Aluminum Filler Alloy Chart

Ratings are given per top base alloy in the order of the characteristics W S D C T M ("-" = no rating in that position).

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951	6061 6070	7005 7021 7039 7046 710.0 711.0	413.0 443.0 444.0 356.0 A356.0 A357.0 359.0	319.0 333.0 354.0 355.0 C355.0 380.0	
Characteristics		W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	W S D C T M	
319.0 333.0 354.0 355.0 C355.0 380.0	2319*			B A A A A -	B A A A A -														2319*
	4043/4047*	A C B A A -	A C B A A -	C D C D A -	C D C D A -	A C B A A -	A C B A A -	A C B A A -	A C B A A -				A C B A A -	A C B A A -	A C B A A -	A - B A A -	A C B A A C		4043/4047*
	4009*	B B A A A -	B B A A A -	B C B C A -	B C B C A -	B B A B A -	B B A B A -	B B A B A -	B B A B A -				B B A B A -	B B A B A -	B B A B A -	B B A B A -	B B A A A A	B B A A A A	4009*
	4145*	A A B A A -	A A B A A -	A B C B A -	A B C B A -	A A B B A -	A A B B A -	A A B B A -							A A B B A -	A A B B A -	A A B A A B	A A B B A B	4145*
	5554							A A A A A -	A A A A A -			A A A A - -	B A A A A -	B A A A A -	B A A A A -				5554

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951	6061 6070	7005 7021 7039 7046 710.0 711.0	413.0 443.0 444.0 356.0 A356.0 A357.0 359.0	319.0 333.0 354.0 355.0 C355.0 380.0
413.0 443.0 444.0 356.0 A356.0 A357.0 359.0	4043/4047*	B B A A A -	B B A A A -	B B A A A -	B B A A A -	B B A A A -	A A A A A -	A A A A A -	A A A A A -					B B A A A -	B B A A A -	B B A A A -	A B A A A B	4043/4047*
	4145*	A A B B A -	A A B B A -	A A B A A -	A A B A A -	A A B B A -								A A B B A -	A A B B A -	A A B B A -	A A B B A B	4145*
	4008*																A A A A A A	4008*
	5554																	5554

