What is stainless steel?

Fe
Cr ≥ 10,5%
C ≤ 1,2%
What is stainless steel?

Iron alloy bearing ≥ 10.5% chromium and ≤ 1.2% carbon, necessary to ensure the build-up of a self-healing surface layer (passive layer) which provides the corrosion resistance.

Main families

- **Austenitic**: Iron-chromium-nickel, carbon < 0.1% (including grade 1.4301/304, often referred to as 18/8; 18/10), non-magnetic in the as-delivered condition; > 65% of world stainless use
- **Ferritic**: Iron-chromium, carbon < 0.1%, magnetic
- **Martensitic**: Iron-chromium, carbon > 0.1%, magnetic and hardenable
- **Duplex**: Iron-chromium-nickel, combined austenitic-ferritic structure, magnetic

Main properties

- Biological neutrality – ease of fabrication and cleaning – strength-to-weight ratio

Commonly available finishes and process routes

1. **1D**: Hot rolled, heat treated, pickled
2. **2B**: Cold rolled, heat treated, pickled, skinpassed
3. **2H**: Work hardened
4. **2R**: Cold rolled, bright annealed, may be skinpassed

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1) See also: Guide to Stainless Steel Finishes (Building Series, Volume 1), Luxembourg: Euro Inox, 2005.
How are austenitic grades interrelated?

Starting from the universal commodity grade 1.4301, the alloying content can be adapted to modify the steel’s characteristics:

Designations according to EN 10088 and AISI. Please note that there is no 1:1 relationship between AISI and EN grades (*). For details about chemical composition and equivalence, please consult www.euro-inox.org/technical_tables.
What are the ferritic options?

The most popular grade is EN 1.4016 (AISI 430). Low chromium alloys can be chosen in non-severe environments and where appearance is not a priority. Chromium and molybdenum increase corrosion resistance. Titanium and niobium improve weldability.

Relative corrosion resistance

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* common designations
And what about duplex?

Duplex stainless steels typically show higher mechanical properties and corrosion resistance than the most common ferritic and austenitic grades. The relative differences between duplex stainless steel grades – of which EN 1.4462 is the most popular one – should be viewed in this context.

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