

Your. Ref. Mr. Brea

**TOSI F.LLI SRL**  
Frazione Roccapietra, Z.I.  
Via Monte Rosa, 1  
**13019 VARALLO SESIA (VC)**

Our. Ref. Mrs. Bongioni

Provaglio d'Iseo, the 12<sup>th</sup> July 2010

**TEST REPORT Nr. 2010-1485/PC-1; page 1 di 16 of all**

*Description test material: N° 6 fittings made of brass designated:*

Sample 2010-1485/1: disassembled fitting galvanized 12 µm white trivalent + FINIGAR.  
Sample 2010-1485/2: disassembled fitting galvanized 12 µm white trivalent + FINIGAR.  
Sample 2010-1485/3: assembled fitting galvanized 12 µm white iridescent + FINIGAR 401.  
Sample 2010-1485/4: disassemble fitting galvanized 12 µm white iridescent trivalent +  
FINIGAR 401  
Sample 2010-1485/5: disassembled fitting with 8 µm Zn-Ni treatment trivalent passiv. + FINIGAR 401  
Sample 2010-1485/6: assembled fitting with 8 µm Zn-Ni treatment trivalent passiv. + FINIGAR 401

*Sampling: executed by the customer.*

*Ordinance date of samples and referential documents:* on the 05<sup>th</sup> May 2010 with RDP06170 of the 05<sup>th</sup> May 2010, and Delivery Document nr. 12 20 of the 04<sup>th</sup> May 2010.

*Reference offer/order:* offer nr. 2010-1671 of the 23<sup>rd</sup> April 2010 and your order nr. S/210014 of the 04<sup>th</sup> May 2010.

*Known informations:*

As required during the test will be given special attention to the occurrence of greenish corrosion products. Such corrosion will be notified and the exposure will be suspended or continued by agreement

*Standard reference:* neutral salt spray test in accordance with UNI EN ISO 9227.

**AQM srl**

Via Edison 18 - 25050 Provaglio d'Iseo

Tel. centralino 030/9291711 - Telefax 030/9291777; Punto UNI CEI 030/9291700

Capitale sociale € 3.000.000,00 i.v. C.F./P IVA Reg. Impr. BS 01746710175 - Iscrizione R.E.A. BS n° 265091

Internet: <http://www.aqm.it>

E-mail: [segreteria@aqm.it](mailto:segreteria@aqm.it)

Type of test: NSS (neutral salt spray).

NSS test conditions:

- Solution: deionized water + NaCl 99.5% RPE (concentration 50 g / l)
- Inclination of samples in the chamber: the samples have been located on the inert support with an inclination between 25-30 °.
- Test temperature: 35 ° C
- pH of test solution: 6,9
- Density of the solution in the collecting devices: 1.031 g/cm<sup>3</sup>
- Volume of the solution in the collecting devices: 1.6 (ml / h per 80 cm<sup>2</sup>)
- Total exposure duration: 1000 hours
- Start test date: 11<sup>th</sup> May /2010
- End test date: 21<sup>st</sup> June/2010
- Preliminary conditioning of the sample / security cuts: cleaning with solvent

Observation : orderly control after 24, 96, 192, 240, 480, 750 and 1000 hours of exposure

Analysis, tests and additional surveys:

- macroscopic examination

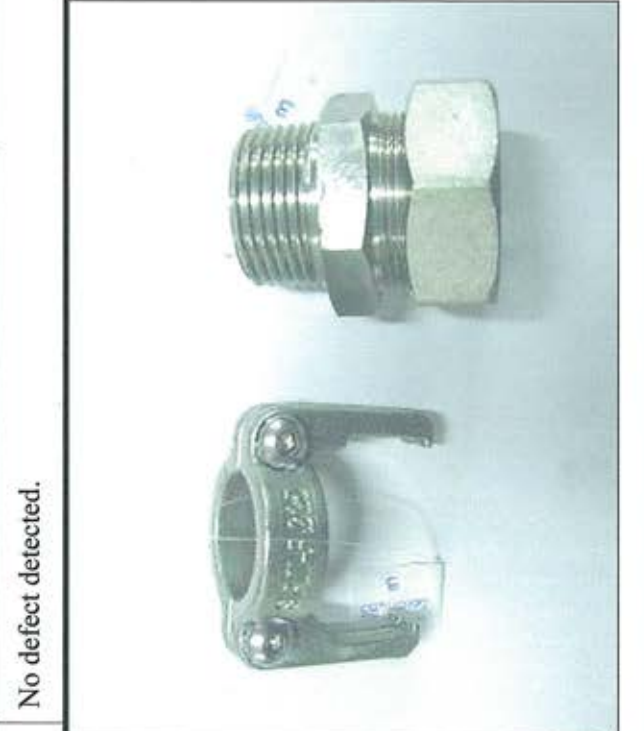
Equipments: salt spray chamber Angelantoni code CNS 1300 MA.6.CC.1



