**Industries & Market**

- All, any that require couplant to be applied.

**Typical Parts**

- Steel
- Welds
- Structures
- General Weld Inspection
- Corrosion Monitoring
- Thickness Measurement

**Technical Inspection**

- Manual Inspection

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**Brief Description**

Couplant is required for sound waves to pass from an Ultrasonic Probe into a material under test. Limited and inconsistent couplant application between probe and surface can impact measurement results significantly. Defect sizing relies on a consistent couplant and known surface attenuation measurements. Sonatest is concerned that it finds wallpaper paste is being used as a couplant material. In the field Sonatest has found the use of wallpaper paste is wide spread and seen as alternative solution to formulated ultrasonic couplant. Sonatest will show via ‘experimental evidence’ that the performance of wallpaper paste as a couplant material is not as effective as a formulated ultrasonic couplant.

**Findings**

Wallpaper Paste can give more unreliable readings than purpose formulated ultrasonic couplant. Results will show a measurement inconsistent of over 1dB, which is equivalent to 8% variance at 80% screen height. Gain levels are impacted. It can also be shown to have a detrimental impact on the material surface.

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**Features and Benefits**

- Higher productivity and Improved Reliability
- Reduce Measurement Error Tolerances
- Reduce Gain levels
- Reduce surface deterioration after inspection

**RECOMMENDED TOOL PACKAGE**

- Sonatest Couplant – (Sonagel – W)

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**Figure 1. Condition after 5 days:**

![Condition after 5 days]
Introduction

This document provides evidence that formulated Sonatest ultrasonic couplant has better and more consistent ultrasonic performance than wallpaper paste. As well as reliability, it shall be demonstrated longer term potential surface damage can be reduced.

Scope – Tests Performed

1. Gain Measurement
   A Transducer was connected to a Universal Calibration Block, the signal gain was set to ensure a repeat echo 80% screen height. Between each reading Sonatest Ultrasonic Couplant (Sonagel W) was added between probe and Calibration block surface. Each time the Probe was manually adjusted to read the maximum signal possible. The test was repeated multiple times. Each time the resulting gain adjustment was noted to ensure the single amplitude was at 80% screen height.
   The test was repeated for Wallpaper paste as a couplant.
   The test was repeated for both twin 5 MHz Crystal single compression wave probes and also single 5 MHz Crystal shear wave angle probes. (See Figure 2). Data was recorded.

2. Measurement Repeatability
   From test 1 above, the gain variance was also noted and measured.

3. Exposure to Couplant and Wallpaper
   A calibration block with surface deterioration was used for this test. A calibration block that has deterioration can be cleaned up.
   However, if left untreated the surface will deteriorate over a few weeks to its original poor condition. (Rust). See Figure 3.
   The Block was cleaned with sandpaper and water. See Figure 4.
The test involved adding Sonatest Ultrasonic Couplant to one section, Wallpaper paste to a second section, and leaving a section untreated. The test ran for 12 hours. See Figure 5.

4. Long Term Exposure
The Sonatest Couplant and Wallpaper paste were removed and the test block was placed outside for 4-5 days.

Results

Test 1. Gain Measurement
To obtain a signal height of 80%, the gain was found to be consistently lower with Sonatest Ultrasonic Couplant. 1.5dB lower + over 10% Screen height at 80%

Test 2. Gain Repeatability
To obtain a signal height of 80%, the gain was found to be consistently improved with Sonatest Ultrasonic Couplant. 1dB’s variance was found with Wallpaper paste, which is equivalent to 8% signal inconsistency at 80% full screen height.

0.3dB’s was found with Sonatest Ultrasonic Couplant, which is equivalent less than 2% inconsistency at 80% full screen height.
Test 3. Exposure to Couplant
The Wallpaper paste began to corrode the sample surface in less and Wallpaper Paste than 12 hours after exposure. See Figure 6.

Test 4. Longer Term Exposure
The Sonatest Ultrasonic Couplant area, after 4-5 days shows less signs of deterioration than both the wallpaper and the untreated surface.

Figure 6.

Figure 7.

Conclusion
Formulated Ultrasonic Couplant is much better than Wallpaper paste. It has lower gains, less deviation of results and improves surface conditions after exposure.

Wallpaper paste can be used, however, caution should be taken in the reliability of results, especially when defect sizing is involved.

The tests performed were using a small sample and we do not and cannot confirm the performance ability of any other product other than Sonatest Couplant, which we manufacture.
Sonatest present a full range of stable gels specifically designed for ultrasonic inspection. Thixotropic properties provide excellent wetting and acoustic transmission. The Sonagel range is non-corrosive to metals, non-toxic and safe to the user and the environment.

SONAGEL W
A stable clear yellow gel specifically designed for the ultrasonic inspection of all types of surfaces and is especially suited to solving the problems of rough, pitted and uneven surfaces.
Sonagel W is non-flammable and operates in the temperature range of -10°C to 60°C.
Contains a special tracer dye to enable areas to be checked for coverage and is easily removed with water, alcohol or similar solvent.
Available in: 125 mls, 250 mls, 1 Litre, 5 Litre, 25 Litres.

SONAGEL O
Sonagel O is a stable semi-transparent orange gel and is intended as a replacement for mineral oils and greases. It is hydrocarbon-based and retains its gel state without causing corrosion or drying on the test surface. Sonagel O has a flash point of 175°C (PM) and operates in the temperature range of -10°C to 70°C.
Available in: 125 mls, 1 Litre, 5 Litre, 25 Litres.

SONAGEL LTHT
Sonagel LTHT is a thick, translucent paste designed for ultrasonic inspection up to 300°C. It is non-toxic and safe to the environment, does not generate any toxic fumes at elevated temperatures and is free from volatile organic compounds.
This product is also available in a number of different liquid viscosities.
Available in: 1 Litre

SONAGEL D1
Sonagel D1 is a bright yellow fine powder that when mixed with water, forms a stable clear yellow gel specifically designed for ultrasonic inspection.
This product is specifically designed for “on site” spot tests where it is impractical to carry or deliver ready to use couplant in bulk.
Available in: 1 Kilo Dry Powder

Get in touch with our local Sonatest expert, available in more than 50 countries over 5 continents!