



Bond voor Materialenkennis

**VWT**



Vereniging voor Warmtebehandelingstechniek

[www.vwt.myweb.nl](http://www.vwt.myweb.nl)

## ***Uitnodiging***

De Vereniging voor Warmtebehandelingstechniek organiseert op:

**donderdag 16 september 2010**

- Lezingenavond in het Amrâth Hotel Brabant te Breda met als thema:

**Process control in gaseous carburising and nitriding:  
state of the art**

**Basics - actual status and future - applied to carburising  
and nitriding processes**

Aanvang registratie

17.00 uur

Sluiting

21.30 uur

# Programma

17.00 uur **Ontvangst-Registratie-Aperitief**

18.00 uur **Diner**

19.10 uur **Opening door de voorzitter van de Vereniging voor Warmtebehandelingstechniek**  
*Bernard Vandewiele, Surface Treatment Company NV, Sint Truiden*

19.15 uur **Process Control in Gaseous Heat Treating - State of the Art**  
*Karl-Michael Winter, Process-Electronic GmbH, Heiningen*

Iron just as other metals has a tendency to interact with gas atoms and carbon atoms. Depending on the actual temperature and the gas or carbon availability in the surrounding atmosphere the foreign atoms will first be placed within the iron lattice and once the maximum solubility at temperature is reached it will start to build combinations of the gas or carbon atoms and the iron atoms. These combinations are then known as oxides, nitrides or carbides.

In the heat treating of steel the specification of the final properties of the parts requires all sorts of variations between foreign atoms in solution while at the same time trying to avoid any carbides or oxides and actually aiming for a surface layer that might be pure nitrides or carbonitrides with an additional oxide layer on top. There are even processes producing stacked layers of carbides and nitrides.

This presentation will give an overview on the gas-steel reactions and how the atmospheric potentials have to be set in order to produce the desired structures. The major processes will be discussed, such as carburizing and carbonitriding on the one hand and nitriding and nitrocarburizing on the other hand. Based on the dominant atmosphere-steel reactions the available measuring equipment will be presented and put into an order according to their accuracy and ease of handling. Control variants aiming for specific surface layer compositions but also aiming for saving on expensive gas consumptions are ready to use in existing heat treating equipment and might be taken into account.

Simulations will sum up the effects and help to develop recipes which can further on be used in the control hardware.

- 1) Gases and carbon in steels
  - The iron lattice, influence of temperature
  - Solubility and phases
    - Iron - Carbon
    - Iron - Nitrogen
    - Iron - Oxygen
    - Iron - Hydrogen
  - Interactions of carbon and nitrogen
  - Activities and potentials
  - Influence of alloying elements
  - Transfer from atmosphere into steel
  - Diffusion of the foreign atoms within the iron lattice
  
- 2) Carburizing and carbonitriding
  - Carburizing and nitriding reactions
  - Carrier gas and enrichment gases
  - Available measuring equipment
  - Control variants
    - Soot limit
    - Carbide limit
    - Carbon transfer coefficient Beta
      1. Neutral hardening
      2. Save on carrier gases
    - Carbon and nitrogen potential
  - Process setup and simulation
    - Hardenability
    - Quenching behaviour
    - Retained austenite
    - Resulting hardness

20.15 uur **Koffiepauze**

- 3) Nitriding, oxi-nitriding, nitrocarburizing, post-oxidizing
  - Nitriding and carburizing reactions
  - Process gases
  - Available measuring equipment
  - Control variants
    - Residual ammonia
    - Dissociation
    - Nitriding potential
    - Nitriding and oxidizing potential
    - Nitriding and carburizing potential
    - Nitrogen transfer coefficient (diluted atmospheres)
    - Weight percentages N and C in the white layer
    - Phase control (aiming for low porosity)
    - Oxidation potential
  - Process setup and simulation

21.30uur **Sluiting**

## DEELNAMEKOSTEN

De kosten, inclusief BTW, bedragen voor:

Leden VWT € 55.00

Leden BvM € 80.00

Niet-leden € 105.00

Betaling op 16 september 2010 bij de registratie met gepast geld wordt op prijs gesteld.

## AANMELDING

U kunt zich aanmelden per fax +31 (0)40 296 99 26, per telefoon +31 (0)40 296 99 13 of per e-mail [info@materialenkennis.nl](mailto:info@materialenkennis.nl).

## ANNULERING

Bij afwezigheid op de bijeenkomst zonder voorafgaande afmelding uiterlijk 24 uur voor de bijeenkomst, zijn de volledige deelnamekosten verschuldigd.

## ROUTEBSCHRIJVING

U ontvangt een routebeschrijving naar **Amrâth Hotel Brabant te Breda, Heerbaan 4, 4817 NL BREDA** bij de bevestiging van uw aanmelding.

## AGENDA

09-12-2010

10-02-2011

19-05-2011

15-09-2011

08-12-2011

Het bestuur van de Vereniging voor Warmtebehandelingstechniek hoopt u op **16 september 2010** te begroeten

B. Vandewiele, voorzitter

H. Veltrop, vice-voorzitter

R. de Vries, penningmeester

R.C. Jongbloed

N.C.W. Kuijpers

F.A. van Dartel

R. Devos

K. Bonny

G. Claus

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