

TYPES OF TESTING OF REFRACTORIES

The durability of refractories is a matter which vitally concerns all manufacturers and users since it is intimately connected with economics and efficiency of the process in they are employed. Refractories are characteristically anisotropic in nature which makes it all the more difficult to judge exactly the durability while it is in use. The furnace designer has to choose the refractories according to the data from different tests available to him. That means in order to fulfill the users or various application requirements and to achieve long service lives, refractory products must be assessed by testing.

The main functions of refractories testing may be classified into three types:

1. Evaluation of new materials before use.
2. Quality control by the manufacturer or user.
3. Post-mortem examination of refractory bricks that behaved differently than the normal.

The testing of refractories can be categorized as:

1. Non-destructive type.
2. Destructive type.

A list including both these types of testing is given below:

=> Bulk density

=> Apparent porosity

=> Apparent specific gravity

=> True specific gravity and true density

=> Particle size analysis

=> Permeability

=> Pore size distribution

=> Refractoriness or Pyrometric Cone Equivalent (P.C.E)

=> Refractoriness Under Load (R.U.L)

=> Cold Crushing Stress (C.C.S)

=> Modulus of Rupture (M.O.R)

=> Modulus of Elasticity (M.O.E)

=> Permanent Linear Change (P.L.C)

=> Reversible Thermal Expansion (R.T.E)

=> Thermal Conductivity

=> Differential Thermal Analysis (DTA)

=> Thermo-gravimetric Analysis (TGA)

=> Spalling Resistance (water quenching and air spalling)

=> Hydration Resistance Test

=> Creep in Compression Test

=> Abrasion Resistance Test

=> Resistance to Carbon Monoxide

=> Slag Corrosion Test

=> Microstructural analysis under Optical Microscope

=> Mineral Phase identification by X-ray Diffractometer (XRD pattern)

=> Chemical Analysis

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