



Great Ingot = Great Castings

**Main Office/Plant**  
 900 E 14<sup>th</sup> Street  
 Chicago, Hts, IL 60411  
 PH 708.757.4200  
 FX 708.757.3933

[www.trialco.net](http://www.trialco.net)

Mr. Jay Armstrong / President / [armstrong@trialco.net](mailto:armstrong@trialco.net)

Direct - 708.898.9903

Mr. Richard A. Milnes / Director of Sales / [milnes@trialco.net](mailto:milnes@trialco.net)

Direct - 330.495.7770 - fax 330.491.0308

xxx.0 Casting Spec -- xxx.1 Secondary Ingot Spec -- xxx.2 Primary Ingot Spec

## 301 Alloy

<u>301.0</u>		<u>301.1 <sup>33</sup></u>	
Si	9.5 - 10.5	Si	9.5 - 10.5
Fe	0.8 - 1.5	Fe	0.8 - 1.2
Cu	3.0 - 3.5	Cu	3.0 - 3.5
Mn	0.50 - 0.8	Mn	0.50 - 0.8
Mg	0.25 - 0.50	Mg	0.30 - 0.50
Cr		Cr	
Ni	1.0 - 1.5	Ni	1.0 - 1.5
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.03	Others EA	0.03
Others Tot	0.10	Others Tot	0.10
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 302 Alloy

<u>302.0</u>		<u>302.1 <sup>33</sup></u>	
Si	9.5 - 10.5	Si	9.5 - 10.5
Fe	0.25	Fe	0.20
Cu	2.8 - 3.2	Cu	2.8 - 3.2
Mn		Mn	
Mg	07. - 1.2	Mg	0.8 - 1.2
Cr		Cr	
Ni	1.0 - 1.5	Ni	1.0 - 1.5
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.03	Others EA	0.03
Others Tot	0.10	Others Tot	0.10
Al	BAL	Al	BAL

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## 303 Alloy

<u>303.0</u>		<u>303.1 <sup>33</sup></u>	
Si	9.5 - 10.5	Si	9.5 - 10.5
Fe	0.8 - 1.5	Fe	0.8 - 1.2
Cu	0.20	Cu	0.20
Mn	0.50 - 0.8	Mn	0.50 - 0.8
Mg	0.45 - 0.7	Mg	0.50 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.03	Others EA	0.03
Others Tot	0.10	Others Tot	0.10
Al	BAL	Al	BAL

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## 308 Alloy

<u>308.0</u>		<u>308.1</u> <sup>33</sup>		<u>308.2</u> <sup>33</sup>	
Si	5.0 - 6.0	Si	5.0 - 6.0	Si	5.0 - 6.0
Fe	1.0	Fe	0.8	Fe	0.8
Cu	4.0 - 5.0	Cu	4.0 - 5.0	Cu	4.0 - 5.0
Mn	0.50	Mn	0.50	Mn	0.30
Mg	0.10	Mg	0.10	Mg	0.10
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	1.0	Zn	1.0	Zn	0.50
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA		Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL	Al	BAL

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## 318 Alloy

<u>318.0</u>		<u>318.1 <sup>33</sup></u>	
Si	5.5 - 6.5	Si	5.5 - 6.5
Fe	1.0	Fe	0.8
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.10 - 0.6	Mg	0.15 - 0.6
Cr		Cr	
Ni	0.35	Ni	0.35
Zn	1.0	Zn	0.9
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 319 Alloy

<u>319.0</u>		<u>319.1</u> <sup>33</sup>		<u>319.2</u> <sup>33</sup>	
Si	5.5 - 6.5	Si	5.5 - 6.5	Si	5.5 - 6.5
Fe	1.0	Fe	0.8	Fe	0.6
Cu	3.0 - 4.0	Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50	Mn	0.10
Mg	0.10	Mg	0.10	Mg	0.10
Cr		Cr		Cr	
Ni	0.35	Ni	0.35	Ni	0.10
Zn	1.0	Zn	1.0	Zn	0.10
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA		Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50	Others Tot	0.20
Al	BAL	Al	BAL	Al	BAL

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## A319 Alloy

<u>A319.0</u>		<u>A319.1 <sup>33</sup></u>	
Si	5.5 - 6.5	Si	5.5 - 6.5
Fe	1.0	Fe	0.8
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.10	Mg	0.10
Cr		Cr	
Ni	0.35	Ni	0.35
Zn	3.0	Zn	3.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## B319 Alloy

<u>B319.0</u>		<u>B319.1</u> <sup>33</sup>	
Si	5.5 - 6.5	Si	5.5 - 6.5
Fe	1.2	Fe	0.9
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.8	Mn	0.8
Mg	0.10 - 0.50	Mg	0.15 - 0.50
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	1.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 320 Alloy

