

ALLOY: 1050A

CHEMICAL COMPOSITION											
%	S	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.											99.50
Max.	0.25	0.40	0.05	0.05	0.05		0.07	0.05	0.03		

ALLOY: HA 105011

(normal quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	65	95	80	20	30	20	30	0 t	0 t	20
	0.5	1.5	65	95	80	20	30	22	34	0 t	0 t	20
	1.5	3.0	65	95	75	20	30	26	40	0 t	0 t	20
H12	≥0.3	0.5	85	125	105	65	100	2	4	0.5 t	0 t	28
	0.5	1.5	85	125	100	65	95	4	6	0.5 t	0 t	28
	1.5	3.0	85	125	95	65	90	5	8	0.5 t	0.5 t	28
H14	≥0.3	0.5	105	145	125	85	120	2	3	1 t	0 t	34
	0.5	1.5	105	145	115	85	110	3	4	1 t	0.5 t	34
	1.5	3.0	105	145	110	85	105	4	7	1 t	1 t	34
	3.0	4.0	105	145	130	85	125	5	10		1.5 t	34
H16	≥0.3	0.5	120	160	135	100	125	1	2		0.5 t	39
	0.5	1.5	120	160	135	100	125	2	3		1 t	39
	1.5	3.0	120	160	140	100	130	3	6		1.5 t	39
H18	≥0.3	0.5	140		165	120	150	1	2		1 t	42
	0.5	1.5	140		155	120	145	2	3		2 t	42
	1.5	2.5	140		150	120	140	2	3		3 t	42
H19	≥0.3	0.5	150		185	130	170	1	2			
	0.5	1.5	150		180	130	165	1	2			

* For information only

ALLOY: 1050A

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.											99.50
Max.	0.25	0.40	0.05	0.05	0.05		0.07		0.03		

ALLOY: HA 105014

(deep drawing quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend Radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	65	95	85	20	25	25	35	0 t	0 t	20
	0.5	1.25	65	95	80	20	35	30	40	0 t	0 t	20
H12	≥0.3	0.5	85	125	105	65	95	2	4	0 t	0 t	28
	0.5	1.5	85	125	105	65	95	4	6	0 t	0 t	28
	1.5	2.3	85	125	105	65	95	5	8	0 t	0 t	28
H14	≥0.3	0.5	105	145	125	85	120	2	3	1 t	0 t	34
	0.5	1.8	105	145	125	85	120	3	4	1 t	0 t	34

* For information only

General information:

1. Deep drawing quality in soft temper, thickness up to and including 1.25 mm, is supplied in alloy HA 105014.
2. Soft temper: Grain size = max. 150 microns.
Earing = max. 5%.

ALLOY: EN 1200A

CHEMICAL COMPOSITION										
%	Si+Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
								Each	Total	
Min.										99.00
Max.	1.00	0.10	0.30	0.30	0.10	0.10		0.05	0.15	

ALLOY: HA 120011

(normal quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	75	105	90	25	40	19	30	0 t	0 t	23
	0.5	1.5	75	105	90	25	40	21	32	0 t	0 t	23
	1.5	3.0	75	105	85	25	40	24	34	0 t	0 t	23
H12	≥0.3	0.5	95	135	120	75	110	2		0.5 t	0 t	31
	0.5	1.5	95	135	120	75	110	4		0.5 t	0 t	31
	1.5	3.0	95	135	115	75	110	5		0.5 t	0.5 t	31
H14	≥0.3	0.5	115	155	140	95	130	2	3	1 t	0 t	37
	0.5	1.5	115	155	135	95	125	3	5	1 t	0.5 t	37
	1.5	3.0	115	155	130	95	125	4	6	1 t	1 t	37
	3.0	4.0	115	155	130	95	125	5	7	1.5 t	1.5 t	37
H16	≥0.3	0.5	130	170	160	115	155	1	2		0.5 t	42
	0.5	1.5	130	170	155	115	145	2	3		1 t	42
	1.5	3.0	130	170	155	115	145	3	4		1.5 t	42
H18	≥0.3	0.5	150		200	130	190	1	2		1 t	45
	0.5	1.5	150		195	130	185	2	3		2 t	45
	1.5	2.5	150		180	130	170	3	3		3 t	45
H19	≥0.3	0.5	160			140		1				48
	0.5	1.5	160			140		1				48
H24	≥0.3	0.5	115	155	140	90	130	3	10	1 t	0 t	37
	0.5	1.5	115	155	130	90	120	4	12	1 t	0.5 t	37
H26	≥0.3	0.5	130	170	150	105	140	2	8		0.5 t	41
	0.5	1.5	130	170	150	105	140	3	10		1 t	41