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951	6061 6070	7005 7021 7039 7046 710.0 711.0	413.0 443.0 444.0 356.0 A356.0 A357.0 359.0
7005 7021 7039 7046 710.0 711.0	4043/4047*	A C C A A -	A C C A A -	B B A A A -	B B A A A -	A C C A A -	A D C B A -	A D C B A -	B D C B A -						A D C B A -	B D C B A -	4043/4047*
	4145*			A A B A A -	A A B A A -												4145*
	5183	B A B A - A	B A B A - A			B A B A - A	B A B A - A	B A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	5183
	5356	B B A A - A	B B A A - A			B B A A - A	B B A A - A	B B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	5356
	5554						C C A A A A	C C A A A A	B C A A A A			B C A A - A	B C A A A A	B C A A A A	B C A A A A	B C A A A A	5554
	5556	B A B A - A	B A B A - A			B A B A - A	B A B A - A	B A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	5556
	5654						C C A A - B	C C A A - A	B C A A - A			B C A A - A	B C A A - A	B C A A - A	B C A A - A	B C A A - A	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951	6061 6070	7005 7021 7039 7046 710.0 711.0
6061 6070	4043/4047*	A E C A A -	A E C A A -	B B A A A -	B B A A A -	A E C A A -	A - C A A -	A D C A A -	A D C A A -					A D C A A -	A C C A A -	4043/4047*
	4145*	A D D B A -	A D D B A -	A A B A A -	A A B A A -	A D D B A -	A D D B A -									4145*
	4643*													A D C A A -	A C C A A -	4643*
	5183	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	B A B - - A	A A B A - A	A A B A - A	A A B B - B	A A B B - B	B A B B - A	B A B B - B	5183
	5356	B B A - - A	B B A - - A			B B A - - A	B B A - - A	B B A - - A	B B A - - A	A B A A - A	A B A A - A	A B A B - A	A B A B - A	B B A B - A	B B A B - A	5356
	5554	B C A - B A	B C A - B A			B C A - B A	B C A - B A	B C A - B A	B C A - B A	B C A B - A	B C A B - A	B C A A - B	B C A A A B	C C A B B A	C B A B B B	5554
	5556	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	B A B - - A	A A B A - A	A A B A - A	A A B B - B	A A B B - B	B A B B - A	B A B B - B	5556
	5654							C C A B - A	C C A B - A	B C A B - A	B C A B - A	B C A A - A	B C A A - A	C C A B - B	C B A B - B	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951	6061 6070
6005 6060 6063 6101 6151 6351 6951	4043/4047*	A E C A A -	A E C A A -	B B A A A -	B B A A A -	A E C A A -	A - C A A -	A D C A A -	A D C A A -					A D C A A -	4043/4047*
	4145*	A D D B A -	A D D B A -	A A B A A -	A A B A A -	A D D B A -	A D D B A -								4145*
	4643*													A D C A A -	4643*
	5183	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	B A B - - A	A A B A - A	A A B A - A	B A B B - A	B A B B - A	B A B B - A	5183
	5356	B B A - - A	B B A - - A			B B A - - A	B B A - - A	B B A - - A	B B A - - A	A B A A - A	A B A A - A	B B A B - A	B B A B - A	B B A B - A	5356
	5554	B C A - B A	B C A - B A			B C A - B A	B C A - B A	B C A - B A	B C A - B A	B C A B - A	B C A B - A	C C A A - A	C C A A A A	C C A B B A	5554
	5556	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	B A B - - A	A A B A - A	A A B A - A	B A B B - A	B A B B - A	B A B B - A	5556
	5654							C C A B - A	C C A B - A	B C A B - A	B C A B - A	C C A A - B	C C A B - B	C C A B - B	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454	6005 6060 6063 6101 6151 6351 6951
5454	5183	A A B B - A	A A B B - A			A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	5183
	5356	A B A B - A	A B A B - A			A B A B - A	A B A B - A	A B A B - A	A B A B - A	A B A B - A	A B A B - A	A B A B - A	A B A B - A	5356
	5554	B C A A A A	B C A A A A			B C A A A A	B C A A A A	B C A A A A	C C A A A A	C C A A - A	C C A A - A	B C A A - A	B C A A A A	5554
	5556	A A B B - A	A A B B - A			A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	A A B B - A	5556
	5654								B C A B - A	B C A B - A	B C A B - A	B C A B - A	B C A B - A	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254	5454
511.0 512.0 513.0 514.0 5154 5254	5183	A A B B - A	A A B B - A			A A B B - A	A A B B - A	A A B B - A	A A B B - B	A A B A - A	A A B A - A	A A B B - B	5183
	5356	A B A B - A	A B A B - A			A B A B - A	A B A B - A	A B A B - A	A B A B - A	A B A A - A	A B A A - A	A B A B - A	5356
	5554	B C A A - A	B C A A - A			B C A A - A	B C A A - A	B C A A - A	C C A A - B	B C A A - A	B C A A - A	B C A A - B	5554
	5556	A A B B - A	A A B B - A			A A B B - A	A A B B - A	A A B B - A	A A B B - B	A A B A - A	A A B A - A	A A B B - A	5556
	5654	B C A A - B	B C A A - B			B C A A - B	B C A A - B	B C A A - B	B C A A - A	B C A A - B	B C A A - B	B C A A - A	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056	511.0 512.0 513.0 514.0 5154 5254
5086 5056	5183	A A B A - A	A A B A - A			A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	5183
	5356	A B A A - A	A B A A - A			A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	A B A A - A	5356
	5554								C C A A - A			5554
	5556	A A B A - A	A A B A - A			A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	5556
	5654								B C A A - B			5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456	5086 5056
5083 5456	5183	A A B A - A	A A B A - A			A A B A - A	A A B A - A	A A B A - A	A A B A - A	A (3) B A - A	5183
	5356	A B A A - A	A B A A - A			A B A A - A	A B A A - A	A B A A - A	A B A A - A	A - A A - A	5356
	5554								C C A A - A		5554
	5556	A A B A - A	A A B A - A			A A B A - A	A A B A - A	A A B A - A	A A B A - A	A A B A - A	5556
	5654								B C A A - B		5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052	5083 5456
5052	4043/4047*	A C C A A -	A C C A A -			A C C A A -	A C C A A -	A C C A A -	A D C B A -	4043/4047*
	5183	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	A A B C - B	5183
	5356	B B A - - A	B B A - - A			B B A - - A	B B A - - A	B B A - - A	A B A C - A	5356
	5554								C C A A A B	5554
	5556	B A B - - A	B A B - - A			B A B - - A	B A B - - A	B A B - - A	A A B C - B	5556
	5654								B C A B - A	5654

