



Introduction to Stainless Steel Starter Workshop 1 Day Course

Key Learning Objectives:

- Understand why stainless steel is different from non stainless steel and be familiar with the diverse product range and the market sectors supplied
- Learn about the different types of stainless steel i.e. ferritic, martensitic, austenitic, duplex, PH and how they differ in terms of structure and composition
- Learn about the mechanical and physical properties of each stainless steel type and how this influences end use
- Be familiar with the corrosion mechanisms that can undermine stainless steel performance and the important metrics which define corrosion resistance
- Understand the basic methods of forming, fabricating and joining stainless steel - know the pros and cons of welding each stainless steel type

Who Should Attend:

This course suits designers, specifiers, sales people, buyers. It is also relevant to engineers, managers and technicians responsible for the QA testing of stainless steel products.

The course gives a comprehensive overview of the types of stainless steel available, with emphasis on structure, properties and end uses. An important aim is to provide up-to-date information to help with the selection of the most appropriate grade(s)

Contacts:

Dr Mike Lewus:
Technical Advisor, BSSA
0114 2922637

mike.lewus@bssa.org.uk
<http://www.bssa.org.uk>





Section 1:

Applications: Stainless Steel: Products by Market Sector

- Consider the properties required by stainless steel products from a range of market sectors:-
 - i) Transport
 - ii) Construction and architecture
 - iii) Civil engineering
 - iv) Industrial processing
 - v) Surgical and medical
 - vi) Street furniture and sculpture

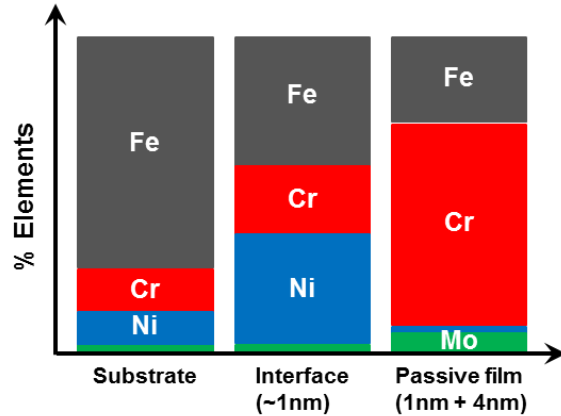


Industrial Processing Applications: Chemical, Oil, Gas Power Generation

Section 2:

Fundamentals of Stainless Steel

- What makes stainless steel 'stainless'
- Nature and properties of the passive film
- Fundamental structure of stainless steel: the meaning of ferritic, austenitic and martensitic explained
- Versatility of stainless steel and how its properties are exploited

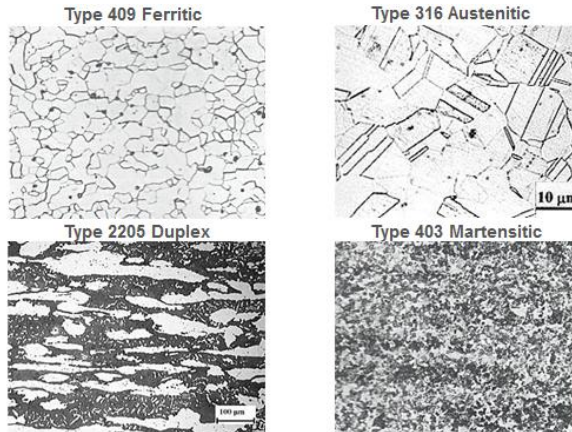


Elements Present in Substrate, Interface and Passive Layer of an Austenitic Stainless Steel (~316 Composition)

Section 3:

