DARLEY REFRACTORIES AUSTRALIA PTY. LTD.

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REFRACTORY CASTABLE (Heat Resistant Concrete)

INSTRUCTIONS FOR USE OF DARLEY CASTABLES

THE PRODUCT

Refractory castables consist of suitably graded aggregates and hydraulic cements in proportions formulated to achieve certain desired properties for the particular end use. They require only the addition of clean water either by hand or mechanical mixing or during pneumatic gunning to form a heat resistant concrete piece or structure.

FORMING

Refractory castables can either be cast between formwork, cast in-situ, gunned, trowelled or cast into moulds to make special shapes Coarse, regular or fine mixes are available to suit the method of application and end use selected. As most castables have negligible shrinkage, the moulds, formwork, etc., can be made to exact size. Mould should be watertight and structurally strong and treated with a suitable release oil or grease to facilitate stripping.

PREPARATION OF SURFACES

Steelwork should be reasonably free from scale and timber should be clean and smooth. For repairs to an existing brickwork or castable structure the area should be cleaned by chipping off slagged or affected areas (see Note 1) and then thoroughly damped to prevent absorption of mixing water from the newly applied castable.

MIXING

Mixing is best done in a paddle mixer, but it is essential that all vessels and implements are clean. Contamination by lime or Portland cement will have a detrimental effect on setting time and properties. For small casts, mix with a shovel on a clean surface. For mechanical and hand mixing, water is worked into the material gradually until its texture changes from “harsh” to “workable”. The correct water addition is achieved when a handful of mix can be formed into a ball and be tossed 30 – 40 cm into the air and caught as a cohesive mass. If too little water is present, the “ball” will break up.

Instructions for Use of Darley Castables cont.

If too much, the "ball" will slump (see Note 2). Where vibration is used to assist placement, slightly lower water contents will give satisfactory results. Excess water reduces strength. Thoroughly mix before placing and never mix more than can be properly handled inside 20 to 30 minutes.

Ideally temperature of mixing water will be 10^0 to 25^0. If site ambient temperatures exceed 25^0, chilled water should be used. Where site ambients reach 35^0 or higher, loss of workability may be encountered.

The refractory concrete can be consolidated by rodding, tamping or vibration. Finish off the surface to the correct profile with a trowel or screeding level. Do not overwork and/or slick to a wet smooth finish. For restoration of vertical surfaces in particular a fine mix of the appropriate grade of castable is recommended. (It is applied with a trowel in the same manner as cement-sand plaster rendering on walls). Alternatively it can be cast behind formwork (se Note 3).

GUNNING

Pneumatic gun placement procedures vary from product to product. Details of typical variables, nozzle air pressure and predamping levels, are available on request.

CURING AND DRYING

After the initial set, cover with damp bags, polythene sheeting, fine water spray, or apply a curing membrane etc., to prevent loss of mixing water. Cure for 24 hours, then remove covering. Air dry for 48 hours. Drying can be prompted by using radiant heat.

If a piece of cold steel when placed against the drying structure for 20 – 30 seconds exhibits moisture droplets on the contact surface, pore water is still present and drying should be continued.

FIRING

A slow fire can be applied and the temperature raised at the rate of 50^0C approx per hour per 25mm thickness of lining until working temperature is reached.

INCORRECT CURING

Castables cast in a hot environment or against a hot structure or denied a proper curing and/or drying treatment will not generate the same properties as at ambient temperatures.

Note: 1. Always try to provide a "key" for the new material to adhere to, e.g. an enlarged joint.

2. When mixing, it is best to reserve a small amount of dry mix. If excess water is added, a correction can be made by adding in the dry mix and proceeding as described above. (If all the mix is committed and excess water is added, the result will be a segregated, under strength casting).

3 Light weight insulating castables are unsuitable for the trowelling vertical repair technique.