<u>320.0</u>		<u>320.1</u> <sup>33</sup>	
Si	5.0 - 8.0	Si	5.0 - 8.0
Fe	1.2	Fe	0.9
Cu	2.0 - 4.0	Cu	2.0 - 4.0
Mn	0.8	Mn	0.8
Mg	0.05 - 0.6	Mg	0.10 - 0.6
Cr		Cr	
Ni	0.35	Ni	0.35
Zn	3.0	Zn	3.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 328 Alloy

<u>328.0</u>			<u>328.1</u> <sup>33</sup>		
Si	7.5 - 8.5		Si	7.5 - 8.5	
Fe	1.0		Fe	0.8	
Cu	1.0 - 2.0		Cu	1.0 - 2.0	
Mn	0.20 - 0.6		Mn	0.20 - 0.6	
Mg	0.20 - 0.6		Mg	0.25 - 0.6	
Cr	0.35		Cr	0.35	
Ni	0.25		Ni	0.25	
Zn	1.5		Zn	1.5	
Ti	0.25		Ti	0.25	
Sn			Sn		
Others EA			Others EA		
Others Tot	0.50		Others Tot	0.50	
	Al	BAL		Al	BAL

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## 332 Alloy

<u>332.0</u>		<u>332.1</u> <sup>33</sup>		<u>332.2</u> <sup>33</sup>	
Si	8.5 - 10.5	Si	8.5 - 10.5	Si	8.5 - 10.0
Fe	1.2	Fe	0.9	Fe	0.6
Cu	2.0 - 4.0	Cu	2.0 - 4.0	Cu	2.0 - 4.0
Mn	0.50	Mn	0.50	Mn	0.10
Mg	0.50 - 1.5	Mg	0.6 - 1.5	Mg	0.9 - 1.3
Cr		Cr		Cr	
Ni	0.50	Ni	0.50	Ni	0.10
Zn	1.0	Zn	1.0	Zn	0.10
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA		Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50	Others Tot	0.30
Al	BAL	Al	BAL	Al	BAL

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## 333 Alloy

<u>333.0</u>		<u>333.1</u> <sup>33</sup>	
Si	8.0 - 10.0	Si	8.0 - 10.0
Fe	1.0	Fe	0.8
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.05 - 0.50	Mg	0.10 - 0.50
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	1.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## A333 Alloy

<u>A333.0</u>		<u>A333.1 <sup>33</sup></u>	
Si	8.0 - 10.0	Si	8.0 - 10.0
Fe	1.0	Fe	0.8
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.05 - 0.50	Mg	0.10 - 0.50
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	3.0	Zn	3.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 336 Alloy

<u>336.0</u>		<u>336.1</u> <sup>33</sup>		<u>336.2</u> <sup>33</sup>	
Si	11.0 - 13.0	Si	11.0 - 13.0	Si	11.0 - 13.0
Fe	1.2	Fe	0.9	Fe	0.9
Cu	0.50 - 1.5	Cu	0.50 - 1.5	Cu	0.50 - 1.5
Mn	0.35	Mn	0.35	Mn	0.10
Mg	0.7 - 1.3	Mg	0.8 - 1.3	Mg	0.9 - 1.3
Cr		Cr		Cr	
Ni	2.0 - 3.0	Ni	2.0 - 3.0	Ni	2.0 - 3.0
Zn	0.35	Zn	0.35	Zn	0.10
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot		Others Tot		Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

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## 339 Alloy

<u>339.0</u>		<u>339.1</u> <sup>33</sup>	
Si	11.0 - 13.0	Si	11.0 - 13.0
Fe	1.2	Fe	0.9
Cu	1.5 - 3.0	Cu	1.5 - 3.0
Mn	0.50	Mn	0.50
Mg	0.50 - 1.5	Mg	0.6 - 1.5
Cr		Cr	
Ni	0.50 - 1.5	Ni	0.50 - 1.5
Zn	1.0	Zn	1.0
Ti	0.25	Ti	0.25
Sn		Sn	
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 354 Alloy

<u>354.0</u>		<u>354.1</u> <sup>33</sup>		<u>354.2</u> <sup>33</sup>	
Si	8.6 - 9.4	Si	8.6 - 9.4	Si	8.6 - 9.4
Fe	0.20	Fe	0.15	Fe	0.06
Cu	1.6 - 2.0	Cu	1.6 - 2.0	Cu	1.6 - 2.0
Mn	0.10	Mn	0.10	Mn	0.10
Mg	0.40 - 0.6	Mg	0.45 - 0.6	Mg	0.45 - 0.6
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	0.10	Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

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## 355 Alloy

<u>355.0</u>		<u>355.1</u> <sup>33</sup>		<u>355.2</u> <sup>33</sup>	
Si	4.5 - 5.5	Si	4.5 - 5.5	Si	4.5 - 5.5
Fe	0.6 <sup>10</sup>	Fe	0.50 <sup>10</sup>	Fe	0.14 - 0.25
Cu	1.0 - 1.5	Cu	1.0 - 1.5	Cu	1.0 - 1.5
Mn	0.50 <sup>10</sup>	Mn	0.50 <sup>10</sup>	Mn	0.05
Mg	0.40 - 0.6	Mg	0.45 - 0.6	Mg	0.50 - 0.6
Cr	0.25	Cr	0.25	Cr	
Ni		Ni		Ni	
Zn	0.35	Zn	0.35	Zn	0.05
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

