



The Professional's Choice  
for Quality High Performance  
UT Couplants  
Q3 — 2007

### TITANIUM CORROSION AND ULTRASONIC COUPLANTS

Titanium and most titanium alloys are highly reactive. Certain chemicals, such as alcohols and trichloroethylene, as well as Halogens, promote cracking of titanium and titanium alloys at ambient and elevated temperatures. This chemical induced cracking is referred to as "stress corrosion cracking" (SCC) and is a consideration when selecting an ultrasonic couplant for flaw inspection and thickness gauging of titanium and its alloys. Often manufacturers of jet engines will specify total Halogens or Chlorine and Fluorine at 50 ppm max for ultrasonic couplants used on titanium alloy components, particularly if the titanium parts will be heated during subsequent manufacturing processing or in service. In critical titanium parts under stress, such as welded titanium components that are UT inspected prior to heat treatment, manufacturers may specify maximum Halogen levels lower than 25 ppm. Chemicals other than those containing Halogens can also cause SCC in titanium; therefore it is prudent to test the ultrasonic couplant for titanium SCC before using it on a titanium component.

Pratt and Whitney specification PWA 36604, MCL E-205 Type II or ASTM F 945 describe test methods for chemical SCC of Titanium Alloys. This is a common test for liquid materials such as ultrasonic couplants, cleaners and penetrants which come in contact with jet engine components. The alloys tested (AMS 4911 and 4916) are mechanically stressed (tension and compression) then wetted or coated with the ultrasonic couplant and heated to 500° or 900° F (260° or 480° C).

Test and control samples are examined using 20 and 500 diameters magnification. The absence of detectable cracks on any specimen constitutes acceptance for the candidate ultrasonic couplant.

PWA 36604, MCLE-205 Type II and ASTM F 945 simulate conditions where ultrasonic inspection occurs at ambient temperature and the component or jet engine is placed into service at operating temperatures.

*Ultragel II, SonoGlide UP and Soundsafe have been tested and approved to Titanium Stress Corrosion Testing Specifications. See chart on last page.*

### POLYMER FUME FEVER

Sonotech formulates high temperature couplants that are effective at high temperatures and safe for the inspector. Some high temperature couplants and high temperature greases contain perfluorocarbons, such as PTFE, which when heated release effluents of hydrogen fluoride (HF), carbonyl fluoride (COF<sub>2</sub>), and polyfluoroisobutylene (PFIB). These gasses can cause "polymer fume fever," a temporary flu-like illness with fever, chills and sometimes cough, of approximately 24 to 48 hours duration. An additional common exposure route is smoking cigarettes handled by fingers contaminated with high temperature ultrasonic couplants or greases containing perfluorocarbons. Inhalation of poisonous fluoride gas can "initially include symptoms of choking, coughing, and severe



The Professional's Choice  
for Quality High Performance  
UT Couplants  
Q3 — 2007

### The Ultrasonic Couplant Experts

Sonotech manufactures a broad selection of ultrasonic couplants with over 45 products. Sonotech UT couplants deliver dependable high performance over a wide range of test conditions and procedures.

**Visit Sonotech at ASNT,  
booth 231 in Las Vegas**

#### In This Issue

**Titanium corrosion and ultrasonic couplants**

**Polymer plume fever**

**New Echogel XP**

**Two new couplant selection CDs**

**Sonotech Ultrasonic Couplants and testing specifications.**

 **SONOTECH<sup>®</sup> INC**  
774 Marine Drive  
Bellingham, WA 98225  
www.sonotech-inc.com

PRSR STD  
U.S. POSTAGE  
**PAID**  
SAM INC

**NDT Newsletter: Featuring Titanium Stress Corrosion and Plume Fever with Ultrasonic Couplants**

eye, nose and throat irritation, possibly followed after a symptomless period by fever, chills, difficulty in breathing, cyanosis, and pulmonary edema. Acute or chronic overexposure to hydrogen fluoride can injure the liver and kidneys." The Society of the Plastics Industry, Inc. "Potential health Effects," 1992 p. 9

## NEW ECHO GEL XP 14 and 20

Sonotech is introducing Echogel XP (extended properties) 14 and 20, an economically priced ultrasonic couplant with an extended upper and lower temperature range (5° to 190 ° F; -15 ° to 87 ° C), slow drying time and a highly salt stable formulation that is excellent for corroded or salt caked surfaces and clings well to vertical surfaces. Sonotech has assigned Echogel XP a relative ferrous corrosion rating of 70. (See Sonotech's ferrous corrosion rating index in the "Couplant Feature Comparison Chart on Sonotech's web site: [HYPERLINK "http://www.sonotech-inc.com" www.sonotech-inc.com](http://www.sonotech-inc.com), at the bottom of the NDT home page).