Note: test of corrosion in salt spray in accordance with UNI EN ISO 9227 under SINAL accreditation

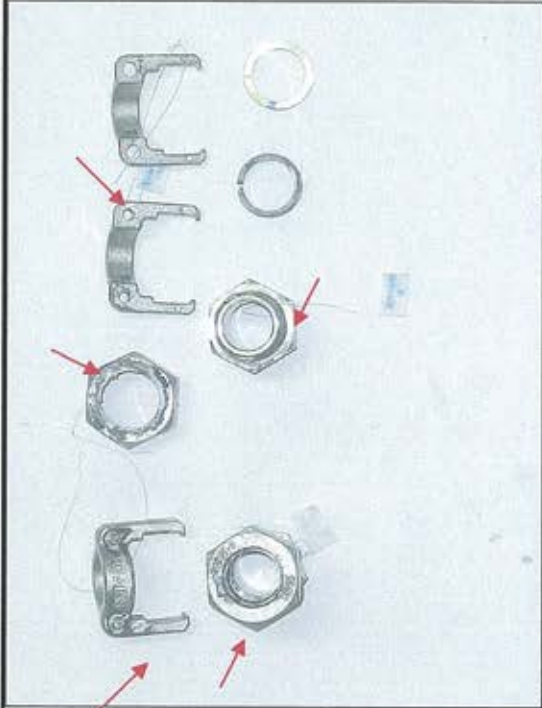
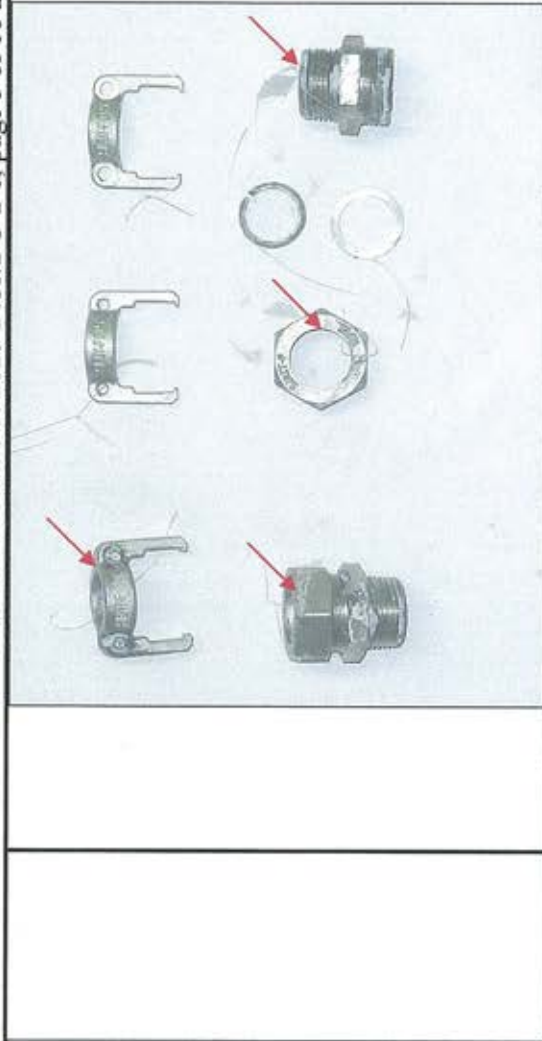
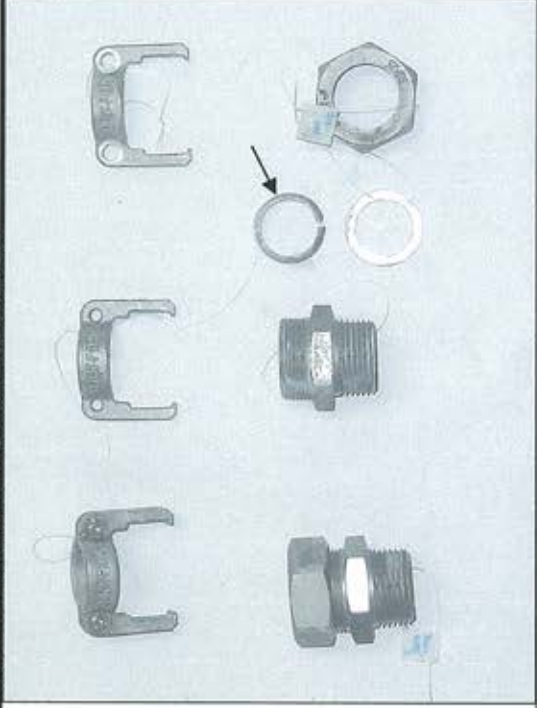
Any opinion or comment contained in this test report is not subject to SINAL accreditation  
Equipments are to be intended under metrological validity.

