

ADDENDUM TO 2018 TAN SHEETS

Tempers for Aluminum and Aluminum Alloy Products Metric Edition

December 10, 2020

New and Revised Registrations Since Publication of 2018 Tan Sheets											
Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in ²¹		Remarks ²
Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
2043-T85	Universal Alloy	02/07/2019	Extrusion	1.00	6.30	*Min ⁶	525	485	6	-	*Tentative Cross-sectional area less than or equal to 15000 mm ² and circle size less than or equal to 410 mm. Solution heat treated and cold worked in the range 3-6% and artificially aged. <u>Stress Corrosion Resistance</u> For ST specimens taken from section thicknesses 20 mm and greater, See footnote 4b. <u>Exfoliation Corrosion Resistance</u> See footnote 15b. Note: ASTM G85 Annex A2 Dry-Bottom MASTMAASIS Method for 2 weeks.
				6.30	12.50	*Min ⁶	540	505	7	-	
				12.50	25.00	*Min ⁶	550	515	-	6	
				25.00	60.00	*Min ⁶	565	540	-	6	
2050 T34	Constellium	01/25/16 Revised 08/04/17 Revised 02/01/2019	Plate	12.50	165.00	Min ⁹	345	235	-	15	Solution heat treated and cold worked 3-4.5%.
2081-T84	Kaiser	11/16/2018	Plate	25.00	50.00	*Min ⁶	525	505	-	7	*Tentative Solution heat treated and cold worked 2-5%.
						*Min ⁹	525	485	-	6	
				50.00	76.00	*Min ⁶	510	490	-	5	
						*Min ⁹	515	470	-	5	
				*Min ¹⁰	495	425	-	2			
				*Min ⁶	505	485	-	5			
				*Min ⁹	510	460	-	3			
				*Min ¹⁰	490	425	-	2			
2397-T87	Alcoa	02/12/2003 Revised 08/17/2005	Plate	80.00	100.00	Min ⁶	425	395	-	4	<u>Stress Corrosion Resistance</u> See footnote 4.b.
						Min ⁹	425	395	-	4	
	Revised Arconic	Revised 08/02/2018				Min ¹⁰	415	370	-	1.5	

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
											Fracture Toughness ¹⁴ – Min K _{IC} For thickness over 80.00 thru 100.00 L-T direction 34 MPa√m T-L direction 30 MPa√m S-L direction 22 MPa√m
6061-T651	Constellium	09/09/2019	Plate	152.00	203.00	*Min ⁹	290	250	-	8	*Tentative
				203.00	254.00	*Min ⁹	280	235	-	7	
				254.00	305.00	*Min ⁹	275	220	-	7	
7048-T6511	Kaiser	04/08/2020	Extrusion	1.00	3.20	Min ⁵	465	435	10	-	
7055-T76511	Alcoa Revised Arconic	01/15/2001 Revised 06/20/2007 Revised 08/14/2020	Extruded Rod, Bar & Profiles	-	6.30	Min ⁶	615	585	7	-	Exfoliation Corrosion Resistance See footnote 15.b.
				6.30	12.50	Min ⁶	620	585	9	-	For thickness up thru 12.50 mm Cross Sectional Area 7700 square mm max. and Circle Size 250 mm max.
				12.50	80.0	Min ⁶	625	595	-	8	For thickness 12.50 – 80.0 mm Cross Sectional Area 17000 square mm max. and Circle Size 390 mm max.
											Longitudinal Compressive Yield Strength: 600 MPa
7160-T7351	Constellium	11/08/2018 Revised 02/06/2020	Plate	25.00	40.00	Min ⁶ Min ⁹	510 510	460 450	- -	11 10	Stress Corrosion Resistance See footnote 4e.
				40.00	50.00	Min ⁶ Min ⁹	505 505	460 450	- -	11 10	Fracture Toughness ¹⁴ – Min K _{IC} or K _Q For thicknesses 25.00 thru 80.00 mm L-T direction 44 MPa√m T-L direction 37 MPa√m
				50.00	80.00	Min ⁶ Min ⁹ Min ¹⁰	495 505 485	450 440 405	- - -	10 9 5	For thicknesses 50.00 thru 80.00 mm L-T direction 49 MPa√m T-L direction 36 MPa√m S-L direction 38 MPa√m