5 Types of Stainless Steel and the Subcategory Grades that Belong to each Type

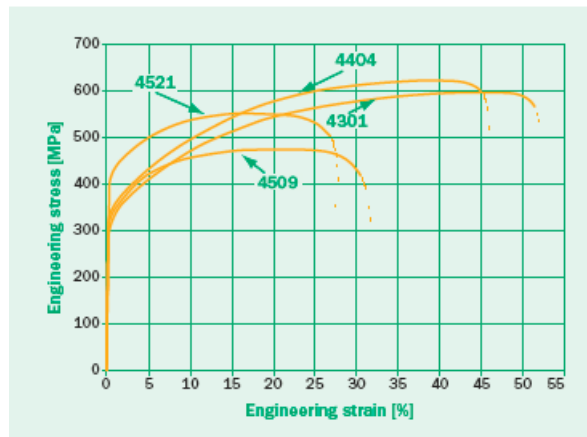
- Composition, properties and basic metallurgy of:-
 - i) Ferritic stainless steel
 - ii) Austenitic stainless steel
 - iii) Martensitic stainless steel
 - iv) Duplex stainless steel
 - v) PH stainless steel



Typical Stainless Steel Microstructures

Section 4: Mechanical and Physical Properties of Stainless Steel

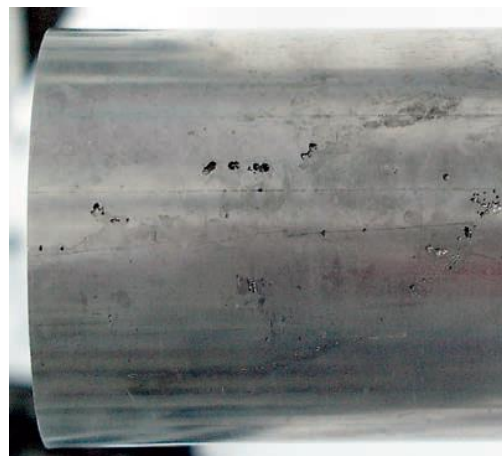
- Tensile strength: key parameters relating to stress-strain plot for different stainless steel types
- Aspects of work hardening
- Toughness: a definition, how it is measured and how toughness differs with stainless steel type
- High temperature properties
- Thermal, electrical and magnetic properties



**Stress-Strain Curves of Ferritic
c.f. Austenitic Stainless Steel**

Section 5: Corrosion of Stainless Steel

- Atmospheric and aqueous corrosion
- Pitting corrosion
- Stress corrosion cracking (SCC) and hydrogen embrittlement
- Crevice corrosion
- High temperature corrosion
- Corrosion of weldments
- Response to exposure to oxidising and reducing acids



**Pitting Corrosion on the Outside of 316
Stainless Steel Tube**

Section 6: Forming, Fabrication and Welding of Stainless Steel

- Cutting, bending, drawing and spinning methods
- Weldability of ferritic, martensitic, austenitic, duplex and PH types – advantages and disadvantages
- Welding dissimilar stainless grades and welding to mild steel
- Embrittling phases



GRINDING POLISHING PICKLING
 INCREASING CORROSION RESISTANCE →

**Weld Seam Cleaning Methods and
Effect on Corrosion Resistance**

BSSA Starter Workshop Booking Form

Please reserve the following places at the BSSA Starter Workshop:

BSSA Member (£160 + VAT) / Non-Member (£210 + VAT) (delete as appropriate)

	Workshop Date	Delegate Name & Company name	£
1			
2			
3			
4			
5			

Total £ _____
 VAT (20%) £ _____

Grand Total £ _____

Main contact details:

Name _____
 Company _____
 Address _____

 _____ Email _____
 Post Code _____
 Tel. No. _____
 Mobile No. _____

Joining instructions will be e-mailed to this email address

Payment Method:

- I enclose a cheque payable to 'BSSA' for: £ _____ - _____
- Please send an invoice
- I wish to pay by credit card/ debit card:

MasterCard Visa Maestro Other _____

Card Number

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Security No (Last three digits on rear of card)

Valid From: / to: / Issue No:

NB: We require the cardholder's registered address if different from the details given:

Name on card _____ Signed _____ Date _____

Please complete the form and return to Association Administrator:

BSSA, Park Suite, Regus Enterprise Centre, Bramall Lane, Sheffield, S2 4SU
Tel 0114 292 2636 **Email** admin@bssa.org.uk **Web** www.bssa.org.uk