

HYDROSTATIC TESTING**1. PURPOSE**

This instruction describes the final resistance test of pressure equipment or a part of it.

2. SCOPE

This instruction applies to both tests carried out at Ziemex S.A.S shop and tests carried out on assembling site, on pressure vessels made of:

- Stainless steel
- Aluminium
- Nickel alloys

3. REFERENCE DOCUMENTS

- List of manufacture and inspection operations
- Approved drawing
- Work order

4. PROCEDURE**4.1. Time for performance**

The time for performance of hydrostatic test is given on the list of manufacture and inspection operations. This test is usually done at the end of manufacture, but it can be done preventively on a part of pressure vessel before final assembly. This test is done before painting and insulation.

4.2. Position of equipment

The equipment will be installed so as to avoid damage to it and do not put the workers in danger. It is also to check for correct vent and drain of the equipment.

4.3. Closing of the equipment

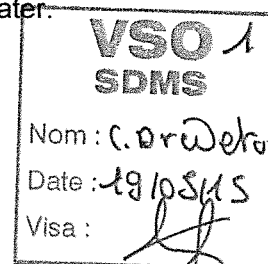
The equipment is completely sealed up to the purge and fill points. The valves for filling, pressurizing and gauges are installed. The closure of the blind flanges is performed with the bolts defined by the design office. There are regularly screwed up without exceeding the torque necessary to seal.

4.4. Filling equipment

The equipment is filled with demineralized water up to the vent points. A filter is added to the water supply.

4.5. Pressure gauges

Only calibrated gauges with a valid usage limit will be used. It is to check that the gauge has a scale such that the test pressure is between 1/4 and 3/4 of it. For vertical equipment, the pressure gauge is to be installed at highest point. If the reading during test becomes difficult or impossible, it may be placed at a lower position. It will then consider the static pressure of water.



HYDROSTATIC TESTING

4.6. Test pressure

The value of the hydraulic test pressure is given on the drawing, the list of manufacture and inspection operations and the hydraulic test certificate. It is calculated according to the formulas of the code, from the permitted maximum working pressure and it must be applied to the highest point of the equipment. If the pressure gauge is placed below, we will add 0.1 bar per meter water.

4.7. Pressurization

Prior to pressurization, the vents are closed. The water is brought by water main or by a pressurizing pump. The tightness of the blind flanges is checked at low pressure and bolts are possibly tightened. The pressure is regularly mounted up to the value of the test pressure.

4.8. Inspection

The inspection must be carried out by the inspector at least 1/2 hour and a maximum 1 hour after pressurization. The external walls must remain dry. In the presence of the inspector, the pressure will be mounted up to the value of the test pressure. During this test, all welds, valves, blind flanges, manholes, bolts will be inspected to detect a water leak, the deformation of the equipment will be checked and the fall of the pressure gauges will be observed.

4.9. Hydraulic test certificate

The satisfactory outcome of a hydraulic test is recorded on a certificate of hydraulic test. This certificate will be signed by the team leader and the manufacturing manager, and eventually the inspector. If the test is unsatisfactory, it will be repeated after sealing the leak.

4.10. Completion of the test

After completion of the hydraulic test, the pressure is lowered to 0.1 bar. Then the vents are opened or possibly a blind flange is removed in the upper section. The equipment is then emptied completely. The test gauge is removed and is delivered to the store.

5 ANNEX

Hydraulic test certificate.

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| <u>Redaction et verification</u> <div style="text-align: right;">C. LAUGEL, 02/2015</div> | <u>Approbation</u> <div style="text-align: right;">A.LAEUFFER, 02/2015</div> |
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CERTIFICAT D'EPREUVE
TEST CERTIFICATE / DRUCK PRÜFUNG ZERTIFIKAT

