



**NIFTYLIFT LIMITED**

**WELDING REQUIREMENTS**

**FOR SUPPLIER APPROVAL**

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## **Normative References**

**BS EN ISO 15614-1:2004 +A2:2012** - *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2004 + A2:2012).*

**EN 288-3:1992** - *Specification and approval of welding procedures for metallic materials. Welding procedure tests for the arc welding of steels*

**BS EN ISO 9606-1:2013** - *Qualification testing of welders. Fusion welding. Steels*

**NNP022** – *Niftylift Welding Standards Document*

**BS ISO 5817:2014** - *Welding. Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded). Quality levels for imperfections*

**BS EN ISO 17637:2011** - *Non-destructive testing of welds / visual testing of fusion-welded joints.*

**BS EN ISO 17638:2009** - *Non-destructive testing of welds. Magnetic particle testing.*

**BS EN ISO 23278:2009** - *Non-destructive testing of welds. Magnetic particle testing of welds. Acceptance levels.*

**BS EN ISO 3834-3:2005** - *Quality requirements for fusion welding of metallic materials. Standard quality requirements.*

## **1. Purpose**

The purpose of this document is to define the requirements, terms of delivery and International Welding Standards that all suppliers must adhere to when supplying welded steel fabrications to Niftylift Ltd.

### **1.1. Scope**

Welded steel fabrications.

### **1.2. Responsibility**

It is the responsibility of the supplier to adhere to the requirements contained in this document. Ongoing evidence of compliance will be required as part of any periodic audit by Niftylift Ltd in accordance with section 3 (Quality Systems) of this document. Niftylift maintain the right to randomly select parts from any batch to be tested. To ensure that the supplier is working in accordance with this document.

## **2. Welding procedures**

It is the suppliers responsibility to assess and evaluate all welded joint configurations and compile welding procedures in accordance with BS EN ISO 15614-1:2004 +A2:2012.

This standard replaces EN 288-3:1992. In the case where the supplier is still using EN 288-3:1992 it does not invalidate previous welding procedure tests made to former national standards or specifications or previous issues of this standard. Where additional tests have to be carried out to make the qualification technically equivalent, it is only necessary to perform the additional tests on a test piece which should be made in accordance with this standard.

## **3. Welder Approval**

All welded joints must be performed by a competent welder qualified and assessed in accordance with BS EN ISO 9606-1:2013. It is the suppliers responsibility to review all welded joints in accordance with BS EN 9606-1:2013 to assess required level of training & approval for each welder performing welded joints on all delivered parts. The supplier is must meet the costs associated with welder qualification, training and approval.

Acceptable weld quality must be assessed in accordance with NNP022 See Appendix 6.1. This document is based on BS ISO 5817 and defines what levels of commonly seen imperfections are permissible.

A supplier may choose to use BS ISO 5817:2014 for guidance on acceptability of weld joint imperfections. In any circumstances where there are contradictions between the two documents, then the Niftylift standard NNP022 overrides the EN ISO.

All initial and ongoing qualification approval will be by an accredited examiner and all test pieces should be mechanically tested by a UKAS accredited laboratory.

Welders certificates must include their photographs and be held on file. These certificates will be required as evidence of compliance with this quality specific term of delivery.

A preliminary Welding Procedure Specification (pWPS) qualified by a welding procedure test according to this standard and obtained by a supplier, is valid for welding in workshops or sites under the same technical and quality control processes of that supplier.

All supplied parts should be traceable to individual welders via the welder's stamp.

#### **4. Niftylift ISIR Process (Initial Sample Inspection Report)**

All first off sample welded fabrications should be supplied in accordance with Niftylift's ISIR process. This requires two samples of the same welded fabrication to be supplied for assessment. One should be coated in accordance with the requested finish as stated by the drawing; the other should be supplied in a bare metal condition. The samples will be subjected to non-destructive testing in accordance with the following standards:

- BS EN ISO 17637:2011
- BS EN ISO 17638:2009

Niftylift Ltd reserve the rights to randomly subject parts to non-destructive testing to assess the quality of delivered parts. If a part fails to achieve the required level of quality in accordance with this document, the costs will be passed on to the supplier and the next three deliveries will be monitored and tested in accordance with Niftylift's ISIR process.

