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FREQUENTLY ASKED QUESTIONS

1. What makes stainless steel stainless?

Answer: Stainless steel must contain at least 10.5 % chromium. It is this element that reacts with the oxygen in the air to form a complex chrome-oxide surface layer that is invisible but strong enough to prevent further oxygen from "staining" (rusting) the surface. Higher levels of chromium and the addition of other alloying elements such as nickel and molybdenum enhance this surface layer and improve the corrosion resistance of the stainless material. See the "Stainless Steel Primer" for more information.

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2. What is the difference between 18/8 and 18/10 stainless steel?

Answer: The first number is the amount of chromium that is contained in the stainless, i.e., 18 is 18% chromium. The second number is the amount of nickel, i.e., 8 stands for 8% nickel. So 18/8 means that this stainless steel contains 18% chromium and 8% nickel. 18/10 is 18% chromium and 10% nickel. The higher the numbers the more corrosion resistant the material. 18/0 is a misleading designation. Both 18/8 and 18/10 contain nickel and are part of the grade family "300 series" stainless. 18/0 means that there is 18% chromium but zero nickel. When there is no nickel the stainless grade family is the "400 series". 400 series are not as corrosion resistant as the 300 series and are magnetic, where the 300 series are non-magnetic.

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3. Can stainless steel rust? Why? (I thought stainless did not rust!)

Answer: Stainless does not "rust" as you think of regular steel rusting with a red oxide on the surface that flakes off. If you see red rust it is probably due to some iron particles that have contaminated the surface of the stainless steel and it is these iron particles that are rusting. Look at the source of the rusting and see if you can remove it from the surface. If the iron is embedded in the surface, you can try a solution of 10% nitric and 2% hydrofluoric acid at room temperature or slightly heated. Wash area well with lots and lots of water after use. Commercially available "pickling paste" can also be used. See "The Care and Cleaning of Stainless Steel" for more information.

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4. What is the difference between 304 and 316 stainless steel?

Answer: 304 contains 18% chromium and 8% nickel. 316 contains 16% chromium, 10% nickel and 2% molybdenum. The "moly" is added to help resist corrosion to chlorides (like sea water and de-icing salts) See "Stainless Steel for Coastal and Salt Corrosion Applications" for more information.

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5. Is stainless steel magnetic?

Answer: There are several "types" of stainless steel. The 300 series (which contains nickel) is NOT magnetic. The 400 series (which just contains chromium and no nickel) ARE magnetic.

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6. What is "passivation"?

Answer: When the amount of chromium (in an iron matrix) exceeds 10 ½%, a complex chrome oxide forms instantaneously that prevents the further diffusion of oxygen into the surface and results in the "passive" nature of stainless steel and its resistance to oxidation (or corrosion). A chemical "dip" into 10% nitric acid plus 2% hydrofluoric acid bath will enhance the development of this "passive" oxide.

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7. Can stainless steel be "welded"?

Answer: YES. Stainless steel is easily welded, but the welding procedure is different than that used with carbon steel. The "filler" rod or electrode must be stainless steel. (Contact the American Welding Society for more information)

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8. Can Stainless steel be "hardened"?

Answer: YES. The 300 series stainless steel can be "hardened" BUT only by "work hardening." That is by cold working the material, either by cold rolling down to lighter and lighter gauges, or by "drawing" through a die or other size altering operation. "Annealing" stainless steel will REMOVE the work hardening effect. YES and NO. The 400 series have two different stainless steel structures. One is called "ferritic" (409, 430, 434. 439) which cannot be hardened by heat treatment. The other is called "martensitic" (403, 410, 416, 420, & 440 A,B,C) which CAN be hardened by heat treatment. See "Design Guidelines for The Selection and Use of Stainless Steel" for more information.

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9. What does the "L" designation mean?

Answer: The use of the letter L after the grade number, i.e., 304L, means that the carbon content is restricted to a MAXIMUM of 0.03% (normal levels are 0.08% max. and in some grades can be as high as 0.15% max.). This lower level of carbon is usually used where "welding" will be performed. The lower level of carbon helps to prevent the chromium from being depleted (by forming chrome carbides at the weld site) and therefore allow it to remain over 10 ½% so it can form the "passive" oxide layer that gives stainless its corrosion resistance.

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10. What is the recycle content of stainless steel?

Answer: Stainless steel can be recycled 100%. That is all stainless steel can be re-melted to made a new stainless steel. The typical amount of recycled stainless steel "scrap" that is used to make new stainless steel is between 65 & 80%.

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11. The stainless steel on my refrigerator door, dishwasher, and/or countertop is scratched. How can I remove the scratches?

Answer: Scratches are difficult to remove. Most kitchen appliances, sinks, and counters have a polished finish with short directional polishing lines. Restoring a polished finish to its original appearance requires a professional such as a company that specializes in fabricating or polishing stainless steel. If the refrigerator or dishwasher door panel is replaceable, purchasing a new panel is normally more cost effective than professional refinishing. The homeowner may want to consider obtaining replacement panels with angel hair, distressed, swirl, or embossed finish. These finishes help to hide light scratching and can be obtained from companies that specialize in stainless steel finishes. Counters and appliance doors that are not easily removable must be refinished in place. When the counter is refinished, it may have long rather than short polishing lines. If a slightly different finish is acceptable and cost is a consideration, a homeowner can refinish the counter or appliance using a non-metallic abrasive pad such as a Scotch Brite® pad. This can be done by rubbing the surface with the pad using long uniform strokes in the same direction as the current polishing lines. This will not eliminate deep scratches. A professional may offer this finish as a less expensive option. The resulting finish is normally referred to as a hairline or long grain finish. Some appliance companies are starting to offer this finish.