### NEW ECHO GEL XP 14 and 20 FOR BRIDGE INSPECTION

Echogel XP is ideal for bridge inspection:

- Easy to spread
- Adheres well to horizontal and vertical surfaces
- Dries slowly
- Good ferrous corrosion inhibition
- Broad temperature range
- Not effected by salts of corrosion or winter road salting
- Economical because it dries slowly and spreads well

For samples, please call (800) 458-4254 or visit [www.sonotech-inc.com](http://www.sonotech-inc.com).

### TECHNICAL SUPPORT

Do you have an application where you need help selecting an appropriate couplant? Chances are we can help. With a degreed Metallurgist with NDT level III (ultrasound), we can help you find solutions to your toughest UT inspection couplant needs. If we don't have an ultrasonic couplant that meets your needs, we can work with you to develop one. To discuss an application, or tell us about an unusual need, please e-mail [mlarson@sonotech-inc.com](mailto:mlarson@sonotech-inc.com).

### VISIT SONOTECH AT ASNT

Sonotech will be exhibiting at the annual ASNT fall conference in Las Vegas this November. Stop by Booth 231 to discuss your couplant application, request free samples, literature and our Couplant Selection CD.

### SONOTECH OFFERS TWO COUPLANT SELECTION CDs

Sonotech has developed a non-commercial PowerPoint presentation outlining the important factors involved in selecting an ultrasonic couplant. These presentations are ideal for local ASNT chapter meetings or discussions where you don't want to reference specific products.

We have also updated our Sonotech Ultrasonic Couplant Selection Training CD which will assist customers in selecting the right Sonotech couplant for their specific application.

## SONOTECH UNLTRASONIC COUPLANTS & TESTING SPECIFICATIONS:

TESTING SPECIFICATION	APPLICATION	APPLICABLE SONOTECH COUPLANT
ASTM F519	Hydrogen embrittlement testing on high strength steel	• Ultragel II • Echogel
PWA 36604, MCL E-205 Type II or ASTM F945	Titanium Stress Corrosion Cracking	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 5544	Hot corrosion testing on Waspalloy	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 5536	Hot corrosion testing on Hastelloy X	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 5608	Hot corrosion testing on Haynes 188 alloy	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 6359	Hot corrosion testing on Ferrous based alloys	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 4037	Hot corrosion testing on Aluminum	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 5608	Hot corrosion testing on Haynes 188	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 5508	Hot corrosion testing on Greek Ascology	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for AMS 4375	Hot corrosion testing on Magnesium	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for PWA 1484	Hot corrosion testing on PWA Turbine Blade Alloy	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for PWA 275	Hot Corrosion Testing on Aluminide Turbine Blade Coating	• Ultragel II • Sonoglide - all grades • Soundsafe
PWA 36700/36604 for PWA 286	Hot Corrosion Testing on Turbine Blade Plasma Spray Coating	• Ultragel II • Sonoglide - all grades • Soundsafe
BAC 5968	Nondestructive inspection of adhesive bonds within metal structures	• Ultragel II • Sonotrace • Echocide • Echowet
BAC 5980	Nondestructive inspection of composite parts and structures	• Ultragel II • Sonotrace • Echocide • Echowet
BAC 5439-PSD622	UT inspection of welds, tubing, wrought materials and immersion testing	• Ultragel II • Echogel

Notes: BAC Specifications are Boeing Aircraft, Testing was performed by The Boeing Company • PWA Specifications are Pratt and Whitney; Testing was performed by Pratt and Whitney • ASTM F519 testing performed by The Boeing Company. Request separate listing for US military specification approvals (restricted distribution)

Registered ISO 9001:2000



Registered ISO 13485:2003

Published by Sonotech, Inc. • 1-800-458-4254 • 1-360-671-9121 • [www.sonotech-inc.com](http://www.sonotech-inc.com)