TEST PROCEDURE N°: INS FA 023

| | | | | | |
|---------------------------------------|-------------|---|-----------------------|---|--|
| CLIENT Customer / Besteller | SDMS | AFFAIRE Transaction / Angelegenheit | Les condamines | DESIGNATION Description / Bezeichnung | Anti-radiation screen 1000x3800x1,5/1,5 Rep. 317111-JLA-702-006 |
| Cde N° P.O. / Auftrag | 20302655 | PLANS DE REFERENCE Reference drawings / Bezugszeichnung | 1125911 - C | | |

| N° | Eléments Items / Bezeichnung | Type de test Kind of test Art der Prüfung | Données Data Angaben | | Date du test Date of test Prüfdatum | Nom du Contrôleur Control-agent's name Name des Prüfer | Remarque Remark Anmerkung |
|----|---|---|--|--------------------|---|--|---------------------------------|
| | | | PRESSION | 10 bar | | | |
| | Epreuve plaque Plate pressure test / Platteprüfung | Eau déminéralisé / Demineralized water | N° manomètre Validité d'étalonnage | S04035 25/12/15 | 12/05/15 | REEB Joël | RAS Deuvé: 307W |
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| | | | | | | | |

DATE D'ETABLISSEMENT DU CERTIFICAT :

Certificate established on
 Attest geschrieben am 12/05/15

Le contrôleur

The inspector / Der Prüfer

Le constructeur

The manufacturer / Der Hersteller
ZIEMEX S.A.S.
 Route de Sarrebourg
 CS 60102
 67269 SARRE-UNION CEDEX
 Tél. 03 88 00 39 40 - Fax 03 88 00 12 39

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|-------------------------------------|------------------------------------|---|-------------------------------------|---|
| Fond Document créé par LAUGEL C. | Numéro Fond document IMP FA 007 | Gestionnaire Fond document document : OSTER M. | Date : 12/12 indice fond document G | Fichier informatique Fond 20302655_IMPFA007G_Epreuve |
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CERTIFICAT D'EPREUVE
TEST CERTIFICATE / DRUCK PRÜFUNG ZERTIFIKAT

TEST PROCEDURE N°: INS FA 023

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|---------------------------------------|-----------------|---|----------------------|---|--|
| CLIENT Customer / Besteller | SDMS | AFFAIRE Transaction / Angelegenheit | Les condamnés | DESIGNATION Description / Bezeichnung | Anti-radiation screen 1000x3800x1,5/1,5 Rep. 317111-JLA-702-011 |
| Cde N° P.O. / Auftrag | 20302655 | PLANS DE REFERENCE Reference drawings / Bezugszeichnung | 1126267 - C | | |

| N° | Eléments Items / Bezeichnung | Type de test Kind of test Art der Prüfung | Données Data Angaben | | Date du test Date of test Prüfdatum | Nom du Contrôleur Control-agent's name Name des Prüfer | Remarque Remark Anmerkung |
|----|---|---|----------------------------|--------------------------------------|---|--|---------------------------------|
| | | | PRESSION | 10 bar | | | |
| | Epreuve plaque Plate pressure test / Platteprüfung | Eau déminéralisé / Demineralized water | N° manomètre 504033 | Validité d'étalonnage 25/12/15 | 12/05/15 | REEB Joël | RAS Duree: 30 MN |
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DATE D'ETABLISSEMENT DU CERTIFICAT :

Certificate established on 12/05/2015
Attest geschrieben am

Le contrôleur
The inspector / Der Prüfer



Le constructeur
The manufacturer / Der Hersteller

ZIEMEX S.A.S.
Route de Sarrebourg
CS-60102

Fichier informatique Fond
20302655 IMPFA007G Epreuve

Date : 12/12 indice fond
document G

Gestionnaire Fond
document : OSTER M.

Numéro Fond document
IMP FA 007

Fond Document créé par
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| <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">I</td> <td style="padding: 2px;">M</td> <td style="padding: 2px;">P</td> <td style="padding: 2px;">F</td> <td style="padding: 2px;">A</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">7</td> <td style="padding: 2px;">G</td> </tr> </table> | I | M | P | F | A | 0 | 0 | 7 | G |
| I | M | P | F | A | 0 | 0 | 7 | G | |
| CERTIFICAT D'ÉPREUVE TEST CERTIFICATE / DRUCK PRÜFUNG ZERTIFIKAT | | | | | | | | | |
| TEST PROCEDURE N°: INS FA 023 | | | | | | | | | |

