A COLLECTIVE DIMENSION ON CASTING IMPREGNATION

Before embarking on alternative methods for metal casting impregnation, it is important to look first at quality control and accountability. Ultraseal International Ltd Guernsey laboratories developed the very first acrylic impregnants - PC504, 66 and MX. These impregnants were all developed during a period of 1970/1980 on the back of what we know today as the US MIL Standard Test Ring. The writer actually introduced test rings as far back as 1963 in his quest to improve impregnation technology and it was only with absolute confidence in the use of test rings, that these impregnants were certified ‘fit for purpose’.

It was also recognised that the rings would prove invaluable as a means of quality assurance for the application of the impregnation processing itself. This still remains the policy of X-Seal today, although sadly this and in spite of the formation of the Institute of Impregnation Technology www.ioit.org, where the benefits of an international standard were spelled out, the opportunity has not yet permeated through the impregnation industry and standards remain fractured, unaccountable and unregulated.

Vacuum Impregnation (VI) (Batch Process)
This is a regular choice today but it does have a down side:
• Visually there is no actual proof impregnation has taken place.
• Even poor processing can risk superficial sealing of porosity.
• Debris in porosity can stop the impregnant from curing.
• Unregulated application can mean contaminated ‘out of spec’ impregnant can be in service for years.
• Breaches US MIL-I-17563C Approval.

It is for these reasons, VI is not recommended (without correct pretreatment) for sealing contaminated castings having been exposed to liquids such as quenching oils, washing solutions and cutting fluids.

Hot Dip Impregnation (HDI). In the 1940s, this was a regular method of sealing porosity by quenching in a bath of impregnant. This could well be a consideration for use with Acrylic-T120. For economic purposes, the diminishing heat from a freshly formed casting could be used. Alternatively, virgin castings could be spot sprayed (US MIL Compliant) onto areas known to harbour porosity.

Benefits:
Low cost application.
Components: Alloy sumps and transmission cases. Could be fully automated.
Only a small amount of impregnant would be at risk.

Cold spray/drip impregnation (CS/DI).
An alternative to HDI, Acrylic-C120 would also provide the same benefits (US MIL Compliant). Requires virgin clean castings.

Internal Pressure Impregnation (PI).
A regular form of sealing porosity up to the 1960s AcrylicT120 is a feasible alternative to replace production ‘air decay’ as a hydraulic test. Components that leak get directed through a wash/cure cycle and back to the production line.

Benefits:
Automatic removal of porosity contamination - No 1 enemy solved.
Components: Alloy cylinder heads/blocks and castings of an intricate nature.
Only a small amount of impregnant in use.

Quality Accountability
US MIL Test Rings can run along side a chosen application procedure for performance confirmation.

Certified Rings & Test Fixtures ‘on-line’ from www.x-seal.co.uk
Be aware of look-alike ‘dumbed-down’ rings in circulation.

APPLICATION OPTIONS

**Vacuum Impregnation
**Hot Dip Impregnation

*Acrylic-T120/C120
*Acrylic-C120

**Internal Pressure Impregnation

*Spot Impregnation

Star indicates levels of expected sealability.

US Navy MIL-I-17563C Compliance * YES. ** NO.

It is also important to be cautious of claims of US MIL Approval when applicable to Vacuum Impregnation as it is not compliant due to the inevitable high risk of impregnant contamination.

Information and recommendations offered or implied are without warrantee. It is for the user to satisfy suitability.

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