

Angles & Flats

Stainless Steel Angles and Flats are produced by hot-rolling.

After fully annealed, they are subjected to special chemical treatment for descaling, which gives the products the following advantages:

1. Clean and silverly coloured surface.
2. Smooth and tight skinned surface by this descaling process, which enables to achieve fine surface finish by polishing.
3. Excellent corrosion resistance and bending quality by full annealing.

Hot rolled stainless steel angles and flats are superior to cold formed products with regard to minimum internal stress, better corrosion resistance and lower cost.

For applications where the corrosion resistance after welding is essential, Extra Low Carbon Stainless Steel Angles and Flats (Ex. AISI 304 L, 316 L) is particularly recommended.

CHEMICAL COMPOSITION AISI, ASTM A276-78

Type	C max.	Mn max.	P max.	S max.	Si max.	Cr	Ni	Mo	Ti
302	0.15	2.0	0.045	0.03	1.0	17.0 - 19.0	8.0 - 10.0	--	
304	0.08	2.0	0.045	0.03	1.0	18.0 - 20.0	8.0 - 10.5	--	
304L	0.03	2.0	0.045	0.03	1.0	18.0 - 20.0	8.0 - 12.0	--	
316	0.08	2.0	0.045	0.03	1.0	16.0 - 18.0	10.0 - 14.0	2.0 - 3.0	
316L	0.03	2.0	0.045	0.03	1.0	16.0 - 18.0	10.0 - 14.0	2.0 - 3.0	
321	0.08	2.0	0.045	0.03	1.0	17.0 - 19.0	9.0 - 12.0	--	5 x C min.
430	0.12	1.0	0.040	0.03	1.0	16.0 - 18.0	--	--	

Angles & Flats

TYPICAL CHARACTERISTICS FOR CHEMICAL COMPOSITION

AISI	Typical Characteristics
302	Basic, general purpose type of non-magnetic, austenite stainless steel with good corrosion resistance and mechanical properties. Retains ductility and impact strength at low temperature. Good cold workability.
304	Low carbon variation of TYPE 302. Superior corrosion resistance and weldability to TYPE 302. Widely used for general purposes as well as parts fabricated by welding.
304L	Extra low carbon eliminates the harmful carbide precipitation due to welding. Suitable for applications where post-weld annealing is unpracticable.
316	Additional of Molybdenum strengthens corrosion resistance to reducing acids such as sulphuric, acetic, phosphoric and chloric acid. Improved pitting resistance and superior creep strength at high temperature to TYPE 302, 304. Used for various chemical industries such as pulp-, photograph-, dye-, textile-, fertilizer industry.
316L	Extra low carbon eliminates the harmful carbide precipitation due to welding. Suitable for applications where post-weld annealing is unpracticable and which are used in severely corrosive atmosphere.
321	Addition of Titanium prevents intergranular corrosion due to welding. Strong creep strength at high temperature. Can be used at high temperature (800 - 1500°F).
430	Typical ferritic stainless steel, magnetic. Superior corrosion resistance to TYPE 410. Suitable for applications used in weak corrosive atmosphere, kitchen equipment and utensils.

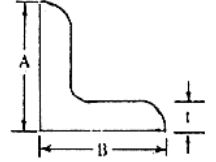
MECHANICAL PROPERTIES

ASTM A276-78

Type	Condition	Size	Tension Test			
			Y.S (0.2%) p.s.i.	T.S p.s.i.	EL. (2 in.) %	RA %
302	annealed	all	min. 30,000	min. 75,000	min. 40	min. 50
304	annealed	all	30,000	75,000	40	40
304L	annealed	all	25,000	70,000	40	50
316	annealed	all	30,000	75,000	40	50
316L	annealed	all	25,000	70,000	40	50
321	annealed	all	30,000	75,000	40	50
430	annealed	all	40,000	70,000	20	45

Angle

Sizes and Unit Weights



IMPERIAL UNITS: APPROX. WT. LBS/FT

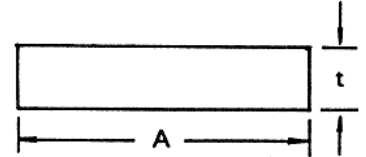
Legs (A x B) in.	Thickness (t) in.					
	1/8	3/16	1/4	5/16	3/8	1/2
3/4 x 3/4	0.599	0.856				
1 x 1	0.814	1.18	1.52			
1 1/4 x 1 1/4	1.03	1.51	1.96			
1 1/2 x 1 1/2	1.25	1.83	2.39			
2 x 2	1.68	2.49	3.26	4.00	4.73	
2 1/2 x 2 1/2		3.13	4.14	5.08	6.02	
3 x 3			5.01	6.19	7.34	9.57
3 1/2 x 3 1/2			5.88	7.27	8.63	11.30
4 x 4			6.75	8.35	9.95	13.00

