

50 GRADES OF STAINLESS STEEL



The BSSA has selected 50 Grades of Stainless Steel as its theme for 2014. Each week throughout the year, we will showcase one grade and illustrate the variety of corrosion resistant, mechanical and physical properties which determine its suitability for a wide range of applications.

#16

904L 1.4539 N08904



Sulphuric Acid Plant



Chimney Liners

904L was originally developed for sulphuric acid service, particularly in concentrations from 20% to 85%. Its high chromium and molybdenum also makes it more resistant to pitting corrosion than standard grades such as 316/316L.

Approximate Composition – 20% Cr, 25% Ni, 4.0% Mo, 1.5% Cu plus N (Exact composition ranges vary between EN and ASTM standards).

This grade combines the following characteristics:

- Excellent resistance to sulphuric acid across the complete concentration range
- Good pitting and crevice corrosion resistance (PREN ~ 32 , comparable to 2205 duplex)
- Excellent stress corrosion cracking resistance
- Good impact toughness at sub-zero temperatures (better than duplex)
- Improved formability compared to duplex
- Non-magnetic. Fully austenitic and very resistant to martensitic transformation

- Good weldability but care is needed to avoid solidification cracking

904L is a good example of the development of an alloy for a specific purpose. Sulphuric acid is one of the most common basic chemicals. Chemical plants require the storage and transport of this acid at a range of concentrations. In dilute acid, up to about 20%, and in concentrated acid greater than 85%, grade 316L can reasonably be used at ambient temperature. 904L “plugs the gap” in between and reduces the corrosion rate compared to 316L at low and medium concentrations. It achieves this by using the combined effects of chromium, nickel, molybdenum and copper.

The high chromium and molybdenum contents also give a good resistance to chloride pitting and crevice corrosion, comparable to 2205 duplex. This is particularly useful when 2205 duplex is ruled out on grounds of sub-zero impact toughness, formability, service above 300 deg C or magnetic properties.

Applications which illustrate these features include:

Pulp and paper, chemical processing, heat exchangers, flue gas desulphurisation (FGD), offshore oil and gas, food processing, chimney liners.

904L is an excellent choice for sulphuric acid and other aggressive environments.

[Find out more about the 50 Grades of Stainless Steel campaign](#) →

[BSSA Home](#) | [BSSA Membership](#) | [Contact Us](#)



Park Suite, Forsyth Enterprise Centre, Bramall Lane, Sheffield, S2 4SU
Tel: +44 (0)114 292 2636 Fax: +44 (0)114 292 2633 Email: admin@bssa.org.uk

If you are interested in learning more about our campaign please [sign up](#) here.

If you no longer wish to receive emails from us please [unsubscribe](#) here.

British Stainless Steel Association (BSSA): registered in England and Wales as a private company limited by guarantee; registration no. 07547349