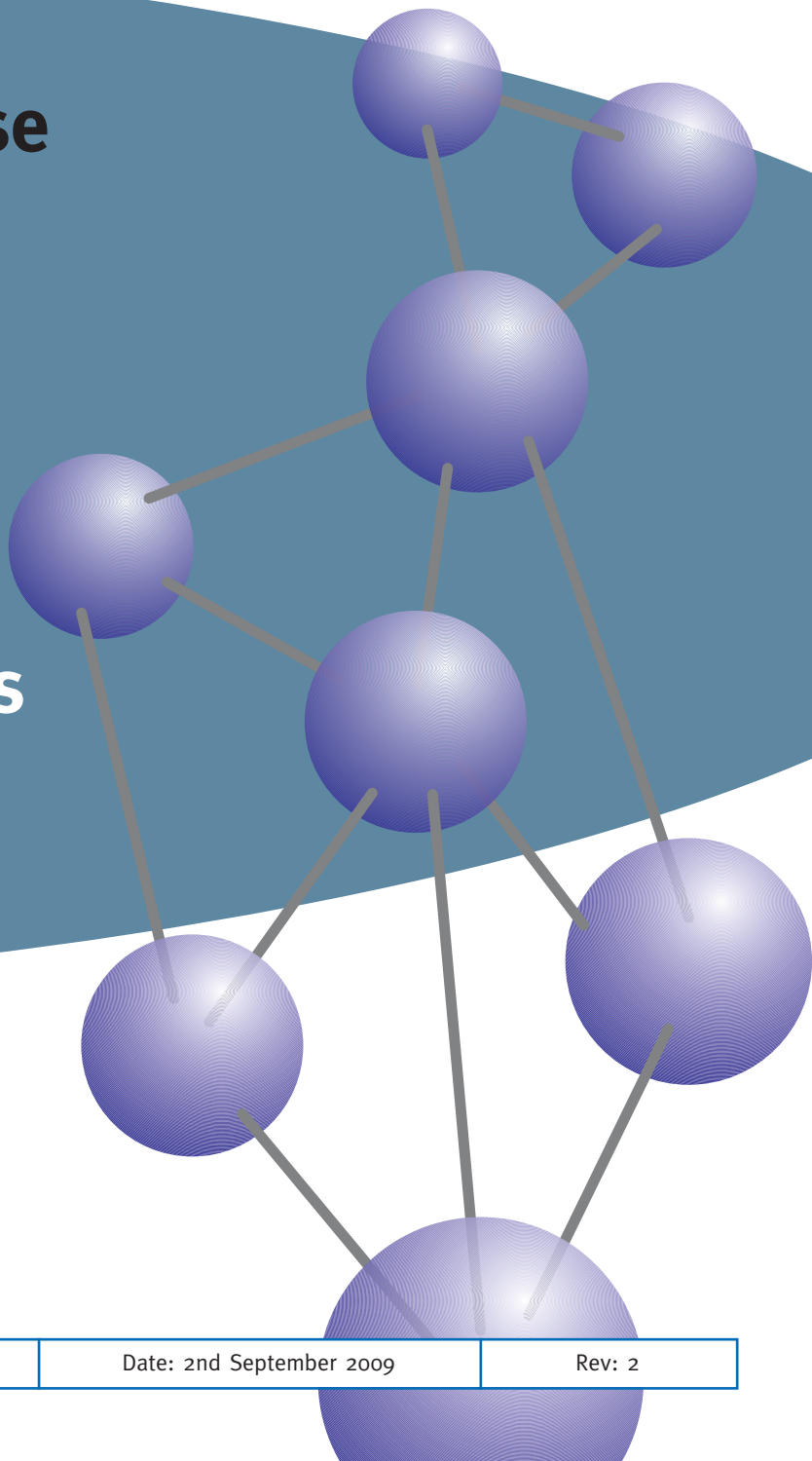




**Langley Alloys**

# **Material Purchase Specification for**

## **Alloy 2205 22% Cr Duplex Stainless Steel Bar and Forgings**



# Material Purchase Specification for

## Alloy 2205 22%Cr Duplex Stainless Steel Bar and Forgings

Document No. MLA-MPS-22V-BAR

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### 1.0 Scope

This specification defines the requirements for machined bar and forgings in Alloy 2205, a 22%Cr duplex stainless steel.

