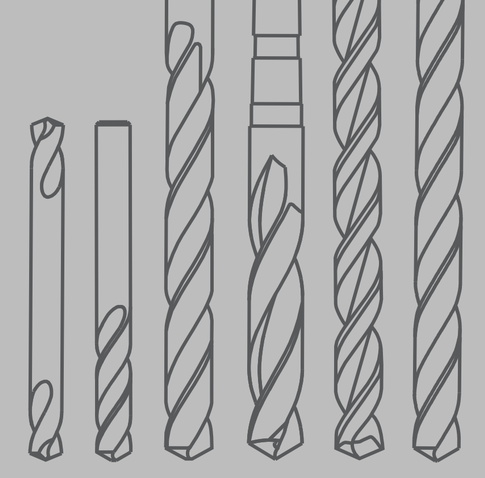
TWIST DRILL

TECHNICAL DATA



% Speed and Feed reduction for deep hole drilling
3 x Drill Diameter - 10%, 4 x Drill Diameter - 20%, 5 x Drill Diameter - 30%, More than 6 x Drill Diameter - 40%

DRILL TECHNICAL DATA

◉ Recommended ○ Suitable

RECOMMENDED SURFACE SPEED IN M/MIN (RECOMMENDED DRILL FEED) PER CODE GROUP (Parameters based on ideal conditions. Adjust parameter accordingly to real applications.)

