in an atmosphere comprising a hydrocarbon gas wherein the metal part is treated using at least one carbon flux measurement and correlating the at least one carbon flux measurement with at least one measurement wherein the at least one measurement is the amount of hydrogen contained within an effluent of the furnace. The surface oxidation under carburization temperatures of steels during the carburization with carbon-containing gas mixtures is avoided by heating the steels to the carburization temperature under a nitrogen/hydrogen mixture or pure hydrogen. For carburization, these gases are replaced by a carbon-containing gas mixture whose oxygen activity is smaller than that required for the formation of manganese(II) oxide or chromium(III) oxide.