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| CLIENT <i>Customer / Besteller</i> | SDMS | AFFAIRE <i>Transaction / Angelegenheit</i> | Les condamnés | DESIGNATION <i>Description / Bezeichnung</i> | Anti-radiation screen 1000x3890x1,5/1,5 Rep. 317111-JLA-702-003 |
| Cde N° <i>P.O. / Auftrag</i> | 20302655 | PLANS DE REFERENCE <i>Reference drawings / Bezugszeichnung</i> | 1126268 ~ F | | |

| N° | Éléments <i>Items / Bezeichnung</i> | Type de test <i>Kind of test Art der Prüfung</i> | Données <i>Data Angaben</i> | | Date du test <i>Date of test Prüfdatum</i> | Nom du Contrôleur <i>Control-agent's name Name des Prüfer</i> | Remarque <i>Remark Anmerkung</i> |
|----|--|---|------------------------------------|----------|---|--|---|
| | | | PRESSION | 10 bar | | | |
| | Epreuve plaque <i>Plate pressure test / Platteprüfung</i> | Eau déminéralisé / <i>DeminerIALIZED water</i> | N° manomètre | 504053 | 12/05/15 | Reels Joël | RAS Durée: 30mn |
| | | | Validité d'étalonnage | 29/12/15 | | | |
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DATE D'ÉTABLISSEMENT DU CERTIFICAT :

Certificate established on
Attest geschrieben am 12/05/2015

Le contrôleur
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Le constructeur
The manufacturer / Der Hersteller

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CERTIFICAT D'EPREUVE
TEST CERTIFICATE / DRUCK PRÜFUNG ZERTIFIKAT

TEST PROCEDURE N°: INS FA 023

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|---------------------------------------|-------------|---|-----------------------|---|--|
| CLIENT Customer / Besteller | SDMS | AFFAIRE Transaction / Angelegenheit | Les condamines | DESIGNATION Description / Bezeichnung | Anti-radiation screen 1000x3890x1,5/1,5 Rep. 317111-JLA-702-002 |
| Cde N° P.O. / Auftrag | 20302655 | PLANS DE REFERENCE Reference drawings / Bezugszeichnung | 1126270 -- F | | |

| N° | Éléments Items / Bezeichnung | Type de test Kind of test Art der Prüfung | Données Data Angaben | | Date du test Date of test Prüfdatum | Nom du Contrôleur Control-agent's name Name des Prüfer | Remarque Remark Anmerkung |
|----|---|---|--|--------------------|---|--|---------------------------------|
| | | | PRESSION | 10 bar | | | |
| | Epreuve plaque Plate pressure test / Platteprüfung | Eau déminéralisé / Demineralized water | N° manomètre Validité d'étalonnage | 504033 29/12/15 | 12/05/15 | REEB Joël | RAS Duree: 30mn |
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DATE D'ETABLISSEMENT DU CERTIFICAT :

Certificate established on
Attest geschrieben am

12/05/15

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The manufacturer / Der Hersteller

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| TEST PROCEDURE N°: INS FA 023 | | | | | | | | |

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| CLIENT Customer / Besteller | SDMS | AFFAIRE Transaction / Angelegenheit | Les condamines | DESIGNATION Description / Bezeichnung | Anti-radiation screen 1000x3890x1,5/1,5 Rep. 317111-JLA-702-004 |
| Cde N° P.O. / Auftrag | 20302655 | PLANS DE REFERENCE Reference drawings / Bezugszeichnung | 1126277 -- F | | |

| N° | Eléments Items / Bezeichnung | Type de test Kind of test Art der Prüfung | Données Data Angaben | | Date du test Date of test Prüfdatum | Nom du Contrôleur Control-agent's name Name des Prüfer | Remarque Remark Anmerkung |
|----|---|---|----------------------------|----------|---|--|---------------------------------|
| | | | PRESSION | 10 bar | | | |
| | Epreuve plaque Plate pressure test / Platteprüfung | Eau déminéralisé / Demineralized water | N° manomètre 504033 | 23/12/15 | 19/05/15 | REZEIS Joël | RAS Durée: 30mn |
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DATE D'ETABLISSEMENT DU CERTIFICAT :

