Claims

1. A meta-stable β titanium alloy comprising 7.5 to 8.5 wt.% vanadium, 5.5 to 6.5 wt.% chromium, 3.5 to 4.5 wt.% molybdenum, 3.5 to 4.5 wt.% zirconium, 3 to 4 wt.% aluminium, up to 0.30 wt.% oxygen, a maximum of 0.3 wt.% iron, nitrogen up to 0.03 wt.%, hydrogen up to 0.03 wt.%, a maximum of 50 ppm yttrium, a maximum of other elements (apart from carbon and titanium) of 0.15 wt.% each and 0.40 wt.% in aggregate in excess of 0.05 wt.% up to 0.1 wt.%, with a balance (apart from carbon) of titanium; the alloy having carbon present at a stable total carbon level above~~sufficiently in excess of~~ 0.05 wt.% achieving an improvement in the mechanical properties of UTS, DSS and fatigue strength in threaded regions relative to standard Beta-C alloy with a specified carbon level below 0.05 wt.%, with a maximum carbon content not exceeding 0.20 wt.% and controlled so as to preclude carbide formation having a detrimental effect on the level of fatigue strength.
2. The titanium alloy of claim 1, wherein the alloy has up to 0.14 wt.% oxygen.
3. The titanium alloy of claim 1 or 2, wherein the carbon content is at least in part provided by an intended addition of carbon, particularly if the modified alloy is to be produced from a quantity of melted standard beta-C alloy.
4. The titanium alloy of any one of claims 1 to 3, wherein total carbon is present to a stable content of from ~~about~~ 0.065 wt.% to ~~about~~ 0.20 wt.%.
5. The titanium alloy of any one of claims 1 to 3, wherein total carbon is present to a stable content of from ~~about~~ 0.070 wt.% to ~~about~~ 0.20 wt.%.
6. The titanium alloy of any one of claims 1 to 3, wherein total carbon is present to a stable content of from ~~about~~ 0.070 wt.% to ~~about~~ 0.15 wt.%.
7. The titanium alloy of any one of claims 1 to 3, wherein total carbon is present to a stable content of from ~~about~~ 0.070 wt.% to ~~about~~ 0.10 wt.%.
8. The titanium alloy of any one of claims 1 to 3, wherein total carbon is present to a stable content of ~~about~~ 0.080 wt.%.
9. The titanium alloy of any one of claims 1 to 8, wherein the total carbon is retained in solid solution in predominant beta phase of the alloy, following cooling from an elevated solution heat treatment regime, rather than as carbide precipitate in the beta phase as a consequence of such cooling.
10. The titanium alloy of any one of claims 1 to 9, wherein the titanium alloy is fabricated into titanium fasteners by subjecting the alloy to a homogenizing heat treatment before being fabricated to a required fastener form, such as by drawing.

11. The titanium alloy of claim 10, wherein the fasteners are subjected to a post heat treatment by direct aging at a furnace temperature of from ~~about~~ 440 °C to ~~about~~ 540 °C for a period of time ranging from ~~about~~ 1 hour to ~~about~~ 12 hours.