

Claims:

1. A threaded fastener comprising:
a fastener having a threaded portion with a ratio of pitch diameter to minor diameter less than 1.28, and
the threaded portion with a major diameter portion, a leading flank having a normal angle between 10° and 60° , a trailing flank having a normal angle between 1° and 30° and a shank portion extending between the trailing flank and the leading flank of adjacent threads of a continuous radius greater than the thread height.
2. The threaded fastener as claimed in claim 1 where the continuous radius forming the shank portion is between 1.2 and 1.8 times the thread height.
3. The threaded fastener as claimed in claim 1 where the normal angle of the lead flank of the threaded portion is greater than the normal angle of the trailing flank of the threaded portion.
4. The threaded fastener as claimed in claim 1 where the normal angle of the lead flank of the threaded portion is between 1.5 and 2.5 times the normal angle of the trailing flank of the threaded portion.
5. The threaded fastener as claimed in claim 1 where the normal angle of the lead flank and the normal angle of the trailing flank are substantially the same.
6. The threaded fastener as claimed in claim 5 where the normal angle of the lead flank and the normal angle of the trailing flank are compound angles.
7. The threaded fastener as claimed in claim 1 where the fastener is adapted to assemble parts made from materials selected from the group consisting of plastic, brass, aluminum, wood, concrete, and steel.

8. The threaded fastener as claimed in claim 1 further comprising:
a plurality of grooves extending transversely through the major diameter portion of the threaded portion.
9. The threaded fastener as claimed in claim 1 further comprising:
a plurality of grooves extending transversely through the major diameter portion of adjacent threads of the threaded portion.
10. The threaded fastener as claimed in claim 1 where the major diameter portion of the threaded portion is tapered toward the lead flank, the trailing flank, or both.
11. The threaded fastener as claimed in claim 1 where the major diameter portion of the threaded portion is arcuate.
12. The threaded fastener as claimed in claim 1 further comprising
at least one minor protrusion is formed along at least a portion of the shank portion of the threaded portions positioned between the trailing flank and the lead flank of adjacent threads.
13. The threaded fastener as claimed in claim 12 where the minor protrusion is continuous along the shank portion positioned between the trailing flank and the lead flank of adjacent threads.
14. The threaded fastener as claimed in claim 12 where the minor protrusion is intermittent along at least a portion of the shank portion positioned between the trailing flank and the lead flank of adjacent threads.
15. The threaded fastener as claimed in claim 12 where the height of the minor protrusion is not more than 30% of the thread height.
16. The threaded fastener as claimed in claim 12 where the height of the minor protrusion is not more than 20% of the thread height.

17. The threaded fastener as claimed in claim 12 where at least a part of the minor protrusion has cross-sectional shape selected from the group consisting of arcuate, rectangular, elliptical, trapezoidal, and triangular.
18. The threaded fastener as claimed in claim 12 where a lead side of the minor protrusion comprises a normal angle between 10° and 60°.
19. The threaded fastener as claimed in claim 1 further comprising a thread-forming portion of at least HRC 50 hardness adapted to thread the fastener into a substrate.
20. The threaded fastener as claimed in claim 19, where the thread-forming portion has a shape selected from a group consisting of bilobular, trilobular, quadlobular and pentalobular.
21. The threaded fastener as claimed in claim 19, where the thread-forming portion has a pentalobular shape.
22. The threaded fastener as claimed in claim 19, where up to five threads adjacent the thread-forming portion are hardened to at least HRC 50 hardness.
23. The threaded fastener as claimed in claim 19, where the thread-forming portion is between 3 and 7 thread pitches in length.
24. The threaded fastener as claimed in claim 1, the thread having a thread tip having a surface selected from the group consisting of a flat surface, an angled surface tapered toward the leading flank, an angled surface tapered toward the trailing flank, angled surfaces tapered toward the leading flank and the trailing flank, radius surface, and an arcuate surface.

25. A threaded fastener comprising
a fastener having a threaded portion with a major diameter portion, a leading flank having a normal angle between 10° and 60° , a trailing flank having a normal angle between 1° and 30° , and a shank portion extending between the trailing flank and the leading flank of adjacent threads, and
at least one minor protrusion formed along at least a portion of the shank portion of the threaded portions positioned between the trailing flank and the lead flank of adjacent threads.
26. The threaded fastener as claimed in claim 25 where the minor protrusion is continuous along the shank portion positioned between the trailing flank and the leading flank of adjacent threads.
27. The threaded fastener as claimed in claim 25 where the minor protrusion is intermittent along at least a portion of the shank portion positioned between the trailing flank and the leading flank of adjacent thread.
28. The threaded fastener as claimed in claim 25 where the height of the minor protrusion is not more than 30% of the thread height.
29. The threaded fastener as claimed in claim 25 where the height of the minor protrusion is not more than 20% of the thread height.
30. The threaded fastener as claimed in claim 25 where at least a part of the minor protrusion has cross-sectional shape selected from the group consisting of arcuate, rectangular, elliptical, trapezoidal, and triangular.
31. The threaded fastener as claimed in claim 25 where a lead side of the minor protrusion comprises a normal angle between 10° and 60° .
32. The threaded fastener as claimed in claim 25 further comprising
a thread-forming portion of at least HRC 50 hardness adapted to thread the fastener into a substrate.

33. The threaded fastener as claimed in claim 32, where the thread-forming portion has a shape selected from a group consisting of bilobular, trilobular, quadlobular and pentalobular.
34. The threaded fastener as claimed in claim 32, where the thread-forming portion has a pentalobular shape.
35. The threaded fastener as claimed in claim 32, where up to five threads adjacent the thread-forming portion are hardened to at least HRC 50 hardness.
36. The threaded fastener as claimed in claim 32, where the thread-forming portion is between 3 and 7 thread pitches in length.
37. The threaded fastener as claimed in claim 25, the thread having a thread tip having a surface selected from the group consisting of a flat surface, an angled surface tapered toward the leading flank, an angled surface tapered toward the trailing flank, angled surfaces tapered toward the leading flank and the trailing flank, radius surface, and an arcuate surface.