**Footnote \*10** / If iron exceeds 0.45, manganese content shall not be less than one-half iron content.

**Footnote #33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## A355 Alloy

<u>A355.0</u>		<u>A355.2 <sup>33</sup></u>	
Si	4.5 - 5.5	Si	4.5 - 5.5
Fe	0.09	Fe	0.06
Cu	1.0 - 1.5	Cu	1.0 - 1.5
Mn	0.05	Mn	0.03
Mg	0.45 - 0.6	Mg	0.50 - 0.6
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.03
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## C355 Alloy

<u>C355.0</u>		<u>C355.1</u> <sup>33</sup>		<u>C355.2</u> <sup>33</sup>	
Si	4.5 - 5.5	Si	4.5 - 5.5	Si	4.5 - 5.5
Fe	0.20	Fe	0.15	Fe	0.13
Cu	1.0 - 1.5	Cu	1.0 - 1.5	Cu	1.0 - 1.5
Mn	0.10	Mn	0.10	Mn	0.05
Mg	0.40 - 0.6	Mg	0.45 - 0.6	Mg	0.50 - 0.6
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	0.10	Zn	0.10	Zn	0.05
Ti	0.20	Ti	0.20	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

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## 356 Alloy

<u>356.0</u>		<u>356.1</u> <sup>33</sup>		<u>356.2</u> <sup>33</sup>	
Si	6.5 - 7.5	Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.6 <sup>10</sup>	Fe	0.50 <sup>10</sup>	Fe	0.13 - 0.25
Cu	0.25	Cu	0.25	Cu	0.10
Mn	0.35 <sup>10</sup>	Mn	0.35 <sup>10</sup>	Mn	0.05
Mg	0.20 - 0.45	Mg	0.25 - 0.45	Mg	0.30 - 0.45
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	0.35	Zn	0.35	Zn	0.05
Ti	0.25	Ti	0.25	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

**Footnote \*10** / If iron exceeds 0.45, manganese content shall not be less than one-half iron content.

**Footnote \*33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## A356 Alloy

<u>A356.0</u>		<u>A356.1 <sup>33</sup></u>		<u>A356.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.20	Fe	0.15	Fe	0.12
Cu	0.20	Cu	0.20	Cu	0.10
Mn	0.10	Mn	0.10	Mn	0.05
Mg	0.25 - 0.45	Mg	0.30 - 0.45	Mg	0.30 - 0.45
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	0.10	Zn	0.10	Zn	0.05
Ti	0.20	Ti	0.20	Ti	0.20
Sn		Sn		Sn	
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B356 Alloy

<u>B356.0</u>		<u>B356.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.09	Fe	0.06
Cu	0.05	Cu	0.03
Mn	0.05	Mn	0.03
Mg	0.25 - 0.45	Mg	0.30 - 0.45
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.03
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
Al	BAL	Al	BAL

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## C356 Alloy

<u>C356.0</u>		<u>C356.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.07	Fe	0.04
Cu	0.05	Cu	0.03
Mn	0.05	Mn	0.03
Mg	0.25 - 0.45	Mg	0.30 - 0.45
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.03
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
Al	BAL	Al	BAL

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## F356 Alloy

<u>F356.0</u>		<u>F356.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.20	Fe	0.12
Cu	0.20	Cu	0.10
Mn	0.10	Mn	0.05
Mg	0.17 - 0.25	Mg	0.17 - 0.25
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.05
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

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## 357 Alloy

<u>357.0</u>		<u>357.1</u> <sup>33</sup>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.15	Fe	0.12
Cu	0.05	Cu	0.05
Mn	0.03	Mn	0.03
Mg	0.45 - 0.6	Mg	0.45 - 0.6
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

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## A357 Alloy

<u>A357.0</u>		<u>A357.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.20	Fe	0.12
Cu	0.20	Cu	0.10
Mn	0.10	Mn	0.05
Mg	0.40 - 0.7	Mg	0.45 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.05
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
<b>Be</b>	<b>0.04 - 0.07</b>	<b>Be</b>	<b>0.04 - 0.07</b>
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B357 Alloy

<u>B357.0</u>		<u>B357.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.09	Fe	0.06
Cu	0.05	Cu	0.03
Mn	0.05	Mn	0.03
Mg	0.40 - 0.6	Mg	0.45 - 0.6
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.03
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
Al	BAL	Al	BAL

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## C357 Alloy

<u>C357.0</u>		<u>C357.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.09	Fe	0.06
Cu	0.05	Cu	0.03
Mn	0.05	Mn	0.03
Mg	0.45 - 0.7	Mg	0.50 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.03
Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn	
<b>Be</b>	<b>0.04 - 0.07</b>	<b>Be</b>	<b>0.04 - 0.07</b>
Others EA	0.05	Others EA	0.03
Others Tot	0.15	Others Tot	0.10
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

