Ceramics Keramik
Céramique

Temporary binders

OPTAPIX, ZUSOPLAST WE

Application

The addition of temporary binders serves to **increase the green strength and dry modulus of rupture.**

After the forming process, it is necessary for the grinding wheel to have **sufficient strength to withstand further handling** during subsequent processing. This is often achieved by the introduction of a ceramic bond (consisting of clay, kaolin, quartz, feldspar and frits). Depending on the particle size distribution, ceramic bonding and porosity aids the **green strength and dry modulus of rupture are often not sufficient**. By **using temporary binders** from Zschimmer & Schwarz, a **high strength** is achievable, even when a high proportion of porosity aid is used or there is a low ceramic bond content.

The addition of a temporary binder to the abrasive body can be made during the **preparation of material for the dry pressing process** by adding to the preparation water to which the ceramic bond is then added. It can also be added in **production via the liquid phase** to the deflocculated slip.

If the **ceramic bond proportion is small**, and the **pressing moisture is below 0.5 %, wax emulsions** may be used as temporary binders, which increase the **green strength** and also lead to an **improvement in compaction behaviour** during pressing.

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Mode of action

The raw materials for the temporary binders supplied by Zschimmer & Schwarz to the grinding wheel industry are **preparations from polysaccharides, polyvinyl alcohols** and **wax emulsions**.

Pre-prepared solutions of binder in water are mainly used. These lead to the **formation of adhesive bonds between the ceramic particles**. A **homogeneous distribution** of the temporary binder ensures that the binder is uniformly available at all contact sites and lead to a good temporary bond.

The contact can be achieved on the one hand through a **coating of the ceramic particles which results from film-building properties** of the temporary binder (e.g. based on polyvinyl alcohols), or on the other hand it is possible via the addition of **colloidally dissolved auxiliaries** to establish **point contact** (e.g. based on polysaccharides). Through the use of **wax emulsions**, which in their function work as **temporary binders and as pressing aids**, compaction behaviour is improved and hence a **reduction in internal stresses is possible.** For the application of wax emulsions, following the initial preparation (mixture of abrasive particles - wax emulsion - ceramic binder), the mixture is dried, so that as the water is removed the **ceramic particles become covered with a wax film**. During pressing, where these wax films are in contact, a temporary binding effect is created as a result of **adhesive forces**.

In addition to the desired mechanical properties of tear extension and tear strength of the binder film, a further significant consideration relates to the burn off characteristics of the temporary binder itself. Good oxidation characteristics, and hence complete combustion in the sintering process, together with minimum emission values, are essential properties; these are readily attainable under single oxidizing kiln conditions using temporary binders from the Zschimmer & Schwarz range.

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