

### Test Report

#### PPR 1601

Mechanical Vibration +  
Compression Test  
at the Isar-Amper Werke

---

Pages: 7

---

Appendix: -

---

Date: 11<sup>th</sup> June 2002

---

---

**Tested by: J.Zell**  
(Application Engineer,  
Energy Products)

Signature:

Date: June 11<sup>th</sup>, 2002

---

**Prepared by: J.Zell**  
(Application Engineer,  
Energy Products)

Signature:

Date: June 11<sup>th</sup>, 2002

---

**Released by: R. Strobl**  
(Product Manager,  
Energy Products)

Signature:

Date: June 11<sup>th</sup>, 2002

---

© Raychem Reports may only be used in their original form

**TYCO ELECTRONICS Raychem GmbH**

Energy Division  
Haidgraben 6  
D-85521 Ottobrunn  
Munich, Germany  
Tel. +49 89 6089-380  
Fax +49 89 6089-654

8k

**PPR 1601:****Subject of Test:** RayGel-24 and GelBox-25**Date of Tests:** May 2002 – June 2002**Requirements:** Isar-Amper Werke (IAW) internal Specification**Location of Tests:** Isar-Amper Werke, Test Laboratory, Munich - Germany  
Tyco Electronics Raychem EPD Laboratories, Ottobrunn - Germany**Test Purpose:** A RayGel-24 and Gel-Box-25 joint covered by 10cm of grit, which is used at railways, were joggled by a compressor for 3 min.  
The compressor should consolidate the grit, so that the joint housings were under big mechanical stress.  
After this mechanical test, electrical tests were carried out to prove the function of the joints.**Reference:** Laboratory Book 5247, page 5

**Test Results:** Both samples passed the test without any big damage. The housings have scratches but are not broken.

**Cable:** **Manufacturer:** Nexans  
**Type:** NY2Y- J 4 x 10 RE

**Cable Preparation:**



**GelBox 25**



**RayGel 24**

8k

# 1. Mechanical Vibration and Compression Test



**Fig. a: Samples covered by 10cm grit**



**Fig. b: Samples joggled for 3 min**



**Fig. c: RayGel-24 after the test**



**Fig. d: GelBox-25 after the test**



**Fig. e: RayGel-24 after the joggle test**

**2. Test sequence in accordance with CENELEC HD 623 S1:1996.**

Test	HD 623 subclause
1. A.C.-voltage withstand immersed	6.6.4
2. Insulation resistance immersed	6.6.7

**2.1 A.C.-voltage withstand in water**

On all samples the outer sheaths of the cables were removed about 50mm after the end of the joints for a length of 50mm ("window cut"). Thus water can penetrate into the core crutch and simulated a sheath damage during the tests. All further tests were done with this removed cable sheath.

The test samples were immersed in a water bath just below the water surface.

An A.C.-voltage of 4kV / 50Hz was applied for a period of one minute between the bunched phase cable cores and the grounded water bath. The voltage was also applied between each phase core in turn and all other phase cores, while the other phase cores were connected together and grounded to the same potential as the water bath.

Requirement: No insulation breakdown

**Result: All joints passed the test.**

## 2.2 Insulation resistance in water

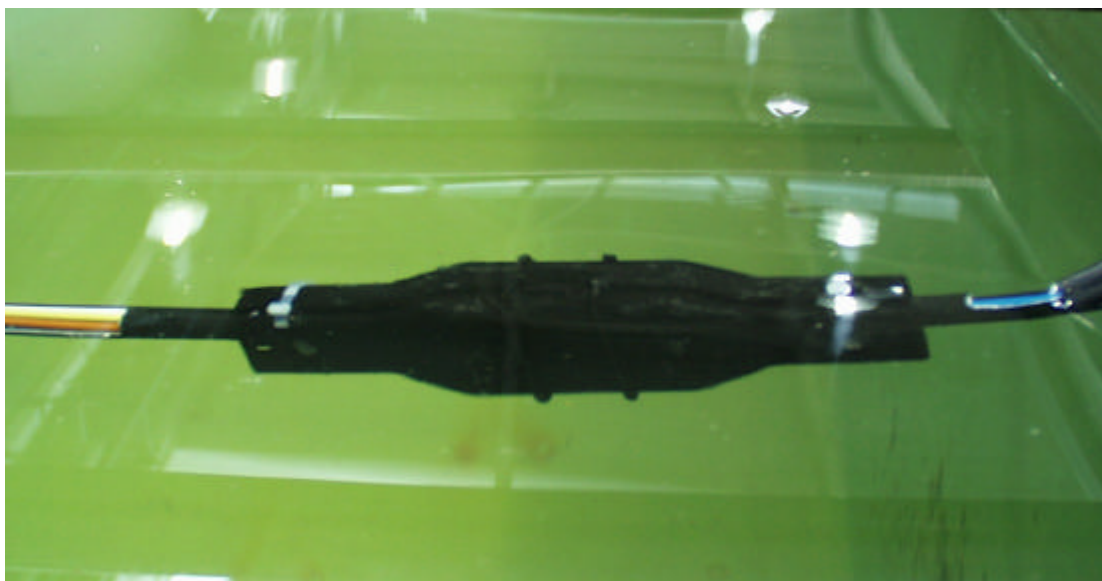
The test samples were still immersed in a water bath just below the water surface.

The insulation resistance was measured between the phase cable cores and the grounded water bath. The resistance was also measured between each phase core in turn and all other phase cores, while the other phase cores were connected together and grounded to the same potential as the water bath. The insulation resistance between each core phase and the other not grounded core phases was measured as well.

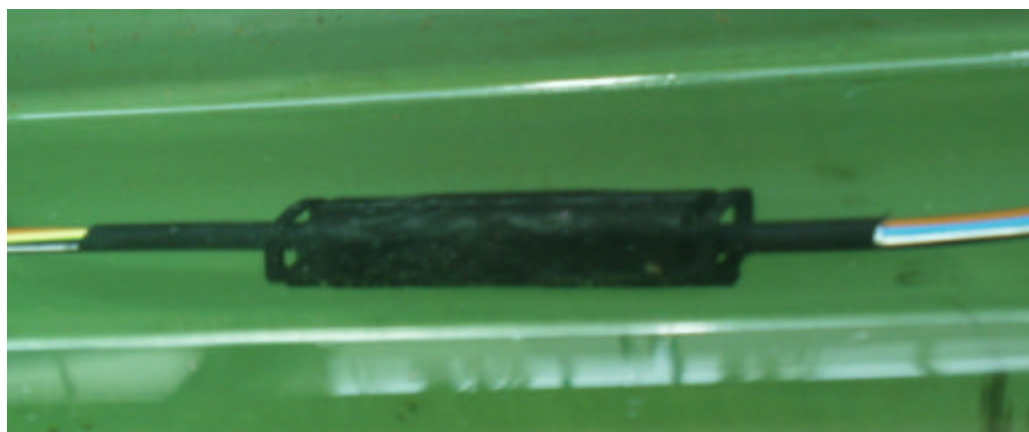
The insulation resistance was measured at ambient temperature at 500 volts D.C. after a voltage stress of one minute.

Requirement: insulation resistance  $>50\text{M}\Omega$

**Result :** All joints passed the test. The values of the insulation resistance were measured with  $>50\text{MW}$



**GelBox 25 in the water bath**



**RayGel 24 in the water bath**