



ALUMINUM FILLER METAL SELECTION CHART



Explanation of Relative Rating A, B, C, & D Filler metal property ratings A, B, C and D are relative values for welding base metals indicated in a specific box. An "A" rating is the best fit for the weldment property and "D" rating is the least fit. A "blank" rating indicates that the filler metal is not recommended for that specific weldment property application. All ratings listed are in the as welded condition. For post weld heat treatment (PWHT) ratings, refer to the table on the right.

Explanation of Ratings A, B, C, & D - Comparison Between Boxes Ratings have comparative meaning within a single box only. For example, an "A" rating in one box does not have any comparative value to an "A" rating in another box.

**Special Filler Metal Considerations Filler Metal 4943 4943 will provide substantially higher strength with comparable weldability and crack sensitivity when compared to 4043. This filler metal has an addition of Mg which provides it with higher as-welded strength without dependence on dilution from base material. It will also provide greater strength in components that are subjected to post weld heat treatment (solutionizing and/or precipitation hardening). Filler Metal 4047 4047 has a lower melting temperature, slightly higher shear strength, higher fluidity and reduced sensitivity to termination cracking when compared to 4043. It is often selected for leak-tight joints and may also make a good substitute for 4043 when welding other types of thin sections.

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Table with 11 columns: PROPERTY, WELD METAL PROPERTIES, CRACK SENSITIVITY, STRENGTH, DUCTILITY, CORROSION RESISTANCE, ELEVATED TEMPERATURE SERVICE, COLOR MATCH AFTER ANODIZING, POST WELD HEAT TREATMENT, TOUGHNESS, and a large grid of property ratings for various filler metals.

Main selection chart table with columns: METAL GROUPS, Pure Aluminum, Aluminum - Copper, Aluminum - Manganese, Aluminum - Magnesium, AL-Mg Si, AL - Zinc, AL - Castings, METAL GROUPS, FILLER METAL, BASE METAL, and WELD METAL PROPERTIES. Includes a detailed grid of ratings and a strength rating table for 5XXX series.

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Filler Metal Selection for Aluminum Welding

This chart is a tool that is designed to help you select the most appropriate filler metal, taking into consideration base metal, the application, and the desired weld metal properties.

How to use the Chart

- 1. Determine which of the weld metal properties are most important for your application. (Table located on far left)
2. Locate the base metal to be welded in the blue left hand column and in the blue row across the top of the chart.
3. Locate the white box where the base metal row and column intersect.
4. Examine the data in the white box and select the row that provides the best match for your application based on the weld metal properties. (There may be more than one filler metal that is acceptable.)
5. Once you identify the row that gives you the properties you need, follow that row to the left or right until you come to a gray box. The filler metal located in that row in the gray box is the most suitable match.
6. Economic Considerations: If there is more than one filler metal that meets the design criteria requirements, choose the most economical product. More than 85% of all aluminum filler metal that is used is 5356 or 4043. These two products are easily acquired and, because of their production volume the cost of these products is generally less than others.

Example: Welding 5454 base material that will be used as a support bracket for an industrial heater - This weldment will be subjected to sustained elevated temperature of 250 to 300 °F (121 to 149 °C).

- 1. As the welded component is operating at temperature above 150 °F (66 °C). Elevated TEMPERATURE is the most important weld metal property.
2. Left hand column 5454 (fifth from top), and top row 5454 (fifth from right).
3. See insert picture of intersecting row and column (On Right).
4. There is only one row that has a rating for elevated temperature.
5. For this particular application we only have one filler metal that is suitable for this application, and that is filler metal 5554. All the other filler metals within the box have a blank rating for elevated temperature which indicates that they are not suitable for this particular welding application.

Inset table showing the intersection of 5454 base metal and 5454 filler metal, resulting in a rating of A.

*5XXX Series Strength Ratings table showing Base Metal, Filler Metal, and Strength Rating for 5086, 5083, and 5456, 5383.