* For information only

ALLOY: EN 1200A

CHEMICAL COMPOSITION										
%	Si+Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
								Each	Total	
Min.										99.00
Max.	1.00	0.10	0.30	0.30	0.10	0.10		0.05	0.15	

ALLOY: HA 120014

(deep drawing quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend Radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	75	105		25		19		0 t	0 t	23
	0.5	1.5	75	105	90	25	35	28	36	0 t	0 t	23
	1.5	3.7	75	105	85	25	40	30	38	0 t	0 t	23
H12	≥0.3	0.5	95	135	120	75	110	2		0.5 t	0 t	31
	0.5	1.5	95	135	120	75	110	4		0.5 t	0 t	31
	1.5	2.3	95	135	120	75	110	5		0.5 t	0.5 t	31
H14	≥0.3	0.5	115	155	140	95	130	2	3	1 t	0 t	37
	0.5	1.8	115	155	140	95	130	3	5	1 t	0.5 t	37

* For information only

General information:

1. Deep drawing quality in soft temper, thickness up to and including 1.25 mm, is supplied in alloy HA 105014.
2. Soft temper: Grain size = max. 150 microns.
Earing = max. 5% for thickness 0.3 - 2.0 mm.

ALLOY: EN 3105

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.				0.30	0.20						Rest
Max.	0.6	0.7	0.30	0.8	0.8	0.20	0.40	0.10	0.05	0.15	

ALLOY: HA 310515

(normal quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	115	165		45		12		0 t	0 t	33
	0.5	1.5	115	165	140	45	60	14	22	0 t	0 t	33
	1.5	2.5	115	165		45		16		1 t	0.5 t	33
H12	≥0.3	1.5	115	145	125	95	120	4	6	1 t	0.5 t	32
	1.5	2.5	115	145	125	95	120	6	8	1 t	1 t	32
H14	≥0.3	1.5	130	180	150	120	140	2	3	2 t	0.5 t	36
	1.5	3.5	130	180	150	120	140	3	4	2 t	1 t	36
H22	≥0.3	1.50	130	180	155	120	145	7	15	0 t	0 t	38
H24	≥0.3	1.50	150	200	165	145	155	6	12	1 t	0.5 t	40

* For information only

ALLOY: EN 3105 B

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.				0.30	0.20						Rest
Max.	0.7	0.9	0.30	0.9	0.8	0.20	0.50	0.10	0.05	0.15	

ALLOY: HA 310516 / HA 310517

(normal quality, soft and temper rolled)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0 ¹⁾	≥0.3	0.5	100	155	120	40	50	14	24	0 t	0 t	31
	0.5	1.5	100	155	120	40	50	15	24	0 t	0 t	31
	1.5	2.5	100	155	120	40	50	17	24	0.5 t	0 t	31
H12	≥0.3	0.5	130	180	150	105	145	3	6	1.5 t	0 t	41
	0.5	1.5	130	180	150	105	130	4	7	1.5 t	0.5 t	41
	1.5	3	130	180	150	105	130	4	8	1.5 t	0 t	41
H14	≥0.3	0.5	150	200	160	130	145	2	4	2.5 t	0 t	48
	0.5	1.5	150	200	160	130	145	2	5	2.5 t	0.5 t	48
	1.5	3	150	200	160	130	145	2	6	2.5 t	1 t	48
H16	≥0.3	0.5	175	225	200	160	185	1	3		1 t	55
	0.5	1.5	175	225	200	160	180	2	4		1 t	55
	1.5	3	175	225	200	160	175	2	4		1 t	55
H18	≥0.3	0.5	195		220	180	210	1	2			61
	0.5	1.5	195		220	180	200	1	3			61
H19	≥0.3	0.5	215		280	190	250	1	3			64
	0.5	1.5	215		250	190	230	1	4			64

* For information only

1) Can be produced in H60

ALLOY: EN 3105 B

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.				0.30	0.20						Rest
Max.	0.7	0.9	0.30	0.9	0.8	0.20	0.50	0.10	0.05	0.15	