### 2.0 Related Specifications

ASTM A479 UNS S32205  
ASTM A276 UNS S32205  
ASTM A182 F51 or F60

ASTM A479 UNS S31803  
ASTM A276 UNS S31803  
EN 10088-3 1.4462

### 3.0 Production Processes

Production process shall follow process route 1X/2B as stipulated in EN 10088-3. Melting shall be by use of Electric Arc Melting followed by Argon-Oxygen Decarburization (AOD) or a similar refining process. All material shall be delivered in a solution annealed and peeled/turned/ground condition.

### 4.0 Chemical Composition

Cr	Ni	Mo	N	Si	Mn	P <sub>max</sub>	S <sub>max</sub>	C <sub>max</sub>	Fe
22.00- 23.00	4.50- 6.50	3.00- 3.50	0.14- 0.20	0.20- 0.70	1.00- 2.00	0.030	0.020	0.030	Rem

### 5.0 Heat Treatment

Alloy 2205 shall be solution treated at a temperature within the range 1060 C-1080 C followed by water quenching. Testing shall be carried out on each heat treatment batch

### 6.0 Mechanical Properties

Tested to ASTM A370 or EN 10002 Pt1 (tensile) and EN ISO 6506-1 (hardness) (as represented by test material) shall be as follows:

0.2% Proof Stress (minimum)	Tensile Strength (minimum)	Elongation 5.65 √So (minimum)	Reduction of cross section area (minimum)	Brinell Hardness
450 N/mm <sup>2</sup>	655 N/mm <sup>2</sup>	25%	45%	220 - 270 HB*

\*The hardness shall be in accordance with NACE MR 01.75 (latest edition) with a maximum HRC value of 28 (270HB).

## 7.0 Impact Requirements

Three specimens of each heat of Alloy 2205 shall be impact tested using Charpy Impact testing shall be carried out to BS EN10045-1 for each batch of material at room temperature. Longitudinal values shall be 80J average minimum.

Sub zero -46°C or lower shall be tested in both longitudinal and transverse directions. Longitudinal sub zero values shall be 45J (average), with 35J minimum single test value. Transverse values will be reported for information only.

## 8.0 Microstructure

The microstructure of each batch of Alloy 2205 shall be examined after solution heat treatment at a minimum of 400X magnification, and verified to be free from grain boundary particles (carbides, nitrides) and intermetallic phases (sigma, chi and laves), as defined by ASTM A 923 Method A. A photomicrograph (x400) can be provided if requested.

The ferrite content is to be determined in accordance with ASTM E562 and must lie between the values of 35% - 55%.

## 9.0 Tolerances

### 9.1 Bar

Alloy 2205 bars shall be supplied straight to within 2mm in any 1m length.

All bars shall be supplied in the proof machined condition, with dimensional tolerance as follows:

<i>Bars up to 30mm diameter:</i>	<i>+0.15mm/-0.0mm</i>
<i>Bars 31 mm to 80mm diameter:</i>	<i>+0.25mm/-0.0mm</i>
<i>Bars 81mm to 200mm diameter:</i>	<i>+1.00mm/-0.0mm</i>
<i>Bars above 200mm diameter:</i>	<i>+1.5mm/-0.0mm</i>

All bars shall be marked with '22V 2205' and the batch number and conform to EN 10088-3, Section 10 - Marking and EN 10088-3 Table 19.

Bars above 30mm diameter shall have 22V 2205 and the batch number marked on the bar ends.

Bars less than 30mm shall be marked by labels attached to the bundle.

Bars are supplied in random lengths of least 2500mm, unless cut pieces are to be supplied. Bar of lengths up to 6m would be acceptable.

Supply of full bars of shorter lengths than 2.5m would be subject to agreement on a case by case basis.

For the supply of cut pieces, tolerance on the cut lengths would be -0, +6mm

### 9.2 Forgings

All forgings shall be inspected by Langley Alloys before despatch with the following requirements for dimensional tolerances and identification.

All forgings shall be free of surface defects such as laps, cracks, etc

All forgings shall be supplied in the proof machined condition of surface finish of 125µin CLA or better

Tolerances on machined dimensions shall generally be within the range +1.5mm to +2mm, -0

## 10.0 Delivery Conditions

In order for goods to be unloaded in a safe manner and be traceable to the associated paperwork, all goods shall conform to the following:

- a) Maximum bundle weight will be 3000kg. Maximum single bar weight will be 3000kg.
- b) All goods are to be packed in such a way as to avoid transit damage and be suitable for unloading by forklift truck.
- c) Documentation shall be supplied with, or prior to, the delivery of the goods.
- d) Where two or more batches of the same grade or size are supplied at the same time, each batch shall be physically separated and clearly labelled.

## 11.0 Certification

Alloy 2205 certificates are to be in accordance with BS EN 10204 3.1.



**Langley Alloys**

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