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## D357 Alloy

<u>D357.0</u>	
Si	6.5 - 7.5
Fe	0.20
Cu	
Mn	0.10
Mg	0.55 - 0.6
Cr	
Ni	
Zn	
Ti	0.10 - 0.20
Sn	
<b>Be</b>	<b>0.04 - 0.07</b>
Others EA	0.05
Others Tot	0.15
<b>Al</b>	<b>BAL</b>

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## E357 Alloy

<u>E357.0</u>		<u>E357.1 <sup>33</sup></u>		<u>E357.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.10	Fe	0.07	Fe	0.07
Cu		Cu		Cu	
Mn	0.10	Mn	0.10	Mn	0.10
Mg	0.55 - 0.6	Mg	0.6 - 0.7	Mg	0.6 - 0.7
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn		Zn		Zn	
Ti	0.10 - 0.20	Ti	0.10 - 0.20	Ti	0.10 - 0.20
Sn		Sn		Sn	
Be	0.002 Max	Be	0.002 Max	Be	0.0003 Max
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

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## F357 Alloy

<u>F357.0</u>		<u>F357.1 <sup>33</sup></u>		<u>F357.2 <sup>33</sup></u>	
Si	6.5 - 7.5	Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.10	Fe	0.07	Fe	0.07
Cu	0.20	Cu	0.20	Cu	0.20
Mn	0.10	Mn	0.10	Mn	0.10
Mg	0.40 - 0.7	Mg	0.45 - 0.7	Mg	0.45 - 0.7
Cr		Cr		Cr	
Ni		Ni		Ni	
Zn	0.10	Zn	0.10	Zn	0.10
Ti	0.04 - 0.20	Ti	0.04 - 0.20	Ti	0.04 - 0.20
Sn		Sn		Sn	
<b>Be</b>	<b>0.002 Max</b>	<b>Be</b>	<b>0.002 Max</b>	<b>Be</b>	<b>0.0003 Max</b>
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

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## 358 Alloy

<u>358.0</u>		<u>358.2 <sup>33</sup></u>	
Si	7.6 - 8.6	Si	7.6 - 8.6
Fe	0.30	Fe	0.20
Cu	0.20	Cu	0.10
Mn	0.20	Mn	0.10
Mg	0.40 - 0.6	Mg	0.45 - 0.6
Cr	0.20	Cr	0.05
Ni		Ni	
Zn	0.20	Zn	0.10
Ti	0.10 - 0.20	Ti	0.12 - 0.20
Sn		Sn	
<b>Be</b>	<b>0.10 - 0.30</b>	<b>Be</b>	<b>0.15 - 0.30</b>
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

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## 359 Alloy

<u>359.0</u>		<u>359.2 <sup>33</sup></u>	
Si	8.5 - 9.5	Si	8.5 - 9.5
Fe	0.20	Fe	0.12
Cu	0.20	Cu	0.10
Mn	0.10	Mn	0.10
Mg	0.50 - 0.7	Mg	0.55 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## A359 Alloy

<u>A359.0</u>		<u>A359.1</u> <sup>32,33</sup>	
Si	8.5 - 9.5	Si	8.5 - 9.5
Fe	0.25	Fe	0.20
Cu	0.20	Cu	0.20
Mn	0.10	Mn	0.10
Mg	0.40 - 0.6	Mg	0.45 - 0.6
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.03	Others EA	0.03
Others Tot	0.10	Others Tot	0.10
Al	BAL	Al	BAL

**Footnote \*32** / Primarily used for making metal matrix composite.

**Footnote #33** / See last page for description of Foundry Ingot Containing Structural Modifiers

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## 360 Alloy

<u>360.0</u> <sup>11</sup>		<u>360.2</u> <sup>33</sup>	
Si	9.0 - 10.0	Si	9.0 - 10.0
Fe	2.0	Fe	0.7 - 1.1
Cu	0.6	Cu	0.10
Mn	0.35	Mn	0.10
Mg	0.40 - 0.6	Mg	0.45 - 0.6
Cr		Cr	
Ni	0.50	Ni	0.10
Zn	0.50	Zn	0.10
Ti		Ti	
Sn	0.15	Sn	0.10
Others EA		Others EA	
Others Tot	0.25	Others Tot	0.20
Al	BAL	Al	BAL

**Footnote \*11** / A360.1, A380.1 and A413.1 ingot is used to produce 360.0 and A360.0; 380.0 and A380.0; 413.0 and A413.0 castings, respectively.

