

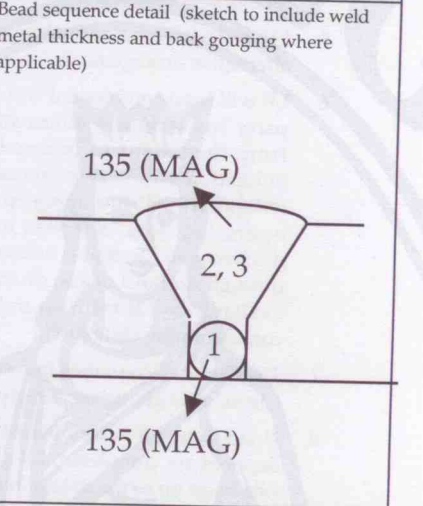
## WELDING PROCEDURE QUALIFICATION RECORD (PQR)

Qualification: Codes/Standards  
BS EN 288-3: 92

|  |
|--|
| Date of issue<br><b>29 May 2001</b>                |
| LR Office<br><b>PIRAEUS</b>                        |
| PQR certificate number<br><b>PIR 0107457/15/A1</b> |

|  |
|--|
| Manufacturer's name and address<br><b>CHALKIS SHIPYARDS<br/>VATHI, AVLIDAS<br/>34100 EVIA<br/>GREECE</b> |
|--|

|  |
|--|
| Test joint details (sketch with dimensions) of weld preparation<br><b>BUTT SINGLE VEE<br/>ROOT FACE 1.5 mm<br/>ROOT GAP 3.0 mm<br/>BEVEL ANGLE 60°<br/>THICKNESS 12.0 mm</b> |
|--|



|   |   |
|---|---|
| p WPS* number and revision<br><b>135 Rev. 0</b>   | Date of welding<br><b>11 April 2001</b>           |
| Test place/location shop/site<br><b>CHALKIS SHIPYARDS, VATHI</b>                            |   |
| <b>RANGE OF APPROVAL</b>  |   |
| Welding process(es)<br><b>135 (MAG)</b>   | Single pass/multipass<br><b>MULTIPASS</b>         |
| Joint type(s)<br><b>BUTT &amp; FILLET</b>   | Parent metal group(s)<br><b>GROUP W01</b>         |
| Plate thickness range<br><b>3.0&lt;t&lt;24.0 mm</b>   | Pipe outside diameter range<br><b>&gt; 500 mm</b> |
| Filler metal type/designation<br><b>ER 70 S-6, 5.18</b>                                     | Heat treatment<br><b>-</b>                        |
| Gas/flux<br><b>82% ARGON, 18% CO2</b>   | Type of welding current<br><b>DC</b>              |
| Welding positions<br><b>ALL</b>   | Progression (up/down)<br><b>UPHILL</b>            |
| <b>WELD AND FILLER METAL DETAILS</b>  |   |
| Parent Materials<br><b>LRS GRADE A</b>  | Test piece position<br><b>PF</b>                  |
| Welding process<br><b>135 (MAG)</b>   | Joint type<br><b>BUTT, SINGLE VEE</b>             |
| Filler material<br><b>AWS: ER 70 S-6, SFA: 5.18</b>   | Shielding gas/flux flow rate<br><b>-</b>          |
| Make/type/diameter<br><b>BOHLER, EMK 6/S</b>  | Gas composition<br><b>82% ARGON, 18% CO2</b>      |
| Composition<br><b>-</b>   | Flux type<br><b>-</b>                             |
| Other information<br><b>-</b>   |   |
| Preheat and interpass temperature (method) and control<br><b>PREHEAT AMBIENT: MIN 10 °C</b> |   |
| Postweld heat treatment temperature (method) and control<br><b>N/A</b>                      |   |

**PROCEDURE DETAIL**

| RUN NUMBER | PROCESS | SIZE OF FILLER MATERIAL | CURRENT A | VOLTAGE V | AC/DC POLARITY | WIRE FEED/ TRAVEL SPEED | HEAT INPUT kJ/mm |
|------------|---------|-------------------------|-----------|-----------|----------------|-------------------------|------------------|
| 1          | 111     | 1.2 mm                  | 100-110   | 20 - 22   | DC RP          | -                       | -                |
| 2, 3       | 111     | 1.2 mm                  | 110-130   | 20 - 22   | DC RP          | -                       | -                |

|                            |  |  |
|----------------------------|--|--|
| Date<br><b>30 May 2001</b> | Welder's name<br><b>LATHOURAS VASILIOS</b> | WPQ certificate number<br><b>PIR 0107457/11/A1</b> |
|----------------------------|--|--|

\*Manufacturer's Preliminary Welding Procedure Specification

|  |
|--|
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| LR Office<br><b>PIRAEUS</b>                        |
| PQR certificate number<br><b>PIR 0107457/15/A1</b> |

**TEST RESULTS**

NON-DESTRUCTIVE EXAMINATION (STATE 'ACCEPTABLE', 'UNACCEPTABLE' OR 'NONE')

|                             |                                  |                                 |                                  |             |
|-----------------------------|----------------------------------|---------------------------------|----------------------------------|-------------|
| Visual<br><b>Acceptable</b> | Magnetic particle<br><b>None</b> | Liquid penetrant<br><b>None</b> | Radiography<br><b>Acceptable</b> | Ultrasonics |
|-----------------------------|----------------------------------|---------------------------------|----------------------------------|-------------|

