

WHAT IS CLAIMED IS:

1. A method of manufacturing an aluminium alloy plate for vacuum chamber elements, valves, or total assemblies, the method comprising the steps of:
 - (a) providing a rolling feedstock material of an Al-Mg-Si aluminium alloy having a composition comprising of, in wt.%,

Mg	0.80% to 1.05%,
Si	0.70% to 1.0%,
Mn	0.70% to 0.90%,
Fe	up to 0.20%,
Zn	up to 0.08%,
Cu	up to 0.05%,
Cr	up to 0.03%,
Ti	up to 0.06%,

unavoidable impurities each <0.03%, total <0.10%, balance aluminium;
 - (b) homogenizing of the rolling feedstock at a temperature in a range of 550°C to 595°C;
 - (c) hot-rolling of the homogenized rolling feedstock in one or more rolling steps to a hot-rolled plate having a thickness of at least 10 mm;
 - (d) solution heat-treatment (“SHT”) of the hot rolled plate at a temperature in a range of 540°C to 590°C;
 - (e) rapid cooling the SHT plate;
 - (f) stretching of the cooled SHT plate to obtain a permanent elongation from 1% to 5%; and
 - (g) artificial ageing of the stretched plate.
2. The method according to claim 1, wherein the hot rolling of the homogenized rolling feedstock is to a plate having a thickness in the range of 10 mm to 230 mm.
3. The method according to claim 1 or 2, wherein the Mg-content is in a range of 0.85% to 1.05%.
4. The method according to any one of claims 1 to 3, wherein the Si-content is in a range of 0.70% to 0.95%.

5. The method according to any one of claims 1 to 4, wherein the ratio (in wt.%) Mg/Si is more than 0.9.
6. The method according to any one of claims 1 to 5, wherein the Mn-content is in a range of 0.75% to 0.85%.
7. The method according to any one of claims 1 to 6, wherein the Fe-content is up to 0.12%.
8. The method according to any one of claims 1 to 7, wherein the Ti-content is in a range of 0.01% to 0.06%.
9. The method according to any one of claims 1 to 8, wherein homogenizing of the rolling feedstock is at a temperature in a range of 555°C to 595°C.
10. The method according to any one of claims 1 to 9, wherein the solution heat treatment of the hot rolled plate is at a temperature in a range of 545°C to 580°C.
11. The method according to any one of claims 1 to 10, wherein the artificial ageing is performed at a temperature in the range of 150°C to 190°C.
12. The method of claim 11, wherein the artificial ageing is performed for a time of 5 to 60 hours.
13. The method according to any one of claims 1 to 12, wherein the rapid cooling is performed by one of spray quenching or immersion quenching in water or other quenching media.
14. The method according to any one of claims 1 to 13, wherein the artificial ageing is performed to achieve a T6 temper.
15. The method according to any one of claims 1 to 14, further comprising the steps of:

- (h) machining said aged plate into a vacuum chamber element, a valve, or a total assembly; and
 - (i) surface treating of the vacuum chamber element, the valve, or the total assembly.
16. The method of claim 15, wherein the surface treating is performed by anodization.
17. The method of any one of claims 1 to 16, wherein the aluminum alloy plate has a density of phases and particles having a size greater than $10\ \mu\text{m}^2$ of less than $400\ \mu\text{m}^2$.
18. A method of manufacturing an aluminium alloy plate for vacuum chamber elements, valves, or total assemblies, the method comprising the steps of:
- (a) providing a rolling feedstock material of an Al-Mg-Si aluminium alloy having a composition comprising of, in wt.%,
 - Mg 0.70% to 1.05%;
 - Si 0.70% to 1.0%;
 - Mn 0.60% to 1.0%;
 - Fe up to 0.20%;
 - Zn up to 0.2%;
 - Cu up to 0.10%;
 - Cr up to 0.05%;
 - Ti up to 0.1%;
 - Ni up to 0.06%;
 - unavoidable impurities each $<0.05\%$, total $<0.15\%$, balance aluminium;
 - (b) homogenizing of the rolling feedstock at a temperature in a range of 550°C to 595°C ;
 - (c) hot-rolling of the homogenized rolling feedstock in one or more rolling steps to a hot-rolled plate having a thickness of at least 10 mm;
 - (d) solution heat-treatment (“SHT”) of the hot rolled plate at a temperature in a range of 540°C to 590°C ;
 - (e) rapid cooling the SHT plate;
 - (f) stretching of the cooled SHT plate to obtain a permanent elongation from 1% to 5%; and
 - (g) artificial ageing of the stretched plate.

19. The method according to claim 18, wherein the rapid cooling is performed by one of spray quenching or immersion quenching in water or other quenching media.
20. The method according to claim 18 or 19, wherein the artificial ageing is performed at a temperature in the range of 150°C to 190°C and for a time of 5 to 60 hours.
21. The method according to any one of claims 18 to 20, wherein the artificial ageing is performed to achieve a T6 temper.