**Footnote \*33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## A360 Alloy

<u>A360.0</u> <sup>11</sup>		<u>A360.1</u> <sup>11,33</sup>		<u>A360.2</u> <sup>33</sup>	
Si	9.0 - 10.0	Si	9.0 - 10.0	Si	9.0 - 10.0
Fe	1.3	Fe	1.0	Fe	0.6
Cu	0.6	Cu	0.6	Cu	0.10
Mn	0.35	Mn	0.35	Mn	0.05
Mg	0.40 - 0.6	Mg	0.45 - 0.6	Mg	0.45 - 0.6
Cr		Cr		Cr	
Ni	0.50	Ni	0.50	Ni	
Zn	0.50	Zn	0.40	Zn	0.05
Ti		Ti		Ti	
Sn	0.15	Sn	0.15	Sn	
Others EA		Others EA		Others EA	0.05
Others Tot	0.25	Others Tot	0.25	Others Tot	0.15
<b>Al</b>	BAL	<b>Al</b>	BAL	<b>Al</b>	BAL

**Footnote \*11** / A360.1, A380.1 and A413.1 ingot is used to produce 360.0 and A360.0; 380.0 and A380.0; 413.0 and A413.0 castings, respectively.

**Footnote \*33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## 361 Alloy

<u>361.0</u>		<u>361.1</u> <sup>33</sup>	
Si	9.5 - 10.5	Si	9.5 - 10.5
Fe	1.1	Fe	0.8
Cu	0.50	Cu	0.50
Mn	0.25	Mn	0.25
Mg	0.40 - 0.6	Mg	0.45 - 0.6
Cr	0.20 - 0.30	Cr	0.20 - 0.30
Ni	0.20 - 0.30	Ni	0.20 - 0.30
Zn	0.50	Zn	0.40
Ti	0.20	Ti	0.20
Sn	0.10	Sn	0.10
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 363 Alloy

<u>363.0</u>		<u>363.1</u> <sup>33</sup>	
Si	4.5 - 6.0	Si	4.5 - 6.0
Fe	1.1	Fe	0.8
Cu	2.5 - 3.5	Cu	2.5 - 3.5
Mn	17	Mn	17
Mg	0.15 - 0.40	Mg	0.20 - 0.40
Cr	17	Cr	17
Ni	0.25	Ni	0.25
Zn	3.0 - 4.5	Zn	3.0 - 4.5
Ti	0.20	Ti	0.20
Sn	0.25	Sn	0.25
<b>Pb</b>	<b>0.25 Max</b>	<b>Pb</b>	<b>0.25 Max</b>
Others EA		Others EA	
Others Tot	0.30	Others Tot	0.30
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

**Footnote \*17** / Mn+Cr=0.8 max

**Footnote \*33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## 364 Alloy

<u>364.0</u>		<u>364.2</u> <sup>33</sup>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.5	Fe	0.7 - 1.1
Cu	0.20	Cu	0.20
Mn	0.10	Mn	0.10
Mg	0.20 - 0.40	Mg	0.25 - 0.40
Cr	0.25 - 0.50	Cr	0.25 - 0.50
Ni	0.15	Ni	0.15
Zn	0.15	Zn	0.15
Ti		Ti	
Sn	0.15	Sn	0.15
<b>Be</b>	<b>0.02 - 0.04</b>	<b>Be</b>	<b>0.02 - 0.04</b>
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
<b>Al</b>	<b>BAL</b>	<b>Al</b>	<b>BAL</b>

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 365 Alloy

<u>365.0</u>		<u>365.1</u> <sup>33</sup>	
Si	9.5 - 11.5	Si	9.5 - 11.5
Fe	0.15	Fe	0.12
Cu	0.03	Cu	0.03
Mn	0.50 - 0.8	Mn	0.50 - 0.8
Mg	0.10 - 0.50	Mg	0.15 - 0.50
Cr		Cr	
Ni		Ni	
Zn	0.07	Zn	0.07
Ti	0.04 - 0.15	Ti	0.04 - 0.15
Sn		Sn	
P	0.001 max	P	0.001 max
Sr	0.005 - 0.015	Sr	0.010 - 0.020
Others EA	0.03	Others EA	0.03
Others Tot	0.10	Others Tot	0.10
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 366 Alloy

<u>366.0</u>		<u>366.1</u> <sup>33</sup>	*36
Si	6.5 - 7.5	Si	6.5 - 7.5
Fe	0.15	Fe	0.12
Cu	0.05	Cu	0.05
Mn	0.03	Mn	0.03
Mg	0.5 - 1.2	Mg	0.6 - 1.2
Cr		Cr	
Ni		Ni	
Zn	0.05	Zn	0.05
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

**Footnote \*36** Used for semi-solid formed products.

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## 367 Alloy

<u>367.0</u>	*39	<u>367.1</u> <sup>33</sup>	*39
Si	8.5 - 9.5	Si	8.5 - 9.5
Fe	0.25	Fe	0.20
Cu	0.25	Cu	0.25
Mn	0.25 - 0.35	Mn	0.25 - 0.35
Mg	0.30 - 0.50	Mg	0.35 - 0.50
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

**Footnote \*39** / Casting: P 0.001Max / Sr 0.05 - 0.07 / Ingot: P 0.001Max / Sr range to be determined between producer and purchaser to allow for potential burn out at caster's facility.