	Material Type	Hardness	01J COATED	01J UNCOATED	01S COATED	01S UNCOATED	0CJ COATED	0CJ UNCOATED	0CS COATED	0CS UNCOATED	1X1 1X2 1X4 1X5	1X3 1X6	101 102	1TT	112 177	140 141 151	1AQ	1BB 1BS 1BT	1G7 1GB 1GL	1R5	1W6	175 176	116 117	121-126 132-136	154 164 BRIGHT FINISH	163 BRIGHT FINISH	163 164 COATED	109 110	118	119	120	10F 10L	184 185 TIAIN COATED	184 185 BRIGHT FINISH	138 139 1NA	114 115 BRIGHT FINISH	114 115 TIN COATED	2X1-2X4	201-205, 211-214 2A1, 2A2 242, 244-245 252, 254-255 221-224	208 2A7	2A9	261 279
STEEL	Free Cutting Steel	< 120 HB	◉ 125(V)	◉ 95(L)	◉ 125(W)	◉ 95(V)	◉ 125(V)	◉ 95(L)	◉ 125(W)	◉ 95(V)	◉ 35(H)	◉ 45(H)	◉ 35(H)	◉ 47(J)	◉ 35(J)	◉ 35(J)	○ 60(J)	○ 38(H)	◉ 60(J)	○ 60(J)	-	○ 35(H)	◉ 27(G)	◉ 24(E)	◉ 38(H)	◉ 40(J)	◉ 54(J)	◉ 38(F)	◉ 31(C)	◉ 31(B)	◉ 31(A)	◉ 35(J)	◉ 45(E)	◉ 35(E)	◉ 35(I)	◉ 35(I)	◉ 47(I)	◉ 35(I)	◉ 35(I)	◉ 35(J)	◉ 35(J)	○ 35(J)
	Structural Steel	< 200 HB	◉ 110(V)	◉ 80(L)	◉ 110(W)	◉ 80(V)	◉ 115(V)	◉ 85(L)	◉ 115(W)	◉ 85(V)	◉ 30(H)	◉ 40(H)	◉ 30(H)	◉ 40(J)	◉ 30(H)	◉ 30(J)	○ 50(J)	○ 33(H)	◉ 50(J)	○ 50(J)	-	○ 30(H)	◉ 25(G)	◉ 22(E)	◉ 33(H)	◉ 34(J)	◉ 46(J)	◉ 33(F)	◉ 26(C)	◉ 26(B)	◉ 26(A)	◉ 30(H)	◉ 39(E)	◉ 30(E)	◉ 30(I)	◉ 30(I)	◉ 41(I)	◉ 30(I)	◉ 30(I)	◉ 30(H)	◉ 30(H)	○ 30(H)
	Plain Carbon Steel	< 250 HB	◉ 90(V)	◉ 70(L)	◉ 90(W)	◉ 70(V)	◉ 110(V)	◉ 80(L)	◉ 110(W)	◉ 80(V)	◉ 25(F)	◉ 35(F)	◉ 25(F)	◉ 35(F)	◉ 27(G)	◉ 27(G)	○ 44(I)	○ 26(H)	◉ 44(I)	○ 44(I)	-	○ 25(F)	○ 20(E)	◉ 16(C)	◉ 26(H)	◉ 32(I)	◉ 43(I)	◉ 22(G)	◉ 22(C)	◉ 22(B)	◉ 22(A)	◉ 27(G)	◉ 35(C)	◉ 27(C)	◉ 25(G)	◉ 25(G)	◉ 34(G)	◉ 25(F)	◉ 25(F)	◉ 27(G)	◉ 27(G)	○ 27(G)
	Alloy Steel	< 250 HB	◉ 80(V)	◉ 60(L)	◉ 80(W)	◉ 60(L)	◉ 95(V)	◉ 70(L)	◉ 95(W)	◉ 70(L)	◉ 20(F)	◉ 30(F)	◉ 20(F)	◉ 30(F)	◉ 24(F)	◉ 21(G)	○ 44(I)	○ 26(H)	◉ 44(I)	○ 44(I)	-	○ 20(E)	◉ 16(E)	◉ 15(C)	◉ 26(H)	◉ 32(I)	◉ 43(I)	◉ 22(G)	◉ 22(C)	◉ 22(B)	◉ 22(A)	◉ 23(F)	○ 27(C)	○ 21(C)	◉ 20(F)	◉ 20(F)	◉ 27(F)	◉ 20(F)	◉ 20(F)	◉ 23(F)	◉ 23(F)	○ 23(F)
	Alloy Steel - Hardened	250 - 350 HB	◉ 60(V)	◉ 45(L)	◉ 60(W)	◉ 45(L)	◉ 75(V)	◉ 55(L)	◉ 75(W)	◉ 55(L)	-	-	-	-	○ 17(E)	-	○ 33(G)	○ 21(E)	◉ 33(G)	◉ 33(G)	-	○ 13(D)	-	-	◉ 21(E)	◉ 23(E)	◉ 31(E)	◉ 17(C)	◉ 12(A)	◉ 12(A)	◉ 12(A)	◉ 17(E)	○ 18(C)	○ 14(C)	○ 13(E)	○ 13(E)	○ 18(E)	-	○ 12(E)	◉ 17(E)	◉ 17(E)	◉ 17(E)
	Alloy Steel - Hardened	> 350 HB	◉ 50(U)	◉ 40(H)	◉ 50(U)	◉ 40(H)	◉ 65(U)	◉ 50(H)	◉ 65(U)	◉ 50(H)	-	-	-	-	○ 10(D)	-	○ 26(G)	○ 25(F)	○ 26(G)	◉ 26(G)	-	○ 9(C)	-	-	-	-	◉ 26(E)	-	-	-	-	◉ 10(D)	○ 13(B)	○ 10(B)	○ 9(D)	○ 9(D)	○ 12(D)	-	○ 9(D)	◉ 10(D)	◉ 10(D)	◉ 10(D)