##### **4.1. Magnetic particle testing**

In accordance with BS EN ISO 17638-2009, Niftylift's acceptance standards are based on BS EN ISO 23278-2009. Niftylift's acceptance of linear indications will be in accordance with Table 1 below.

Table 1 – Acceptance levels for Indications

<b><u>Type of indication</u></b>	<b><u>Acceptance Level</u></b>	<b><u>Acceptance Level</u></b>
	<b>2</b>	<b>3</b>
<b>Linear indication</b> <i><b>I = length of indication</b></i>	<b><math>I \leq 3</math></b>	<b><math>I \leq 6</math></b>
<b>Non-Linear indication</b> <i><b>d = major axis</b></i>	<b><math>d \leq 3</math></b>	<b><math>d \leq 4</math></b>

(Dimensions in millimetres)

## **4.2. Grouped indications**

Any adjacent indication separated by less than the major dimension of the smaller shall be assessed as a single, continuous indication. Group indications shall be evaluated in accordance with application standards.

## **4.3. Removal of imperfections**

Where the product specifications permit, as stated on the drawing, local grinding may be used to reduce or remove imperfections which are the cause of unacceptable indications. All such areas shall be retested and evaluated with the same magnetic system and techniques.

## **5. Quality Systems**

As a minimum the supplier must employ and use a competent weld inspector as part of their weld inspection process. The weld inspector must be fully trained to PCN level 2 as a minimum or CSWIP Level 1.

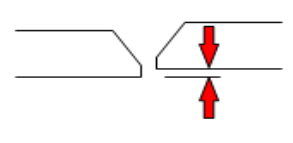
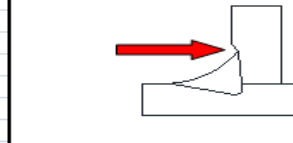

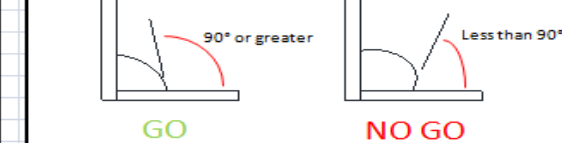
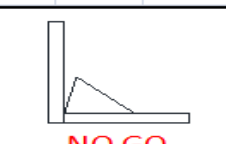
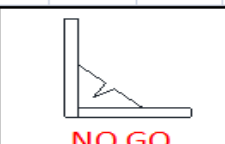

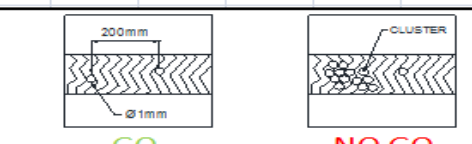
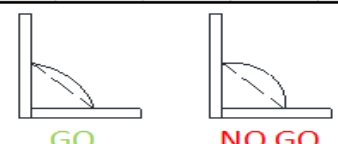

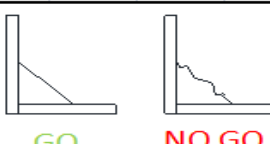

As part of ongoing supplier assessment, evidence will be required to show the calibration and checking of all welding related equipment, tooling and fixtures. Evidence of ongoing training schedules will be required for all supplier employees that perform welded joints on parts delivered to Niftylift Ltd. It is recommended that all suppliers that deliver purchased parts with welded joints to Niftylift Ltd should have an accredited quality system in accordance with BS EN ISO 3824-3:2005.

