

Temporary binders



MORMATE, OPTAPIX

Application

In the tableware sector among others temporary binders are used in the preparation of bodies for semi-isostatic pressing. Their use serves to increase **green strength and dry modulus of rupture**.

The granulate strength has to be adjusted in a way so that **no breakdown of the granulate occurs during transportation**, which would lead to decreased flow properties and a more difficult de-airing of the body during the pressing process. Furthermore, a simple destruction during pressing must be ensured.

Because of the defined composition of the temporary binders, the granulate properties with regard to the **strength and plasticity of the granulate particles** can be regulated as required, as can those concerning the **elasticity of the binder matrix**.

Furthermore, temporary binders are used in the pressure casting process in order to minimize the scrap rate in case of insufficient green strength and dry modulus of rupture, thus allowing the **formation of pressable granulates, especially in cases of low plastic blends**.

Temporary binders are seen in their mode of action in a close connection with the use of pressing aids. Partly, these are already incorporated into the temporary binders offered by Zschimmer & Schwarz. A simplification of the technological procedure is therefore available. Furthermore this promotes an **improved reproducibility in the preparation process**, through the **increased product homogeneity**.

Mode of action

The raw material base of the temporary binders available from Zschimmer & Schwarz are **polysaccharides, polyvinyl alcohols, polyacrylates**, as well as **polyvinyl acetates**. The pressing agents contained in some of the binders are based on polyols.

The addition of temporary binders leads to the formation of **adhesive forces between the ceramic particles**.

The contact with the binder can on the one hand be achieved through a **coating of the ceramic particles**, as a result of film forming properties (e.g. use of polyvinyl alcohols). On the other hand it is possible that through the addition of colloiddally dissolved products (e.g. use of polysaccharides) a **point contact** is built up. The film forming properties of a temporary binder have an effect on the binding mechanism, especially with regard to **elongation and tear strength** of the binder film. Adhesion via point contact produces in general a more brittle bond.

Given a homogeneous distribution of the binder within the body this should ensure that the binder is uniformly available at all contact sites, hence leading to an optimal temporary binding effect.

In addition to the desired mechanical properties, 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.

Probably the addition of binders can have an influence on the slip rheology. If necessary this must be re-adjusted.