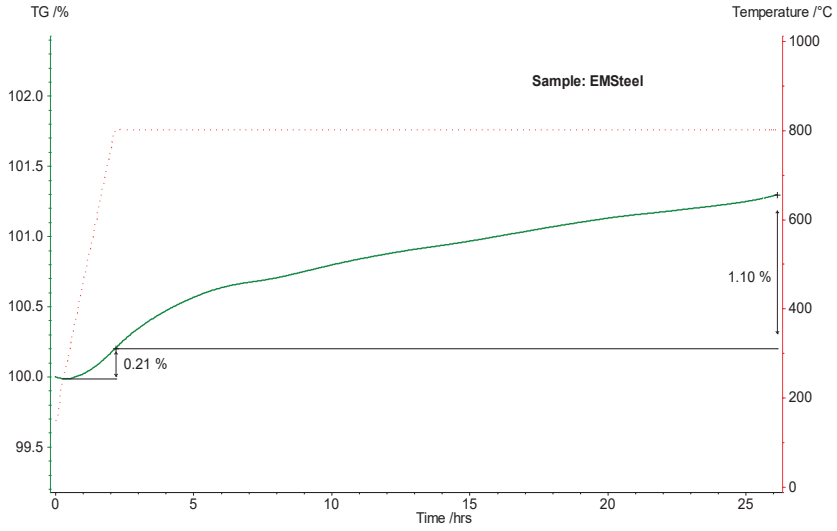
APPLICATION**SHEET**

Metals/Alloys · Metal Industry
STA 2500 *Regulus*

Steel Corrosion under a Humid Atmosphere

Introduction

Corrosion is a deterioration of intrinsic properties in a material due to reactions with its environment. Weakening of steel due to oxidation of the iron atoms is a well-known example of electrochemical corrosion. Most structural alloys corrode merely from exposure to moisture in the air, but the process can stronlgy be affected by exposure to certain substances like acids, bases, halogens, etc. Controlled corrosion treatments such as passivation and chromate conversion will increase a materials's corrosion resistance. Stainless steel, for example, a ferrous alloy with a minimum of 10.5% chromium content, does not stain, corrode or rust as easily as ordinary steel. Corrosion processes can be well simulated and studied by means of thermogravimetry under defined temperature, gas and humidity conditions.



Test Conditions

Temperature range:	RT ... 800°C
Heating rate:	10 K/min
Atmosphere:	Air + 50% H_2O at 160 ml/min
Sample mass:	303.12 mg
Crucible:	TGA plate Al_2O_3
Sensor:	TGA type S

Test Results

A steel sample was heated and kept isothermal at 800°C for more than 20 hours. The measurement was carried out under a humid atmosphere. The observed increase in the sample mass is due to corrosion of the steel sample. A humid atmosphere up to 100% absolute concentration can be created by a special water vapor furnace which can also be coupled to evolved gas analysis. Typical application fields of humid atmospheres are corrosion and scaling processes on steels, where the oxidation and decarbonization by means of the water vapor is especially important. The same applies to the study of sintering processes in ceramic components and water gasification of petroleum coke. Also inorganic building materials are often investigated in humid atmospheres.

NGB · Application Sheet 071 · E · 0621 · Technical specifications are subject to change.

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