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12. What is the "annealed" condition?

Answer: Stainless steel is usually sold in the "annealed" condition. It just means that the material is in the "soft" or annealed condition. The 300 series of stainless steels can not be hardened by heat treatment (like carbon steels) but can be hardened by cold working. This cold work can be eliminated by a heating treatment (annealing) that will restore the original soft condition.

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13. What does the term "CRES" mean?

Answer: CRES is something used to designate stainless steel. It stands for Corrosion RESistant steel. It does not necessarily mean that the steel is in fact stainless steel as there are other materials that are corrosion resistant but not stainless steel.

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14. Can stainless steel be used at very low and very high temperatures?

Answer: Yes. Stainless steel has excellent properties at both extremes of the temperature scale. Stainless steel can be used down to liquid nitrogen temperatures and up to about 1800° F.

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15. What are AISI Specifications for stainless steel?

Answer: The AISI (American Iron and Steel Institute) was the originator of the 300 and 400 series numbering system (i.e., Type 304 stainless steel). They also published a Stainless Steel products manual that listed these designations and the chemical analysis as well as most mechanical and physical properties of each individual grade. They are NOT specifications as such, just definitions of the individual grades. Most specifications that are used with stainless steel are from the ASTM (American Society for Testing Material). See "Specifications for Stainless Steel" for more information. The Iron & Steel Society took over from the AISI in publishing the Stainless Steel Products Manual a number of years ago.

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16. Can stainless steel be machined?

Answer: Yes. However the standard grades of stainless steel are usually "gummy" and will not produce a clean chip when machined or turned. To solve this problem, many companies produce "free-machining" grades of stainless where they add a "chip-breaker" to the matrix. Grade 303 is the free-machining equivalent to grade 304.

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17. I have a stainless steel kitchen with a tile floor and when the tile grout was cleaned with muratic acid the stainless discolored. How can I repair this problem?

Answer: The stainless steel that is used on kitchen appliances and vent hood etc. is usually type 304. This is a very good grade of stainless steel, but IT IS NOT RESISTANT TO MURATIC ACID. Cleaners that are used with grout around title and stone etc. SHOULD NOT BE USED IF STAINLESS STEEL IS PRESENT. It is not even necessary that the acid touch the stainless steel, just the "fumes" from it will cause a discoloration of the stainless.

The chances of repairing this discoloration depend on the extent of the discoloration and the depth of the attack. If possible the entire panel of stainless steel should be replaced. If that is not possible you can try to repair the damage by following the procedure for removing scratches.

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18. I have a stainless steel refrigerator and since some stainless steels are non-magnetic I cannot attach items to the surface magnetically. What is the best way to attach something to stainless steel?

Answer: We suggest "Remount Spray Adhesive" for temporary, light weight and repositional bonding. For stronger or more permanent bonding Super 77 (from 3M) is a good suggestion. Removal using 3M Citrus Base Adhesive Remover should easily take care of any residual adhesive. For more info:www.3m.com/us/mfg_industrial/adhesives/jhtml/wheretobuy.jhtml

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19. Who invented stainless steel?

Answer: Click here to access our History section.

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20. What is the best way to clean my stainless steel BBQ grill?

Answer: Check out "The Care and Cleaning of Stainless Steel" under Information Handbooks section.

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21. What are the standard finishes for stainless steel like 2B and #4?

Answer: Check out the "Standard Finishes" section for a description and visual comparison of all the standard finishes available.

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22. What is the difference between the "annealed" condition and the "dead soft" condition for stainless steel?

Answer: The usual "condition" that stainless steel products (sheets, plates, bars, wire etc.) are supplied to is the "annealed" condition. That means that the last operation is to heat the material up a temperature where the residual stresses of manufacturing can be relieved, and the material will be in the "soft" condition. Most flat rolled products however are made in coils and when a "sheet" is cut from the coil it is usually "flattened" which does add some small amount of stress to the material. Bar products are usually straightened and that adds some small amount of stress as well. The term "dead soft" usually refers to a product where the even this small amount of stress is removed, but as a practical matter, this condition is not readily available.

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23. Do you need to "preheat" stainless steel before welding?

Answer: NO. Austenitic stainless steel (the 300 series) do not need to be preheated before welding.

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24. What is the inch dimension for the various "gauges" that are sometime used?

Answer: The U.S. Standard Gauges for stainless steel have the following nominal thickness in inches:

Gauge	Thickness
10	0.141 in
11	0.125
12	0.109
14	0.078
16	0.063
18	0.050
20	0.038
22	0.031
24	0.025
26	0.019

28	0.016
32	0.010

However: It is always the best practice to order stainless steel products by the specific thickness in "inches" and NOT BY GAUGE NUMBERS.

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25. What is the "recycle" rate for stainless steel?

Answer: All stainless steel products are 100% recyclable. Many recycling companies will want the various grade types to be kept separate (all 300 series together etc.). The typical re-melt rate for stainless steel is between 60 and 85%.

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