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## 368 Alloy

<u>368.0</u>	*39	<u>368.1</u> <sup>33</sup>	*39
Si	8.5 - 9.5	Si	8.5 - 9.5
Fe	0.25	Fe	0.20
Cu	0.25	Cu	0.25
Mn	0.25 - 0.35	Mn	0.25 - 0.35
Mg	0.10 - 0.30	Mg	0.15 - 0.30
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

**Footnote \*39** / Casting: P 0.001Max / Sr 0.05 - 0.07 / Ingot: P 0.001Max / Sr range to be determined between producer and purchaser to allow for potential burn out at caster's facility.

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## 369 Alloy

<u>369.0</u>		<u>369.1 <sup>33</sup></u>	
Si	11.0 - 12.0	Si	11.0 - 12.0
Fe	1.3	Fe	1.00
Cu	0.50	Cu	0.50
Mn	0.35	Mn	0.35
Mg	0.25 - 0.45	Mg	0.30 - 0.45
Cr	0.30 - 0.40	Cr	0.30 - 0.40
Ni	0.05	Ni	0.05
Zn	1.0	Zn	0.9
Ti		Ti	
Sn	0.10	Sn	0.10
Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 380 Alloy

<u>380.0</u> <sup>11</sup>		<u>380.2</u> <sup>33</sup>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	2.0	Fe	0.7 - 1.1
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.10
Mg	0.10	Mg	0.10
Cr		Cr	
Ni	0.50	Ni	0.10
Zn	3.0	Zn	0.10
Ti		Ti	
Sn	0.35	Sn	0.10
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.20
Al	BAL	Al	BAL

**Footnote \*11** / A360.1, A380.1 and A413.1 ingot is used to produce 360.0 and A360.0; 380.0 and A380.0; 413.0 and A413.0 castings, respectively.

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## A380 Alloy

<u>A380.0</u> <sup>11</sup>		<u>A380.1</u> <sup>11,33</sup>		<u>A380.2</u> <sup>33</sup>	
Si	7.5 - 9.5	Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.3	Fe	1.0	Fe	0.6
Cu	3.0 - 4.0	Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50	Mn	0.10
Mg	0.10	Mg	0.10	Mg	0.10
Cr		Cr		Cr	
Ni	0.50	Ni	0.50	Ni	0.10
Zn	3.0	Zn	2.9	Zn	0.10
Ti		Ti		Ti	
Sn	0.35	Sn	0.35	Sn	
Others EA		Others EA		Others EA	0.05
Others Tot	0.50	Others Tot	0.50	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

**Footnote \*11 /** A360.1, A380.1 and A413.1 ingot is used to produce 360.0 and A360.0; 380.0 and A380.0; 413.0 and A413.0 castings, respectively.

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B380 Alloy

<u>B380.0</u>		<u>B380.1 <sup>33</sup></u>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.3	Fe	1.0
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.10	Mg	0.10
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	0.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## C380 Alloy

<u>C380.0</u>		<u>C380.1 <sup>33</sup></u>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.3	Fe	1.0
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.10 - 0.30	Mg	0.15 0.30
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	3.0	Zn	2.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## D380 Alloy

<u>D380.0</u>		<u>D380.1 <sup>33</sup></u>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.3	Fe	1.0
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.10 - 0.30	Mg	0.15 - 0.30
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	0.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## E380 Alloy

<u>E380.0</u>		<u>E380.1 <sup>33</sup></u>	
Si	7.5 - 9.5	Si	7.5 - 9.5
Fe	1.3	Fe	1.0
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.30	Mg	0.30
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	3.0	Zn	2.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al BAL		Al BAL	

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## 381 Alloy

<u>381.0</u>		<u>381.2</u> <sup>33</sup>	
Si	9.0 - 10.0	Si	9.0 - 10.0
Fe	1.3	Fe	0.7 - 1.0
Cu	3.0 - 4.0	Cu	3.0 - 4.0
Mn	0.50	Mn	0.50
Mg	0.13	Mg	0.13
Cr	0.15	Cr	0.15
Ni	0.50	Ni	0.50
Zn	3.0	Zn	2.9
Ti	0.20	Ti	0.20
Sn	0.15	Sn	0.15
<b>Sb</b>	0.15 Max	<b>Sb</b>	0.15 Max
<b>Pb</b>	0.15 Max	<b>Pb</b>	0.15 Max
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
<b>Al</b>	BAL	<b>Al</b>	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 383 Alloy

<u>383.0</u>		<u>383.1</u> <sup>33</sup>		<u>383.2</u> <sup>33</sup>	
Si	9.5 - 11.5	Si	9.5 - 11.5	Si	9.5 - 11.5
Fe	1.3	Fe	1.0	Fe	0.6 - 1.0
Cu	2.0 - 3.0	Cu	2.0 - 3.0	Cu	2.0 - 3.0
Mn	0.50	Mn	0.50	Mn	0.10
Mg	0.10	Mg	0.10	Mg	0.10
Cr		Cr		Cr	
Ni	0.30	Ni	0.30	Ni	0.10
Zn	3.0	Zn	2.9	Zn	0.10
Ti		Ti		Ti	
Sn	0.15	Sn	0.15	Sn	0.10
Others EA		Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50	Others Tot	0.20
Al	BAL	Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## A383 Alloy