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050	5052
5005 5050	1100	C E A A A A	C E A A A A			C - A A A A		B - A A A A	1100
	4043/4047*	A D D A A -	A D D A A -			A D D A A -	A C C A A -	A C D A A -	4043/4047*
	4145*	B C E B A -	B C E B A -			B C E B A -			4145*
	5183	C A C - - B	C A C - - B			C A C C - B	B A B - - A	B A C - - B	5183
	5356	C B B - - B	C B B - - B			C B B C - B	B B A - - A	B B B - - B	5356
	5556	C A C - - B	C A C - - B			C A C C - B	B A B - - A	B A C - - B	5556

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004	5005 5050
3004	1100	D E A A A A	D E A A A A			D - A A A A		1100
	4043/4047*	A D D A A -	A D D A A -			A D D A A -	A D D A A -	4043/4047*
	4145*	B C E B A -	B C E B A -			B C E B A -		4145*
	5183	C A C - - B	C A C - - B			C A C - - B	B A C C - A	5183
	5356	C B B - - B	C B B - - B			C B B - - B	B B B C - A	5356
	5554						C C A B A A	5554
	5556	C A C - - B	C A C - - B			C A C - - B	B A C C - A	5556

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003	3004
3003	1100	C C A A A A	C C A A A A			- C A A A A	1100
	4043/4047*	B B B A A -	B B B A A -	B B A A A -	B B A A A -	B B B A A -	4043/4047*
	4145*	A A C B A -	A A C B A -	A A B A A -	A A B A A -	A A C B A -	4145*

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219	3003
2219	2319*			B A A A A A	A A A A A A	2319*
	4043/4047*	B B A A A -	B B A A A -	B C B C A -	- C B C A -	4043/4047*
	4145*	A A B A A -	A A B A A -	A B C B A -	- B C B A -	4145*

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036	2219
2014 2036	2319*			C A A A A A	2319*
	4043/4047*	B B A A A -	B B A A A -	B C B C A -	4043/4047*
	4145*	A A B A A -	A A B A A -	A B C B A -	4145*

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100	2014 2036
1100	1100	B B A A A A	B B A A A A	1100
	4043/4047*	A A B A A -	A A B A A -	4043/4047*

Base Alloys	Filler Alloys	1060 1070 1080 1350	1100
1060 1070 1080 1350	1100	B B A A A B	1100
	1188	C C A A A A	1188
	4043/4047*	A A B A A -	4043/4047*

How To Use This Chart

1. Select base alloys to be joined (one from the side blue column, the other from the top blue row).
2. Find the block where the column and row intersect.
3. This block contains horizontal rows of letters (A, B, C or D) representative of the alloy directly across from them in the filler alloy box at the end of each row. The letters in each line give the A-to-D rating of the characteristics listed at the top of each column – W, S, D, C, T and M (see Legend at right for explanation of each letter).
4. Analyze the weld characteristics afforded by each filler alloy. You will find that you can "trade off" one characteristic for another until you find the filler that best meets your needs.

Example

If joining base alloys 6061 and 5086; first find the box where the 6061 row and the 5086 column intersect. Then notice that there are no ratings for filler alloys 4043/4047, 4145 or 4643 – this means they are not usually recommended for this base combination.

Filler alloy 5356 has an "A" rating for ductility, but a "B" rating for strength. However, alloy 5556 has an "A" rating for strength, but a "B" rating for ductility. Therefore, it must be decided which attribute has the highest priority.

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SYMBOL	CHARACTERISTIC
W	**Ease of welding** Relative freedom from weld cracking.
S	**Strength of welded joint** (as-welded condition) Rating applies particularly to fillet welds. All rods & electrodes rated should develop presently specified minimum strengths for butt welds.
D	**Ductility** Rating is based upon the free bend elongation of the weld.
C	**Corrosion resistance** in continuous or alternate immersion in fresh or salt water.
T	Recommended for service at **sustained temperatures** above 150°F (65.5°C).
M	**Color match** after anodizing.
A, B, C, & D are relative ratings in decreasing order of merit. The ratings have relative meaning only within a given block.	

**NOTES:*
(1) Combinations having no rating are not usually recommended.

(2) The following filler alloys are heat-treatable and can produce higher strength weldments after postweld solution heat treatment and aging: 206, 357, 2319, 4008, 4009, 4145, and 4643.

(3) An "A" rating for alloy 5083 to 5083 and 5083 to 5456. No rating for alloy 5456 to 5456.

(4) 4047 can be used in lieu of 4043. Alloy 4047 provides increased fluidity for welding leak-tight joints, minimizes solidification cracking, and has a slightly higher fillet weld shear strength.

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