A INDEX

B SCOPE

This method may be used for castings in any material provided that the casting has not been rejected for low strength or gross defects. Other methods e.g. dip or spray, will be covered by a separate document.

Castings which require subsequent welding cannot be sealed due to the detrimental effect of heat on the impregnant.

C REQUIREMENTS

1 **Introduction**

Genuine difficulties may be encountered by foundries, resulting in micro porous castings which are not pressure tight. Unless prohibited as a drawing requirement, castings may be reclaimed by impregnation on a temporary basis subject to prior written approval (Engineering concession). Where it is known that a high risk is entailed in certain castings and 100% impregnation is needed, this shall be stated on the Engineering drawings. Components produced by the sinter route may also be made pressure tight by this process if required.

2 **Identification**

2.1 Impregnated castings shall be identified with a permanent marking by an agreed method except where clause 2.3 is applicable. A stamping punch may only be used in a position approved by the Product Engineering department involved and must not produce local stress.

2.2 The type of marking should give reference to the type of impregnant used.

2.3 Where any particular casting is required by the drawing to be 100% impregnated, no additional marking is required.

3 **Process And Impregnants**

3.1 The choice will depend upon :-

3.1.1 The nature of the casting - material, size and form.

3.1.2 The liquids in contact, heat and other service conditions and environment

3.1.3 Subsequent finishing treatment.

3.1.4 The type of porosity defect to be rectified.

3.2 Early sealants were generally based on aqueous solutions of silicates containing mineral fillers in suspension. These require subsequent baking to drive off surplus water and to harden the silicates to form a seal. While this is generally the cheapest type of sealant it has been shown that sealant in deep cracks may not fully harden and also that it may be attacked by hot aqueous solutions (i.e. antifreeze). Modern sealants are usually polymer based and either anaerobic, catalytic or heat curing. Total curing is more easily achieved, and volume change is less than for silicate type sealants. lower viscosity gives better penetration and the cured product is more inert to heat and chemical attack.

4 **Method**

This will normally be specified in detail by the supplier of the impregnant used but usually includes the following processes.

4.1 Prior to impregnation, treatments such as pickling or anodising should be completed.

4.2 Components for impregnation shall be clean, dry and grease-free. This may be accomplished by vapour degreasing or using a suitable emulsion cleaner. In the latter case components shall be dried thoroughly after washing.

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4.3 Impregnation is usually carried out by first evacuating the component in an autoclave then admitting the sealant, or by evacuating under sealant. Pressure may then be applied to assist penetration.

4.4 After impregnation the component is washed to remove surplus sealant and any curing operation required is carried out. The latter usually involves heating at temperatures up to 200 deg C - time and temperature depending on the type of sealant.

5 **Inspection**

5.1 Castings shall be re-pressure tested after impregnation. In the event of failure a second impregnation may only be permitted after agreement from the Product Engineering Department.

D VALIDATION OF NEW PROCESSES / PROCESSORS

1 **Processors**
Impregnation shall only be carried out by SQA approved processors.

2 **Test Samples**
Samples of components to be treated shall be obtained which have leak sites identified by a suitable pressure test to a pressure specified by the customer. See Note 1.

3 **Process**
Impregnation shall be carried out using a sealant identified after consulting clause C3, to process manufacturers instructions. Afterwards components will be retested as in clause D2. See Note 4.

4 **Fluid Ageing**
Separate sealed components shall be subjected by the customer to 72 hours immersion in one of each of the fluids they will meet in production and service e.g. :-

40% Glycol antifreeze	@ boiling point
10% Caustic Soda	@ 40 deg C
Trichlorethylene	@ 20 deg C
Petroleum Spirit	@ 20 deg C
Engine Oil	@ 10 deg C

Other test fluids and temperatures may be added or substituted according to customer requirements.

5 **Validation**
After fluid ageing the components will be retested as in clause D2. Absence of leaks shall be accepted as satisfactory proof of the process; whereupon the customer will provide the processor with a report approving the process, quoting the make and type of sealant, the fluid ageing tests and the pressures applied. A processor subsequently wishing to vary the process must inform the customer with a view to revalidation.

Notes

1 Where components to be tested are not suitable for complete or partial immersion for the fluid ageing test (clause D4) an alternative component, preferably of similar material and construction, may be substituted. Alternatively a standard test piece may be used.

2 Quantity of samples shall be agreed between the Plant Quality Department of the customer and the processor.

3 Where pressure testing is carried out by the processor and not witnessed by the customer, written certification of sealant used and test result shall be supplied by the processor for quotation in the validation report.

4 In the event of a leak persisting, the sealing process may be repeated once, if permitted (clause C5). Components leaking after two impregnations shall not be used for validation.

5 Partial immersion may be used if this includes identified leak sites.

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