<u>A383.0</u>		<u>A383.1 <sup>33</sup></u>	
Si	9.5 - 11.5	Si	9.5 - 11.5
Fe	1.3	Fe	1.0
Cu	2.0 - 3.0	Cu	2.0 - 3.0
Mn	0.50	Mn	0.50
Mg	0.10 - 0.30	Mg	0.15 - 0.30
Cr		Cr	
Ni	0.30	Ni	0.30
Zn	3.0	Zn	2.9
Ti		Ti	
Sn	0.15	Sn	0.15
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B383 Alloy

<u>B383.0</u>		<u>B383.1 <sup>33</sup></u>	
Si	9.5 - 11.5	Si	9.5 - 11.5
Fe	1.3	Fe	1.0
Cu	2.0 - 3.0	Cu	2.0 - 3.0
Mn	0.50	Mn	0.50
Mg	0.30	Mg	0.30
Cr		Cr	
Ni	0.30	Ni	0.30
Zn	3.0	Zn	2.9
Ti		Ti	
Sn	0.15	Sn	0.15
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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## 384 Alloy

<u>384.0</u>		<u>384.1</u> <sup>33</sup>		<u>384.2</u> <sup>33</sup>	
Si	10.5 - 12.0	Si	10.5 - 12.0	Si	10.5 - 12.0
Fe	1.3	Fe	1.0	Fe	0.6 - 1.0
Cu	3.0 - 4.5	Cu	3.0 - 4.5	Cu	3.0 - 4.5
Mn	0.50	Mn	0.50	Mn	0.10
Mg	0.10	Mg	0.10	Mg	0.10
Cr		Cr		Cr	
Ni	0.50	Ni	0.50	Ni	0.10
Zn	3.0	Zn	2.9	Zn	0.10
Ti		Ti		Ti	
Sn	0.35	Sn	0.35	Sn	0.10
Others EA		Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50	Others Tot	0.20
Al	BAL	Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## A384 Alloy

<u>A384.0</u>		<u>A384.1 <sup>33</sup></u>	
Si	10.5 - 12.0	Si	10.5 - 12.0
Fe	1.3	Fe	1.0
Cu	3.0 - 4.5	Cu	3.0 - 4.5
Mn	0.50	Mn	0.50
Mg	0.10	Mg	0.10
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	0.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B384 Alloy

<u>B384.0</u>		<u>B384.1 <sup>33</sup></u>	
Si	10.5 - 12.0	Si	10.5 - 12.0
Fe	1.3	Fe	1.0
Cu	3.0 - 4.5	Cu	3.0 - 4.5
Mn	0.50	Mn	0.50
Mg	0.10 - 0.30	Mg	0.15 - 0.30
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	1.0	Zn	0.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## C384 Alloy

<u>C384.0</u>		<u>C384.1</u> <sup>33</sup>	
Si	10.5 - 12.0	Si	10.5 - 12.0
Fe	1.3	Fe	1.0
Cu	3.0 - 4.5	Cu	3.0 - 4.5
Mn	0.50	Mn	0.50
Mg	0.10 - 0.30	Mg	0.15 - 0.30
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	3.0	Zn	2.9
Ti		Ti	
Sn	0.35	Sn	0.35
Others EA		Others EA	
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## 390 Alloy

<u>390.0</u>		<u>390.2<sup>33</sup></u>	
Si	16.0 - 18.0	Si	16.0 - 18.0
Fe	1.3	Fe	0.6 - 1.0
Cu	4.0 - 5.0	Cu	4.0 - 5.0
Mn	0.10	Mn	0.10
Mg	0.45 - 0.65	Mg	0.50 - 0.65
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## A390 Alloy

<u>A390.0</u>		<u>A390.1 <sup>33</sup></u>	
Si	16.0 - 18.0	Si	16.0 - 18.0
Fe	0.50	Fe	0.40
Cu	4.0 - 5.0	Cu	4.0 - 5.0
Mn	0.10	Mn	0.10
Mg	0.45 - 0.65	Mg	0.50 - 0.65
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

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## B390 Alloy

<u>B390.0</u>		<u>B390.1 <sup>33</sup></u>	
Si	16.0 - 18.0	Si	16.0 - 18.0
Fe	1.3	Fe	1.0
Cu	4.0 - 5.0	Cu	4.0 - 5.0
Mn	0.50	Mn	0.50
Mg	0.45 - 0.65	Mg	0.50 - 0.65
Cr		Cr	
Ni	0.10	Ni	0.10
Zn	1.5	Zn	1.4
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