## **6. Appendix. 6.1. NNP 022 – Niftylift Welding Standards Document**

Any questions or deviation relating to Standard must be communicated via your Niftylift Purchasing representative and will be responded to in writing by the Niftylift Engineer responsible for the component

# Niftylift Welding Standards Document niftylift

**Created by:** D.Ellis      **Document Number:** NNP022      **Revision:** 04      **Date:** 16/06/2015

																							
MISALIGNMENT	UNDERCUT	CLEANING	OVERLAP																				
<p>Poor joint fit up at the root face. Transition not to exceed 25% of plate thickness.</p>	<p>Any undercut for plate less than 5mm thick must be re-worked. Over 5mm thick plate anymore than 0.5mm undercut must be re-worked.</p>	<p>The 'Go' example shows optimum cleaning standard with no spatter or slag. '(Go/No Go)' demonstrates small amount of spatter permissible if fabrication in finished state.</p>	<p>When the angle at the toe of the weld, between the weld metal and the base metal, is less than 90° the weld is unacceptable.</p>																				
																							
NO GO	NO GO	GO      NO GO	GO      NO GO																				
LACK OF FUSION	CRACK	CRATER FILL	POROSITY																				
<p>Any lack of fusion is unacceptable. Therefore there isn't a 'Go' example.</p>	<p>Any crack in the base or weld metal is unacceptable. Therefore there isn't a 'Go' example.</p>	<p>The 'Go' example has been filled to over 80% of the specified throat. The 'No Go' has not been filled enough.</p>	<ul style="list-style-type: none"> <li>• Pin holes greater than 1mm diameter are <b>No Go</b>.</li> <li>• More than 6 holes in 300mm of weld is <b>No Go</b>.</li> <li>• No porosity is allowed in seam or plasma welds</li> </ul> <p style="text-align: center;">This is standard for a weld's integrity.</p> <p style="text-align: center; color: red; font-weight: bold;">Niftylift standard is all porosity must be re-worked.</p>																				
																							
GO      NO GO	GO      NO GO      NO GO	GO      NO GO	GO      NO GO      NO GO																				
ROPINESS	FILLET SIZE	ROUGHNESS	GROOVE SIZE																				
<p>(CONVEX FILLET WELDS)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black;"><b>Actual leg length:</b></td> <td><b>Max Convex:</b></td> </tr> <tr> <td style="border-right: 1px solid black;">8mm or less</td> <td>1.0mm</td> </tr> <tr> <td style="border-right: 1px solid black;">9 - 12mm</td> <td>1.5mm</td> </tr> <tr> <td style="border-right: 1px solid black;">over 12mm</td> <td>2.0mm</td> </tr> </table>	<b>Actual leg length:</b>	<b>Max Convex:</b>	8mm or less	1.0mm	9 - 12mm	1.5mm	over 12mm	2.0mm	<ul style="list-style-type: none"> <li>• Both legs (Z) must be equal to that specified on drawing - 0.1b / +0.25b max 2mm. (Max. single pass is Z=8mm).</li> <li>• No concavity is allowed. (Minimum throat size of 0.7 times the specified leg size produces a flat weld profile.)</li> <li>• For Convexity tolerance see Ropiness standard.</li> </ul>	<p>If the profile of the weld is very uneven or if the size varies beyond the fillet size standard.</p>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; text-align: center;">If weld depth:</td> <td style="text-align: center;">then max. convexity:</td> <td style="text-align: center;">and max. concavity:</td> </tr> <tr> <td style="border-right: 1px solid black;">6mm or less</td> <td style="text-align: center;">2.5mm</td> <td style="text-align: center;">none</td> </tr> <tr> <td style="border-right: 1px solid black;">7-12mm</td> <td style="text-align: center;">3.0mm</td> <td style="text-align: center;">none</td> </tr> <tr> <td style="border-right: 1px solid black;">over 12mm</td> <td style="text-align: center;">4.0mm</td> <td style="text-align: center;">none</td> </tr> </table>	If weld depth:	then max. convexity:	and max. concavity:	6mm or less	2.5mm	none	7-12mm	3.0mm	none	over 12mm	4.0mm	none
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QUALITY means RIGHT FIRST TIME - Inspect YOUR work. Problems? STOP and FIX - Do NOT send to the next process