**RESULT**  
**SALT SPRAY TEST CORROSION (NSS)**

FOLLOWS: 33 macrography





				
<p><b>Note</b> No defect detected.</p>	<p><b>Sample</b> 2010-1485/1</p> <p><b>Exposure time</b> 24 h</p>	<p><b>Sample</b> 2010-1485/2</p>	<p><b>Exposure time</b> 24 h</p>	
				
<p><b>Note</b> No defect detected.</p>	<p><b>Sample</b> 2010-1485/3</p> <p><b>Exposure time</b> 24 h</p>	<p><b>Note</b> Beginning formation blackish-spotted on the hook and formation of small whitish marks on the fitting.</p>		
<p><b>Note</b> No defect detected.</p>	<p><b>Sample</b> 2010-1485/4</p> <p><b>Exposure time</b> 24 h</p>	<p><b>Note</b> No defect detected.</p>		



				
	<p><b>Sample</b></p> <p>2010-1485/5</p>	<p><b>Exposure time</b></p> <p>24 h</p>	<p><b>Sample</b></p> <p>2010-1485/6</p>	<p><b>Exposure time</b></p> <p>24 h</p>
<p><b>Note</b></p> <p>No defect detected , unless for beginning formation on the body of light opacification and moderate whitish percolate.</p>	<p><b>Note</b></p> <p>Beginning formation on the body of light opacification and moderate whitish percolate on the fitting.</p>			

		
<p><b>Sample</b> 2010-1485/1-2</p>	<p><b>Exposure time</b> 96 h</p>	<p><b>Sample</b> 2010-1485/3-4</p> <p><b>Exposure time</b> 96 h</p>
<p><b>Note</b> The hook and the screw nut present percolate with deposit of whitish salts and slight formation of dark opacification, absence of corrosion phenomena. No defects detected on the o-ring and the nose cone.</p>	<p><b>Note</b> The hook and the screw nut present percolate with whitish salts deposit and slight formation of dark opacification, absence of corrosion phenomena. No defect detected on the o-ring, and on the nose cone.</p>	
		
<p><b>Sample</b> 2010-1485/5-6</p>	<p><b>Exposure time</b> 96 h</p>	<p><b>Sample</b> /</p> <p><b>Exposure time</b> /</p>
<p><b>Note</b> Items present slight formation of dark opacification with moderate whitish percolate, absence of corrosion phenomena. Beginning formation of white-corrosion on the nose cone.</p>		<p><b>Note</b> /</p>





		/	
	<b>Sample</b>	<b>Exposure time</b>	<b>Exposure time</b>
	2010-1485/1-2	192 h	192 h
<b>Note</b>	Any significantly worsening deterioration, compared to the observation executed after 96 hours of exposure		
	<b>Sample</b>	<b>Note</b>	<b>Exposure time</b>
	2010-1485/3-4	Any significantly worsening deterioration, compared to the observation executed after 96 hours of exposure	192 h



		/	
	<b>Sample</b>	<b>Exposure time</b>	<b>Exposure time</b>
	2010-1485/5-6	192 h	/
<b>Note</b>	Any significantly worsening deterioration, compared to the observation executed after 96 hours of exposure		
	<b>Sample</b>	<b>Note</b>	<b>Exposure time</b>
	/	/	/