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## 391 Alloy

<u>391.0</u>		<u>391.1</u> <sup>33</sup>	
Si	18.0 - 20.0	Si	18.0 - 20.0
Fe	1.2	Fe	0.9
Cu	0.20	Cu	0.20
Mn	0.30	Mn	0.30
Mg	0.40 - 0.7	Mg	0.45 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

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## A391 Alloy

<u>A391.0</u>		<u>A391.1 <sup>33</sup></u>	
Si	18.0 - 20.0	Si	18.0 - 20.0
Fe	0.6	Fe	0.50
Cu	0.20	Cu	0.20
Mn	0.30 <sup>10</sup>	Mn	0.30 <sup>10</sup>
Mg	0.40 - 0.7	Mg	.045 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

**Footnote \*10** / If iron exceeds 0.45, manganese content shall not be less than one-half iron content.

**Footnote \*33** / See last page for description of Foundry Ingot Containing Structure Modifiers

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## B391 Alloy

<u>B391.0</u>		<u>B391.1</u> <sup>33</sup>	
Si	18.0 - 20.0	Si	18.0 - 20.0
Fe	0.20	Fe	0.15
Cu	0.20	Cu	0.20
Mn	0.30	Mn	0.30
Mg	0.40 - 0.7	Mg	0.45 - 0.7
Cr		Cr	
Ni		Ni	
Zn	0.10	Zn	0.10
Ti	0.20	Ti	0.20
Sn		Sn	
Others EA	0.10	Others EA	0.10
Others Tot	0.20	Others Tot	0.20
Al	BAL	Al	BAL

Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers

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## 392 Alloy

<u>392.0</u>		<u>392.1 <sup>33</sup></u>	
Si	18.0 - 20.0	Si	18.0 - 20.0
Fe	1.5	Fe	1.1
Cu	0.40 - 0.8	Cu	0.40 - 0.8
Mn	0.20 - 0.6	Mn	0.20 - 0.6
Mg	0.8 - 1.2	Mg	0.9 - 1.2
Cr		Cr	
Ni	0.50	Ni	0.50
Zn	0.50	Zn	0.40
Ti	0.20	Ti	0.20
Sn	0.30	Sn	0.30
Others EA	0.15	Others EA	0.15
Others Tot	0.50	Others Tot	0.50
Al	BAL	Al	BAL

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xxx.0 Casting Spec -- xxx.1 Secondary Ingot Spec -- xxx.2 Primary Ingot Spec

## 393 Alloy

<u>393.0</u>		<u>393.1</u> <sup>33</sup>		<u>393.2</u> <sup>33</sup>	
Si	21.0 - 23.0	Si	21.0 - 23.0	Si	21.0 - 23.0
Fe	1.3	Fe	1.0	Fe	0.8
Cu	0.7 - 1.1	Cu	0.7 - 1.1	Cu	0.7 - 1.1
Mn	0.10	Mn	0.10	Mn	0.10
Mg	0.7 - 1.3	Mg	0.8 - 1.3	Mg	0.8 - 1.3
Cr		Cr		Cr	
Ni	2.0 - 2.5	Ni	2.0 - 2.5	Ni	2.0 - 2.5
Zn	0.10	Zn	0.10	Zn	0.10
Ti	0.10 - 0.20	Ti	0.10 - 0.20	Ti	0.10 - 0.20
Sn		Sn		Sn	
V	0.08 - 0.15	V	0.08 - 0.15	V	0.08 - 0.15
Others EA	0.05	Others EA	0.05	Others EA	0.05
Others Tot	0.15	Others Tot	0.15	Others Tot	0.15
Al	BAL	Al	BAL	Al	BAL

**Footnote \*33 / See last page for description of Foundry Ingot Containing Structure Modifiers**

**Questions? – CALL 708.757.4200**

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**\*33 -- Identifiers for 3xx.x & 4xx.x Foundry Ingot Containing Structure Modifiers**

One of the applicable suffixes in the table below should be added to the registered alloy designation whenever a structure modifier is intentionally added to that alloy.

Alloy Designation Suffix	Structure Modifying Element	Chemical Composition Limits	
		Min (%)	Max (%)
<b>N</b>	<b>Na</b>	<b>0.003</b>	<b>0.080</b>
<b>S</b>	<b>Sr</b>	<b>0.005</b>	<b>0.080</b>
<b>C</b>	<b>Ca</b>	<b>0.005</b>	<b>0.150</b>
<b>P</b>	<b>P</b>	—	<b>0.060</b>

The letter suffix follows and is separated from the registered foundry ingot designations by a hyphen (e.g. "A356.1 - S").

In cases where more than one modifier is intentionally added, only the modifier of greater concentration shall be identified by suffix letter affixed to the registered alloy designation.

When a foundry alloy is sold with a suffix added to its alloy designation, the modifying element's concentration is not to be included in "Others, EA" or "Others, TOT".

It is not intended that these structure modifier identifiers be treated as new alloy registration, nor should these designations be listed.