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in ²¹		Remarks ²
Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
				80.00	100.00	Min ⁶ Min ⁹ Min ¹⁰	490 495 485	440 435 400	- - -	10 8 4	For thicknesses 80.00 thru 100.00 mm L-T direction 42 MPavm T-L direction 33 MPavm S-L direction 37 MPavm
				100.00	120.00	Min ⁶ Min ⁹ Min ¹⁰	485 495 475	440 425 400	- - -	10 7 4	For thicknesses 100.00 thru 120.00 mm L-T direction 40 MPavm T-L direction 30 MPavm S-L direction 34 MPavm
				120.00	150.00	Min ⁶ Min ⁹ Min ¹⁰	485 490 470	435 420 400	- - -	10 6 3	For thicknesses 120.00 thru 150.00 mm L-T direction 31 MPavm T-L direction 27 MPavm S-L direction 29 MPavm
7160-T7451	Constellium	11/02/2018	Plate	25.00	40.00	*Min ⁶ *Min ⁹	530 525	490 475	- -	12 11	*Tentative <u>Stress Corrosion Resistance</u> See footnote 4b.
				40.00	50.00	*Min ⁶ *Min ⁹ *Min ¹⁰	530 525 505	490 475 440	- - -	12 10 5	<u>Fracture Toughness¹⁴</u> – Min K _{IC} or K _Q For thicknesses 25.00 thru 40.00 mm
				50.00	80.00	*Min ⁶ *Min ⁹ *Min ¹⁰	515 515 505	475 470 440	- - -	11 10 5	L-T direction 37 MPavm T-L direction 32 MPavm
				80.00	100.00	*Min ⁶ *Min ⁹ *Min ¹⁰	505 515 495	470 460 425	- - -	11 9 4	For thicknesses 40.00 thru 50.00 mm L-T direction 37 MPavm T-L direction 32 MPavm
				100.00	120.00	*Min ⁶ *Min ⁹ *Min ¹⁰	495 510 485	460 455 420	- - -	10 8 3	For thicknesses 50.00 thru 80.00 mm L-T direction 35 MPavm T-L direction 30 MPavm S-L direction 31 MPavm
				120.00	150.00	*Min ⁶ *Min ⁹	495 505	- -	- -	9 5	

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in ²¹		Remarks ²
Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
						*Min ¹⁰	475	455 450 420	- -	2	For thicknesses 80.00 thru 100.00 mm L-T direction 33 MPaVm T-L direction 27 MPaVm S-L direction 30 MPaVm For thicknesses 100.00 thru 120.00 mm L-T direction 31 MPaVm T-L direction 26 MPaVm S-L direction 29 MPaVm For thicknesses 120.00 thru 150.00 mm L-T direction 29 MPaVm T-L direction 24 MPaVm S-L direction 27 MPaVm
7160-T7651	Constellium	12/05/2017 Revised 12/19/2018	Plate	25.00	40.00	Min ⁶ Min ⁹	545 540	510 495	- -	11 11	<u>Stress Corrosion Resistance</u> See footnote 4a.
				40.00	50.00	Min ⁶ Min ⁹ Min ¹⁰	540 540 515	510 495 455	- - -	10 10 5	<u>Fracture Toughness¹⁴</u> – Min K _{IC} or K _Q For thicknesses 25.00 thru 50.00 mm L-T direction 37 MPaVm T-L direction 32 MPaVm
				50.00	80.00	Min ⁶ Min ⁹ Min ¹⁰	525 530 510	495 490 450	- - -	10 10 4	For thicknesses 50.00 thru 80.00 mm L-T direction 35 MPaVm T-L direction 30 MPaVm S-L direction 32 MPaVm
				80.00	100.00	Min ⁶ Min ⁹ Min ¹⁰	515 530 505	495 485 440	- - -	10 9 4	For thicknesses 80.00 thru 100.00 mm L-T direction 32 MPaVm T-L direction 29 MPaVm S-L direction 31 MPaVm
				100.00	120.00	Min ⁶ Min ⁹ Min ¹⁰	510 525 505	490 475 440	- - -	10 8 4	

Unless specified below, for all referenced footnotes refer to the Yellow and/or Tan Sheets as applicable.

FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in ²¹		Remarks ²
Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
				120.00	150.00	Min ⁶ Min ⁹ Min ¹⁰	510 515 495	485 470 435	- - -	9 7 4	For thicknesses 100.00 thru 120.00 mm L-T direction 27 MPa _v m T-L direction 26 MPa _v m S-L direction 29 MPa _v m For thicknesses 120.00 thru 150.00 mm L-T direction 24 MPa _v m T-L direction 25 MPa _v m S-L direction 26 MPa _v m
7085-T711	Alcoa Revised Arconic	10/25/2011 Revised 08/02/2018	Plate	12.50	40.00	Min ⁹	550	510	-	10	Solution heat treated, stretched 1.5 to 3%, and overaged for ballistic performance.
				40.00	50.00	Min ⁹	540	505	-	10	
				50.00	80.00	Min ⁹	530	495	-	9	Over 12.50 thru 80.00 plate meets armor plate requirements of MIL-DTL-32375 (MR) Class I Type A.
				80.00	100.00	Min ⁹	525	485	-	6	<u>Exfoliation Corrosion Resistance</u> See footnote 15.b.
7085-T721	Alcoa Revised Arconic	10/27/2011 Revised 08/02/2018	Plate	12.50	40.00	Min ⁹	470	415	-	10	Solution heat treated, stretched 1.5 to 3%, and overaged for blast performance.
				40.00	50.00	Min ⁹	460	405	-	10	
				50.00	80.00	Min ⁹	460	400	-	10	Over 12.50 thru 80.00 plate meets armor plate requirements of MIL-DTL-32375 (MR) Class I Type B.
				80.00	100.00	Min ⁹	455	395	-	9	<u>Exfoliation Corrosion Resistance</u> See footnote 15.b.

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FN 4.b. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: b. 240 MPa.

FN 4.e. Material shall be capable of passing the stress corrosion cracking test described in ASTM G47 when stressed to: e. 310 MPa.

FN 15.b. Material shall be capable of demonstrating exfoliation corrosion resistance. Exfoliation corrosion resistance shall be determined in accordance with ASTM G34 and material shall not exhibit exfoliation corrosion greater than that illustrated by Photo EB, Figure 2. The applicable sample plane for testing is indicated by one of the following locations: b. At the T/10 plane.

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Registered			Product	Thickness, mm		Tensile Strength, MPa			Elongation Percent in ²¹		Remarks ²
Alloy Temper	By	Date		Over	Thru	Basis ¹	Ult.	Yield	50 mm	5D or 5.65 √A	
7099-T731	Kaiser	03/13/2020	Plate	50.00	80.00	*Min ⁹	470	400	-	10	*Tentative Solution heat treated, stretched 1.5 to 3%, and artificially aged to meet armor plate requirements. Developed to meet armor plate requirements of MILDTL-32375 (Revision B Amendment 2). <u>Exfoliation Corrosion Resistance</u> See footnote 15.b.
A206-T4	Eck Industries	09/14/2020	Sand Casting	-	-	Min	350	215	9	-	Properties are from separate standard cast coupons.
A206-T7	Eck Industries	09/14/2020	Sand Casting	-	-	Min	345	240	2	-	Properties are from separate standard cast coupons.
E357-T6	Eck Industries	02/17/2017	Sand Casting	-	-	Min	276	234	1	-	Values represent properties obtained from separately cast bars and are derived from ASTM B-26, Standard Specification for Aluminum-Alloy Sand Castings.

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Tentative Removed			
Alloy Temper	Product	By	Revised Date
2397-T87	Plate	Arconic	08/02/2018
7085-T711	Plate	Arconic	08/02/2018
7085-T721	Plate	Arconic	08/02/2018
7160-T7351	Plate	Constellium	02/06/2020
7160-T7651	Plate	Constellium	12/19/2018
2050-T34	Plate	Constellium	02/01/2019

Deactivated Registrations		
Alloy Temper	Product	Date Deactivated
Alclad 2024-O ²	Sheet & Plate	04/11/2018
Alclad 2024-T351 ²	Plate	04/11/2018
Alclad 2024-T42 ²	Sheet & Plate	04/11/2018
1 ½% Alclad 2024-O ²	Sheet & Plate	04/11/2018
1 ½% Alclad 2024-T351 ²	Plate	04/11/2018
1 ½% Alclad 2024-T42 ²	Sheet & Plate	04/11/2018

**Deactivation is limited to specific gauge range(s) for the product indicated

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