		<p><b>Sample</b> 2010-1485/1</p> <p><b>Exposure time</b> 240 h</p>	<p><b>Sample</b> 2010-1485/2</p> <p><b>Exposure time</b> 240 h</p>	<p><b>Note</b> Further extension of the percolation with deposit of whitish salts and blackish-spotted (black spots) on the screw nut, body and nose cone. No defects detected on the o-ring and hook. Absence of corrosion phenomena.</p>	<p><b>Note</b> Further extension of the percolation with deposit whitish salts deposit and blackish-spotted (spots black)</p>
		<p><b>Sample</b> 2010-1485/3</p> <p><b>Exposure time</b> 240 h</p>	<p><b>Sample</b> 2010-1485/4</p> <p><b>Exposure time</b> 240 h</p>	<p><b>Note</b> Further extension of the percolation with deposit of whitish salts deposit and blackish-spotted (spots black). Absence of corrosion phenomena.</p>	<p><b>Note</b> Further extension of the percolation with deposit of whitish salts deposit and blackish-spotted (spots black). Absence of corrosion phenomena.</p>



				
<p><b>Sample</b> 2010-1485/5</p>	<p><b>Exposure time</b> 240 h</p>		<p><b>Sample</b> 2010-1485/6</p>	<p><b>Exposure time</b> 240 h</p>
<p><b>Note</b></p>	<p>Further extension of the white percolation with opacification. Absence of corrosion phenomena</p>		<p><b>Note</b></p>	<p>Further extension of the white percolation with opacification. Absence of corrosion phenomena</p>


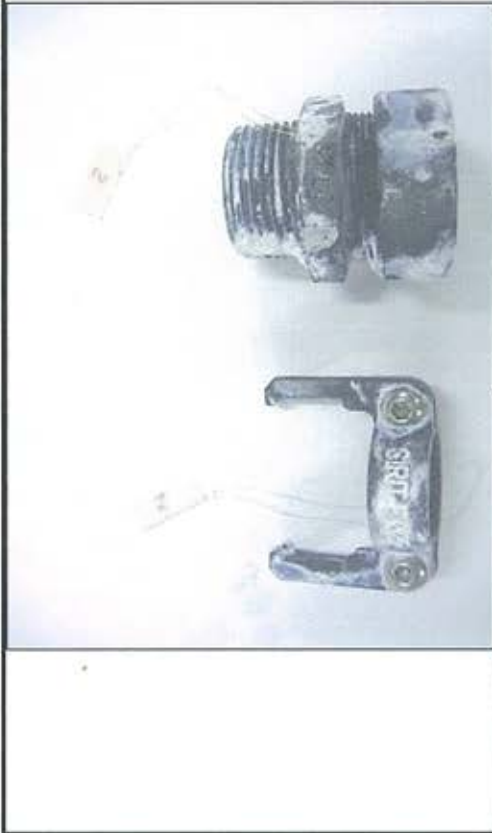






				
	<p><b>Sample</b> 2010-1485/1</p>	<p><b>Exposure time</b> 504 h</p>	<p><b>Sample</b> 2010-1485/2</p>	<p><b>Exposure time</b> 504 h</p>
<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). After macroscopic examination, the surface presents opaque aspect and recurrent presence of salts with crystalline aspect. Absence of corrosion phenomena</p>	<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). After macroscopic examination, the surface presents opaque aspect and recurrent presence of salts with crystalline aspect. Absence of corrosion phenomena</p>	
				
	<p><b>Sample</b> 2010-1485/3</p>	<p><b>Exposure time</b> 504 h</p>	<p><b>Sample</b> 2010-1485/4</p>	<p><b>Exposure time</b> 504 h</p>
<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). After macroscopic examination, the surface presents opaque aspect and recurrent presence of salts with crystalline aspect. Absence of corrosion phenomena</p>	<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). After macroscopic examination, the surface presents opaque aspect and recurrent presence of salts with crystalline aspect. Absence of corrosion phenomena</p>	



	
<p><b>Sample</b> 2010-1485/5</p>	<p><b>Sample</b> 2010-1485/6</p>
<p><b>Exposure time</b> 504 h</p>	<p><b>Exposure time</b> 504 h</p>
<p><b>Note</b> Further extension of the white percolation with opacification. Absence of corrosion phenomena</p>	<p><b>Note</b> Further extension of the white percolation with opacification. Absence of corrosion phenomena</p>

