



# Standard Specification for Super Duplex Fasteners

## 1.0 Scope

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**1.1** This specification covers the supply of all hot forged Super Duplex fasteners and those machined from bar.

**1.2** This standard relates specifically to materials classified as Super Duplex.

## 2.0 Referenced Documents

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### 2.1 ASTM Standards:

**A276** Standard Specification for Stainless Steel Bars and Shapes.

**A182** Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service.

**G48-03** Standard Test Methods for Pitting and Crevice Corrosion Resistance of Stainless Steels and Related Alloys by Use of Ferric Chloride Solution.

### 2.2 Norsok Standards

MDS D57 Rev 3

### 2.3 SSF Standards

**QAP-04** Purchasing and Supplier approval

**SSF001SD** Specification for Hot Forging

**SSF002SD** Specification for Loading

**SSF003SD** Specification for Heat Treatment

**SSF004SD** Specification for Testing

## 3.0 Ordering Information

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**3.1** It is the purchaser's responsibility to;

**3.1.1** Specify the quantity, size and type of fastener as well as any corresponding drawings or specification.

**3.1.2** Request any additional documentation other than that specified in this standard.

**3.1.3** If any specific finished product testing is required over and above that in this standard.

## 4.0 General Requirements

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**4.1** The Receipt of Raw material must be carried out in accordance with SSF's Procedure QAP-04.

**4.2** Product furnished to this specification shall conform to MDS D57 Rev 3. Failure to comply with SSF001SD, SSF002SD, SSF003SD, SSF004 SD if hot forged or Raw Material Receipt if machined from bar constitutes non-conformance with this specification.

## 5.0 Manufacture

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**5.1** The route of manufacture and the work in progress record must be kept for a minimum of 15 years.

**5.2** The route of manufacture needs to be generated based on this specification and held in such a way that it can be repeated exactly with out any chance of human error.

**5.3** If the component is Hot Forged it must be done in accordance with SSF001SD. Furthermore all temperatures must be controlled by equipment such as but not exclusively optical pyrometry. The equipment used must form part of a controlled calibration program.

**5.4** All slugs must be automatically removed from the heat source at temperature to eliminate the risk of Human error.

**5.5** After Hot Forging all components require a rapid temperature controlled water quench in accordance with SSF001SD.

## 6.0 Heat Treatment

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**6.1** All components should be loaded in Heat Treatment Furniture specifically designed for fasteners and in accordance with SSF002SD.

**6.2** All items in the Heat Treatment load must be batch/cast identifiable.

**6.3** All Heat Treatment to be performed in accordance with SSF003SD.

**6.4** Test Pieces will be identified by a map of the heat treatment load, the purchase order or by SSF0004SD.

**6.5** After Heating a rapid quench is required in a temperature controlled water bath. Times, temperatures and other details relating to the quench shall be in accordance with SSF003SD.



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**6.6** At all stages of the heat treatment cycle, temperature control such as, but not explicitly, thermocouples should be used to monitor and control the temperature.

## 7.0 Testing

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**7.1** Heat Treated Components;

**7.1.1** All Test pieces must have a;

**7.1.1.1** Microstructure demonstrating equal proportions of Austenite and Ferrite and be free from any intermetallic phases such as chi or sigma and any harmful carbides or nitrides.

**7.1.1.2** Ferrite Count in accordance with ASTM E562 with a ferrite range 40-55%

**7.1.1.3** ASTM G48-A Corrosion Test at 50°C for 24hr

**7.1.1.4** Charpy Impact Test at -46°C in accordance with SSF004SD.

**7.1.2** Test pieces must be taken from the area of the product considered to be the worst case scenario as defined in SSF004SD.

**7.1.3** Testing is done to prove the success of the Heat Treatment only. If finished product tests are required then this needs to be stated by the purchaser of the finished fastener.

**7.2** Components Machined From Bar;

**7.2.1** Will retain any Testing information from the original Mill Certificate providing no additional heat has been applied to that material after such testing. If additional heat has been supplied then full Ferrite, Microstructure, Corrosion and Impact tests in accordance with SSF004SD shall be performed on the incoming cast of material as part of SSF Ltd incoming raw material procedure.

**7.3** All orders regardless of manufacturing route will, in accordance with the current revision of QAP-04, have representative samples taken for;

**7.3.1** Ferrite Count

**7.3.2** Positive material identification.

## 8.0 Certification

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**8.1** All Orders shall be supplied with a Heat Treatment Certificate and a furnace chart (on request of the purchaser).

**8.1** A raw material cert will be provided in accordance with BS EN 10204 3.1. \*

*\*if the product has been heat treated then any microstructure, ferrite count, corrosion or Impact test performed on the raw material should be used as guidance only. If any of these tests are still required please refer to 7.1.3.*

## 9.0 Marking

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**9.1** All Fasteners will be marked with the name of the manufacturer, material grade and SD-210274 unless otherwise specified in the purchasing specification.

## 10.0 Surface Finish

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**10.1** If the product has been heat treated then the scale needs to be removed by a process of a fine aluminium oxide blast or a clean finish using non metallic medium.

**10.2** All products need to be acid pickled and passivated after the final machining process

## 11.0 Packaging

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**11.1** Finished goods will be packed in such a way that protects them from damage during transit.

**11.2** Packages will contain a tamper evident seal unique to the manufacturer.

**11.3** All packaging will be free from pest infestation.