Certificate established on *19/05/2015*
Attest geschrieben am

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The manufacturer / Der Hersteller

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|---------------------------------------|-------------|---|-----------------------|---|--|
| CLIENT Customer / Besteller | SDMS | AFFAIRE Transaction / Angelegenheit | Les condamines | DESIGNATION Description / Bezeichnung | Anti-radiation screen 1000x3890x1,5/1,5 Rep. 317111-JLA-702-005 |
| Cde N° P.O. / Auftrag | 20302655 | PLANS DE REFERENCE Reference drawings / Bezugszeichnung | 1126271 - F | | |

| N° | Eléments Items / Bezeichnung | Type de test Kind of test Art der Prüfung | Données Data Angaben | | | Date du test Date of test Prüfdatum | Nom du Contrôleur Control-agent's name Name des Prüfer | Remarque Remark Anmerkung |
|----|---|---|----------------------------|----------|--|---|--|---------------------------------|
| | | | PRESSION | 10 bar | | | | |
| | Epreuve plaque Plate pressure test / Platteprüfung | Eau déminéralisé / Demineralized water | N° manomètre | 504033 | | 19/05/15 | REES Joël | RFS Durée: 30DN. |
| | | | Validité d'étalonnage | 28/12/15 | | | | |
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DATE D'ETABLISSEMENT DU CERTIFICAT :
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 mail@solvro.com

ZIEMEX SAS

Route de Sarrebourg
 67269 SARRE-UNION

Votre Référence : **CF1402549**
 (Your reference)
 Notre Référence : **L141201673 du 29/12/14**
 (Our reference)

Date : **29-déc-2014**
 (Date)

PROCES VERBAL D'ÉTALONNAGE N° 14 12 104
 (CALIBRATION REPORT)

APPAREIL ETALONNE / DESIGNATION

| | | | |
|----------------------------------|-----------------------|----------------------------------|-----------------|
| Désignation : (Designation) | Manomètre | Repère : (Tag) | S04033 |
| Constructeur : (Manufacturer) | BAUMER/BOURDON | Type : (Type) | MEX D100 |
| Echelle (bar) : (Range) | 0 + 25 Bar | Classe : (Class) | 1,00% |
| | | N° de série : (Serial number) | |

CONDITIONS D'AMBIANCE / ROOM TEMP

Température d'étalonnage (°C) : **20,0**

QUALITÉ
 09 JAN 2015

MOYENS DE MESURE UTILISES / MASTER USED

Etalonnage effectué par comparaison - Chaîne d'étalonnage raccordée au niveau 4 du BNM - COFRAC
 (Calibration by comparison - Calibration chain master linked to BNM - COFRAC level 4)
 Balance manométrique **BCH 600** - n° série **25074** - PV n° **HA1109410LL** du 14/11/11

RESULTATS / RESULTS

| MONTEE / RISING | | | DESCENTE / FALLING | | |
|---|-----------------------------|-----------------------|------------------------------------|-----------------------------|-----------------------|
| Valeur affichée Master pressure | Valeur lue Gauge reading | Ecart Differential | Valeur affichée Master pressure | Valeur lue Gauge reading | Ecart Differential |
| 5,00 | 5,000 | 0,000 | 5,00 | 5,000 | 0,000 |
| 10,00 | 10,000 | 0,000 | 10,00 | 10,000 | 0,000 |
| 12,50 | 12,500 | 0,000 | 12,50 | 12,500 | 0,000 |
| 15,00 | 15,000 | 0,000 | 15,00 | 15,000 | 0,000 |
| 20,00 | 19,900 | -0,100 | 20,00 | 19,900 | -0,100 |
| 25,00 | 24,900 | -0,100 | 25,00 | 24,900 | -0,100 |
| Incertitude de mesure : (Uncertainty) | | 125 mbar | Hystérésis : (Hysteresis) | | 0,000 |
| Valeurs exprimées en bar (Values in bar) | | | | | |

Opérateur : **Hervé MATHIEU**
 (Operator)

Le Service Qualité
 (Quality Department)

Date d'étalonnage : **29-déc-2014**
 (Date of calibration)

SOLYRO
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 69153 DÉCINES CHARPIEU CEDEX