			
<p><b>Sample</b> 2010-1485/1</p>	<p><b>Exposure time</b> 750 h</p>	<p><b>Sample</b> 2010-1485/2</p>	<p><b>Exposure time</b> 750 h</p>
<p><b>Note</b> Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena.</p>	<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena.</p>	
			
<p><b>Sample</b> 2010-1485/3</p>	<p><b>Exposure time</b> 750 h</p>	<p><b>Sample</b> 2010-1485/4</p>	<p><b>Exposure time</b> 750 h</p>
<p><b>Note</b> Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena.</p>	<p><b>Note</b></p>	<p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena.</p>	

				<table border="1"> <tr> <td data-bbox="702 1993 774 2101"><b>Note</b></td> <td data-bbox="702 1131 774 1993">Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena</td> </tr> <tr> <td data-bbox="702 1630 774 1993"><b>Sample</b></td> <td data-bbox="702 1131 774 1993">2010-1485/5</td> </tr> <tr> <td data-bbox="702 1131 774 1630"><b>Exposure time</b></td> <td data-bbox="702 1131 774 1630">750 h</td> </tr> <tr> <td data-bbox="774 1993 885 2101"><b>Note</b></td> <td data-bbox="774 1041 885 1993">Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena</td> </tr> <tr> <td data-bbox="774 683 885 1041"><b>Sample</b></td> <td data-bbox="774 683 885 1041">2010-1485/6</td> </tr> <tr> <td data-bbox="774 112 885 683"><b>Exposure time</b></td> <td data-bbox="774 112 885 683">750 h</td> </tr> </table>	<b>Note</b>	Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena	<b>Sample</b>	2010-1485/5	<b>Exposure time</b>	750 h	<b>Note</b>	Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena	<b>Sample</b>	2010-1485/6	<b>Exposure time</b>	750 h
<b>Note</b>	Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena															
<b>Sample</b>	2010-1485/5															
<b>Exposure time</b>	750 h															
<b>Note</b>	Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena															
<b>Sample</b>	2010-1485/6															
<b>Exposure time</b>	750 h															

		<p><b>Sample</b> 2010-1485/1</p> <p><b>Exposure time</b> 1000 h</p>	<p><b>Sample</b> 2010-1485/2</p> <p><b>Exposure time</b> 1000 h</p>	<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>	<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>
---	--	---	---	--	--

			
<p><b>Sample</b> 2010-1485/3</p>	<p><b>Exposure time</b> 1000 h</p>	<p><b>Sample</b> 2010-1485/4</p>	<p><b>Exposure time</b> 1000 h</p>
<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>	<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>	<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>	<p><b>Note</b></p> <p>Further extension of the oxidation with deposit of whitish salts and blackish-spotted (black spots). Absence of corrosion phenomena The sample shows, on almost the entire surface, a opaque aspect, probably caused by the superficial oxidation. The salts precipitation with crystalline aspect indicates the presence of corrosion of the coating. At this stage, these phenomena have not yet affected the <math>\alpha</math> matrix of the alloy, not thus generating the typical greenish corrosion products</p>

			
<p><b>Sample</b> 2010-1485/6</p>	<p><b>Exposure time</b> 1000 h</p>	<p><b>Sample</b> 2010-1485/5</p>	<p><b>Exposure time</b> 1000 h</p>
<p><b>Note</b> Any significantly worsening deterioration, compared to the previous observation.</p>	<p><b>Note</b> Any significantly worsening deterioration, compared to the previous observation.</p>	<p><b>Note</b> Any significantly worsening deterioration, compared to the previous observation.</p>	<p><b>Note</b> Any significantly worsening deterioration, compared to the previous observation.</p>

At your disposal for any further deepening.

Best regards

File Manager  
(Bongioni Laura)



Head of Dept.  
(Pozzi p.i. Fabio)



Laboratory Manager  
(Ceselin p.i. Gabriele)



Quality Control AQM



- Notes:
- \* This relation cannot be partially reproduced without written AQM approval.
  - \* Photocopies or fax copies of this report are not recognized as official documents of AQM Srl Laboratory.
  - \* Test results exclusively concern the tested samples, that will be stocked a maximum of 30 days from date of report, if non otherwise accorded on the order.
  - \* If E-mail transmitted, this document cannot be modified without AQM written authorisation. As to the data validity, only the original report stocked in AQM Srl will be considered.