METRIC UNITS: APPROX. WT. KG/M

Legs (A x B) mm	Thickness (t) mm										
	3	4	5	6	7	8	9	10	11	12	13
20 x 20	0.908	1.16	1.41								
25 x 25	1.15	1.48	1.81	2.12							
30 x 30	1.39	1.80	2.21	2.58							
35 x 35	1.64	2.13	2.62	3.00							
40 x 40	1.88	2.45	3.03	3.56							
50 x 50	2.41	3.14	3.87	4.55			6.60	7.26			
60 x 60			4.68	5.53	6.39						
65 x 65			5.13	6.07	6.98	7.87	8.78	9.67			
70 x 70				6.55	7.54	8.51	9.50	10.5			
75 x 75				7.03	8.11	9.16	10.2	11.3	12.3	13.3	14.3
80 x 80				7.52	8.67	9.80	11.0	12.0	13.2	14.3	15.4
90 x 90				8.53	9.85	11.1	12.5	13.7	15.0	16.2	17.5
100 x 100				9.50	11.0	12.4	13.9	15.3	16.7	18.2	19.5

Flat

Sizes and Unit Weights



IMPERIAL UNIT: APPROX. WT. LBS/FT

Width (A) in.	Thickness (t) in.								
	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
1/2	0.217	0.326							
5/8	0.272	0.408	0.543						
3/4	0.326	0.489	0.652	0.816	0.979	1.30			
1	0.435	0.652	0.87	1.09	1.30	1.74	2.18	2.61	
1 1/4	0.544	0.816	1.09	1.36	1.63	2.18	2.72	3.26	
1 1/2	0.653	0.979	1.30	1.63	1.96	2.61	3.26	3.92	5.22
1 3/4	0.761	1.14	1.52	1.90	2.28	3.04			6.09
2	0.87	1.30	1.74	2.18	2.61	3.48	4.35	5.22	6.96
2 1/2	1.09	1.63	2.18	2.72	3.26	4.35	5.44	6.52	8.70
3		1.96	2.61	3.26	3.91	5.22	6.52	7.83	10.40
3 1/2			3.04	3.81	4.57	6.09	7.61	9.14	12.20
4			3.48	4.35	5.22	6.96	8.70	10.40	13.90

METRIC UNIT: APPROX. WT. KG/M

Width (A) mm	Thickness (t) mm											
	3	4	5	6	8	9	10	12	13	15	20	25
12	0.29			0.58								
13	0.314	0.419										
14	0.339	0.451	0.564	0.677								
15	0.363	0.484	0.604									
16	0.387	0.516	0.645	0.774								
20	0.484	0.645	0.806	0.967	1.29	1.45	1.61	1.93				
25	0.604	0.806	1.01	1.21	1.61	1.81	2.02	2.42	2.62	3.02	4.03	
30	0.725	0.967	1.21	1.45	1.93	2.18	2.42	2.90	3.14	3.63	4.84	
35	0.846	1.13	1.41	1.69	2.26	2.54	2.82	3.39	3.67	4.23	5.64	
40	0.967	1.29	1.61	1.93	2.58	2.90	3.22	3.87	4.19	4.84	6.45	8.06
45	1.09	1.45	1.81	2.18	2.90	3.26	3.63	4.35	4.72			9.07
50	1.21	1.61	2.02	2.42	3.22	3.63	4.03	4.84	5.24	6.04	8.06	10.1
60			2.42	2.90	3.87	4.35	4.84	5.80	6.29	7.25	9.67	12.1
65			2.62	3.14	4.19	4.72	5.24	6.29	6.81	7.86	10.5	13.1
70			2.82	3.39	4.51	5.08	5.64	6.77	7.33	8.46	11.3	14.1
75			3.02	3.63	4.84	5.44	6.04	7.25	7.86	9.07	12.1	15.1
80				3.87	5.16	5.80	6.45	7.74	8.38	9.67	12.9	16.1
90				4.35	5.80	6.38	7.25	8.70	9.43	10.9	14.5	18.1
100				4.84	6.45	7.25	8.06	9.67	10.5	12.1	16.1	20.2