Chemical Composition

<table>
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<tr>
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<th>SS 303</th>
<th>TYPE 303</th>
<th>WNR 1.4305</th>
<th>UNS S30300</th>
<th>AISI 303</th>
<th>GRADE 303</th>
<th>AFNOR Z 10 CNF 18-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.15 max</td>
<td>0.15 max</td>
<td>0.15 max</td>
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<td>Manganese</td>
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<tr>
<td>Phosphorus</td>
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<tr>
<td>Sulfur</td>
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<td>0.15 min</td>
<td>0.15 min</td>
<td>0.15 min</td>
<td>0.15 min</td>
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<tr>
<td>Silicon</td>
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<tr>
<td>Chromium</td>
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<td>17.0-19.0</td>
<td>17.0-19.0</td>
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<td>17.0-19.0</td>
<td>17.0-19.0</td>
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<tr>
<td>Nickel</td>
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<td>8.0-10.0</td>
<td>8.0-10.0</td>
<td>8.0-10.0</td>
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Mechanical Properties

<table>
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<tr>
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<tbody>
<tr>
<td>Elongation %</td>
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<td>Reduction in Area, %</td>
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<td>Hardness, HB</td>
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</table>
Standard Available in forms:

- ASTM A182/ASME SA182 Stainless Steel Pipe Fittings
- ASTM A213/ASME SA213 Seamless Stainless Steel Pipes
- ASTM A240/ASME SA240 Stainless Steels Sheets/Plates
- ASTM A249/ASME SA249 Stainless Steel Welded Tubes
- ASTM A269/ASME SA269 Stainless Steel Tubes
- ASTM A270/ASME SA270 Stainless Steel Sanitary Tubes
- ASTM A312/ASME SA312 Stainless Steel Pipes
- ASTM A403/ASME SA403 Stainless Steel Pipe Fittings
- ASTM A554/ASME SA554 Stainless Steel Welded Tubes
- ASTM A731/ASME SA731 Stainless Steel Pipes
- ASTM A789/ASME SA789 Stainless Steel Tubes
- ASTM A790/ASME SA790 Stainless Steel Pipes
- ASTM A791/ASME SA791 Stainless Steel Tubes

Products Available in forms:

- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Plates
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Pipes
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Round Bar
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Tube
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Flanges
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Wire
- SS 303, Type 303, WNR 1.4305, UNS S30300, AISI 303 Fittings

Corrosion Resistance

- Good resistance to mildly corrosive atmospheres, but significantly less than Grade 304 due to the sulphur addition; the sulphide inclusions act as pit initiation sites.
- Grade 303 should not be exposed to marine or other similar environments, as these will result in rapid pitting corrosion.
- Because the sulphide inclusions in 303 are primarily aligned along the rolling direction the corrosion resistance is particularly reduced in cross-sections.
- Grade 303, like other common austenitic stainless steels, is subject to stress corrosion cracking in chloride containing environments above about 60°C.

Heat Resistance

- Good oxidation resistance in intermittent service to 760°C and in continuous service to 870°C.
- Continuous use in 425–660°C range not usually recommended due to carbide precipitation - 303 usually does not have a low carbon content so is susceptible to sensitisation.

Fabrication

- As well as reducing the corrosion resistance, the sulphur additions in 303 also result in poor weldability and reduced formability compared to Grade 304.
- Sharp bends should not be attempted in 303.
- A practical compromise alternative may be a 304 Ugima Improved Machinability grade – this does not machine as readily as 303, but does offer better formability (as well as better weldability and corrosion resistance).

Heat Treatment

- Solution Treatment [Annealing] – Heat to 1010–1120°C and cool rapidly. This grade cannot be hardened by thermal treatment.

Welding

- Not generally recommended but, if unavoidable and a lower strength can be tolerated, use Grade 308L or 309 electrodes.
- AS 1554.6 does not pre-qualify welding of 303. Welds must be annealed for maximum corrosion resistance.
Machining
- A "Ugima" improved machinability version of grade 303 is available in round bar products.
- This machines significantly better even than standard 303, giving very high machining rates and lower tool wear in many operations.

Annealing
- Type 303 should be heated to 1900°F minimum and water quenched or rapidly cooled by other means.

Hardening
- Type 303 cannot be hardened by heat treatment.

Cold Working
- The cold formability of Type 303 is reduced by its high sulfur content.
- Bending with a generous bend radius may be considered for Type 303.
- When cold forming is required, Type 304 should be considered.

Hot Working
- The high sulfur content, added for machinability, is detrimental to hot workability.
- If hot forming is necessary, an alternate grade such as Type 304 should be considered.
- When forging is necessary, it should be done in the 1800-2200°F range, and should be followed by annealing at 1900°F minimum and water quenching or rapid cooling by other means.

Applications
- Nuts and Bolts
- Bushings
- Shafts
- Aircraft Fittings
- Electrical Switchgear Components
- Gears
- In general any component that is heavily machined and where the corrosion resistance and fabrication properties of 303 are viable.