ALLOY: HA 310516 / HA 310517

(normal quality, temper annealed)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
H24	≥0.3	1.5	150	200	185	120	170	8	12	0.5 t	0 t	50
H25	≥0.3	1.5	170	210	195	150	180	7	11	0.5 t	0 t	53
H26	≥0.3	1.5	175	225	200	150	190	6	9	1 t	0.5 t	55
H27	≥0.3	1.5	190	240	210	170	200	4	7	1 t	0.5 t	56
H28	≥0.3	1.5	195	240	225	170	215	3	6	2.5 t	1.5 t	60
H29	≥0.3	1.5	220	260	255	200	245	2	4			64
H60 ¹⁾	≥0.3	1.5	100	155	130	40	85	15	24	0 t	0 t	32
H62 ²⁾	≥0.3	0.5	110	165	140	80	135	5	8	0 t	0 t	36
	0.5	1.5	110	165	135	70	130	6	9	0 t	0 t	36
	1.5	3	110	165	130	70	125	7	10	0 t	0 t	36
H66 ³⁾	≥1.5	3.2	175	225	195	150	185	5	8	2 t	1 t	52
H68 ³⁾	≥1.5	2.5	195	240	205	175	195	4	6	2.5 t	1.5 t	55
	2.5	3.2	180	220	195	170	185	5	7	2 t	1 t	53

* For information only

- 1) Soft annealed and tension levelled
- 2) Soft annealed and skin pass
- 3) Back annealed and skin pass

ALLOY: EN 5005

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.					0.50						Rest
Max.	0.30	0.7	0.20	0.20	1.1	0.10	0.25		0.05	0.15	

ALLOY: HA 500511
ALLOY: HA 500518

(normal quality)
(anodizing quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0	≥0.3	0.5	100	145	120	35	55	15	21	0 t	0 t	29
	0.5	1.5	100	145	120	35	55	19	25	0 t	0 t	29
	1.5	3.0	100	145	120	35	55	20	26	0.5 t	0 t	29
H12	≥0.3	0.5	125	165	150	95	145	2	4	1 t	0 t	39
	0.5	1.5	125	165	150	95	145	2	5	1 t	0.5 t	39
	1.5	2.5	125	165	150	95	145	4	6	1.5 t	1 t	39
H14	≥0.3	0.5	145	185	175	120	165	2	3	2 t	0.5 t	48
	0.5	1.5	145	185	170	120	160	2	3	2 t	1 t	48
	1.5	3.0	145	185	170	120	160	3	4	2.5 t	1 t	48
H16	≥0.3	0.5	165	205	190	145	180	1	2		1 t	52
	0.5	1.5	165	205	190	145	180	2	3		1.5 t	52
	1.5	2.0	165	205	190	145	180	3	4		2.5 t	52
H18	≥0.3	0.5	185		215	165	205	1	2		1.5 t	58
	0.5	1.5	185		215	165	205	2	3		2.5 t	58
H19	≥0.3	0.5	205		250	185	240	1	2			64
	0.5	1.5	205		240	185	230	2	3			64
H24	≥0.3	0.5	145	185	175	110	155	3	10	1.5 t	0.5 t	47
	0.5	1.5	145	185	175	110	155	4	12	1.5 t	1 t	47
H26	≥0.3	0.5	165	205	195	135	185	2	6		1 t	52
	0.5	1.5	165	205	195	135	185	3	8		1.5 t	52

* For information only

ALLOY: EN 5050A

CHEMICAL COMPOSITION											
%	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others		Al
									Each	Total	
Min.					1.1						Rest
Max.	0.40	0.7	0.20	0.30	1.8	0.10	0.25		0.05	0.15	

ALLOY: HA 505016 / HA 505017

(normal quality)

MECHANICAL PROPERTIES												
Temper	Specified thickness (mm)		Ultimate tensile strength (R _m) MPa			Yield strength (R _{p0.2}) MPa		Elongation (A ₅₀) %		Bend radius*		Hardness Brinell*
	over	up to	min.	max.	typ.*	min.	typ.*	min.	typ.*	180°	90°	
0 ¹⁾	≥0.3	0.5	130	170	150	45	55	16	19	0 t	0 t	36
	0.5	1.5	130	170	155	45	65	17	20	0 t	0 t	36
H60	0.5	1.5	130	170	160	60	80		24			
H12	≥0.3	0.5	155	195	175	130	150	2	6		0 t	49
	0.5	1.5	155	195	175	130	150	2	7		0.5 t	49
H14	≥0.3	0.5	175	215	200	150	175	2	5		0.5 t	55
	0.5	1.5	175	215	200	150	175	2	6		1 t	55
H16	≥0.3	0.5	195	235	225	170	210	1	2		1 t	61
	0.5	1.5	195	235	225	170	210	2	3		1.5 t	61
	1.5	3.0	195	235	225	170	210	2	4		2.5 t	61
H18 ²⁾	≥0.3	0.5	220		250	190	235	1	2		1.5 t	68
	0.5	1.5	220		245	190	235	2	3		2.5 t	68

* For information only

1) Can be produced in H60

2) Can be produced in H69