**DESTRUCTIVE TESTS**

| TEST               | TENSILE           | YIELD | % ELONGATION | % REDUCTION OF AREA | FRACTURE    | TEST         |
|--------------------|-------------------|-------|--------------|---------------------|-------------|--------------|
| Units              | N/mm <sup>2</sup> |       |              |                     |             |              |
| Transverse tensile | 493.4/541.2       |       |              |                     | <b>B.M.</b> | <b>24 °C</b> |
| All-weld tensile   | <b>NONE</b>       |       |              |                     |             |              |

**BEND TESTS**

| ORIENTATION    | FORMER DIAMETER | RESULTS           | FILLET WELD FRACTURE (RESULTS)         |
|----------------|-----------------|-------------------|--|
| Root/face/side | 50 mm           | <b>ACCEPTABLE</b> | 1.                                     |
| Root/face/side | 50 mm           | <b>ACCEPTABLE</b> | 2.                                     |
| Root/face/side | 50 mm           | <b>ACCEPTABLE</b> | 3.                                     |
| Root/face/side | 50 mm           | <b>ACCEPTABLE</b> | Macro examination<br><b>ACCEPTABLE</b> |
| Longitudinal   |                 |                   |  |

**IMPACT TESTS**

| RUN NUMBER  | NOTCH LOCATION/<br>ORIENTATION | TEMP<br>°C | VALUES (J) |   |   | AVERAGE<br>(J) | REMARKS |
|-------------|--------------------------------|------------|------------|---|---|----------------|---------|
|             |                                |            | 1          | 2 | 3 |                |         |
| Requirement |                                |            |            |   |   |                |         |
| Size        |                                |            |            |   |   |                |         |
| Type        |                                |            |            |   |   |                |         |
| Retest      |                                |            |            |   |   |                |         |

**HARDNESS SURVEY**

|                 |                       |  |
|-----------------|-----------------------|--|
| Type            | Load                  | Location of hardness measurements (sketch) |
|                 | <b>HARDNESS RANGE</b> |  |
| Parent Material |                       |  |
| H.A.Z.          |                       |  |
| Weld            |                       |  |

Additional test(s) and result(s), eg. chemical analysis, micro examination, ferrite measurement

We certify that the foregoing statements are correct and the test welds were prepared, welded and tested in accordance with the specified Codes or Standards

|  |   |                            |
|--|---|----------------------------|
| Signature - Manufacturer<br>                 | Name in BLOCK CAPITALS<br><b>CHALKIS SHIPYARDS S.A.</b> | Date<br><b>30 May 2001</b> |
| Signature - Surveyor to Lloyd's Register<br> | Name in BLOCK CAPITALS<br><b>P. KAMARADOS</b>           | Date<br><b>30 May 2001</b> |

**TEST RESULTS**

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Manufacturer's Welding Procedure **111 Rev. 0**  
Reference No: -

Inspecting Authority: **LR Piraeus**  
Reference No: **PIR 0307354/16**

Visual Examination: **Acceptable**  
Penetrant/Magnetic Particle Test\*: **Acceptable**

Radiography\*: **Acceptable**  
Ultrasonic Examination\*: **N/A**

**TENSILE TESTS**

Temperature: **Ambient**

| Type/No      | Re<br>N/mm <sup>2</sup> | Rm<br>N/mm <sup>2</sup> | A% on | Z% | Fracture Location | Remarks    |
|--------------|-------------------------|-------------------------|-------|----|-------------------|------------|
| Requirement  | -                       | 400-520                 | -     | -  |                   |            |
| Transverse 1 | -                       | 487.5                   | -     | -  | Parent Metal      | Acceptable |
| Transverse 2 | -                       | 494.2                   | -     | -  | Parent Metal      | Acceptable |

**BEND TESTS**

Former Diameter: **4t**

| Type/No | Bend Angle | Elongation* | Result     |
|---------|------------|-------------|------------|
| Face 1  | > 120°     | N/A         | Acceptable |
| Face 2  | > 120°     | N/A         | Acceptable |
| Root 1  | > 120°     | N/A         | Acceptable |
| Root 2  | > 120°     | N/A         | Acceptable |

Fillet Fracture Test\*:  
**N/A**

Macro/Micro Examination\*:  
**Acceptable**

**IMPACT TESTS\***

Type: **V-Notch**

Size: **10x10x55mm**

Requirement: **-**

| Notch Location/Direction | Temp °C | Values |     |     | Average | Remarks    |
|--------------------------|---------|--------|-----|-----|---------|------------|
|                          |         | 1      | 2   | 3   |         |            |
| Weld                     | - 20 °C | 165    | 105 | 110 | 127     | Acceptable |
| HAZ                      | - 20 °C | 170    | 193 | 203 | 189     | Acceptable |

**HARDNESS TESTS\***

Location of Measurements (Sketch)\*

Type/Load: **Vickers (HV 10)**  
Values - Parent Metal: **170 - 175**  
- H.A.Z.: **215 - 235**  
- Weld Metal: **200 - 215**

**OTHER TESTS**


**None**

**REMARKS**

**Spectrumlabs Reports No. 030416-1/2, 030602-1 & 0300602-2**

Tests carried out in accordance with the requirements of: **BS EN 288-3:92/A1:97**  
Laboratory Report Reference No: **Refer to "REMARKS"**  
Test Results were acceptable/~~not acceptable~~ (Delete as appropriate)

Tests carried out in the presence of:  
**P. MINTZARIDIS**

  
**Lloyd's Register**  
Name and Signature of Surveyor  
**P. MINTZARIDIS**  
Inspecting Authority  
(CEOC Member Organisation)  
Lloyd's Register of Shipping

Übersetzung des gedruckten Textes auf der zweiten Seite

Translation of printed text on the second page

Traduction des rubriques imprimées sur la deuxième page