	Alloy Steel - Hardened	49 - 55 HRC	◉ 30(U)	◉ 25(H)	◉ 30(U)	◉ 25(H)	◉ 30(U)	◉ 25(H)	◉ 30(U)	◉ 25(H)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Alloy Steel - Hardened	55 - 63 HRC	◉ 25(U)	◉ 20(H)	◉ 25(U)	◉ 20(H)	◉ 25(U)	◉ 20(H)	◉ 25(U)	◉ 20(H)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
STAINLESS STEEL	Free machining Stainless Steel	< 250 HB	○ 45(U)	○ 35(H)	○ 45(U)	○ 35(H)	○ 55(V)	○ 40(L)	○ 55(V)	○ 40(L)	-	-	-	○ 20(F)	○ 22(E)	○ 16(F)	-	◉ 17(E)	○ 22(E)	-	-	○ 15(D)	○ 10(D)	○ 9(C)	○ 15(E)	○ 15(F)	◉ 20(F)	○ 15(C)	○ 12(B)	○ 12(B)	○ 12(A)	◉ 24(E)	○ 20(C)	○ 16(C)	○ 15(E)	○ 15(E)	○ 20(E)	-	-	◉ 24(E)	◉ 24(E)	○ 24(E)
	Austenitic Stainless Steel	< 320 HB	○ 40(T)	○ 30(A)	○ 40(T)	○ 30(A)	○ 35(V)	○ 25(L)	○ 35(V)	○ 25(L)	-	-	-	○ 12(G)	○ 11(G)	○ 9(H)	-	◉ 9(E)	○ 11(G)	-	-	○ 7(F)	○ 6(F)	○ 4(E)	○ 7(E)	○ 7(F)	◉ 9(F)	○ 7(E)	○ 7(C)	○ 7(B)	○ 7(A)	◉ 11(G)	○ 11(D)	○ 9(D)	○ 8(G)	○ 8(G)	○ 11(G)	-	-	◉ 11(G)	◉ 11(G)	◉ 11(G)
	Ferritic and Martensitic Stainless Steel	< 300 HB	○ 35(T)	○ 25(A)	○ 35(T)	○ 25(A)	○ 30(U)	○ 25(H)	○ 30(U)	○ 25(H)	-	-	-	○ 16(C)	○ 15(C)	○ 10(D)	-	◉ 11(C)	○ 15(C)	-	-	○ 7(B)	○ 4(B)	○ 8(A)	○ 9(C)	○ 9(D)	◉ 12(D)	○ 9(B)	○ 8(A)	○ 8(A)	○ 8(A)	◉ 17(C)	○ 13(B)	○ 10(B)	○ 10(C)	○ 10(C)	○ 14(C)	-	-	◉ 17(C)	◉ 17(C)	◉ 17(C)
	Precipitation Hardened Stainless Steel	320 - 410 HB	○ 35(T)	○ 25(A)	○ 35(T)	○ 25(A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAST IRON	Lamellar Graphite Cast Iron	< 150 HB	◉ 90(W)	◉ 70(V)	◉ 90(W)	◉ 70(V)	◉ 110(W)	◉ 80(V)	◉ 110(W)	◉ 80(V)	◉ 30(H)	◉ 40(J)	◉ 30(H)	◉ 40(J)	◉ 35(H)	◉ 32(J)	-	-	○ 35(H)	-	◉ 58(I)	○ 27(H)	◉ 28(H)	◉ 25(G)	◉ 24(J)	◉ 34(L)	◉ 46(L)	◉ 16(L)	◉ 23(C)	◉ 23(B)	◉ 23(A)	◉ 35(J)	○ 41(E)	○ 32(E)	◉ 30(I)	◉ 30(I)	◉ 41(I)	○ 30(I)	◉ 30(I)	◉ 35(J)	◉ 35(J)	○ 35(J)
	Lamellar Graphite Cast Iron	150 - 300 HB	◉ 90(W)	◉ 70(V)	◉ 90(W)	◉ 70(V)	◉ 110(W)	◉ 80(V)	◉ 110(W)	◉ 80(V)	◉ 24(F)	◉ 30(E)	◉ 24(F)	◉ 30(E)	◉ 28(D)	◉ 27(G)	-	-	○ 28(D)	-	◉ 47(I)	○ 22(E)	◉ 21(E)	◉ 18(D)	◉ 19(J)	◉ 26(L)	◉ 35(L)	◉ 16(L)	◉ 23(C)	◉ 23(B)	◉ 23(A)	◉ 28(G)	○ 35(C)	○ 27(C)	◉ 24(F)	◉ 24(F)	◉ 32(F)	○ 24(E)	◉ 24(E)	◉ 28(G)	◉ 28(G)	○ 28(G)
	Nodular Graphite, Malleable Cast Iron	< 200 HB	◉ 70(V)	◉ 55(L)	◉ 70(V)	◉ 55(L)	◉ 80(V)	◉ 60(L)	◉ 80(V)	◉ 60(L)	-	○ 28(E)	○ 20(E)	○ 28(E)	◉ 22(E)	○ 20(F)	-	-	○ 22(E)	-	◉ 34(J)	○ 19(D)	○ 15(D)	○ 13(C)	◉ 19(J)	◉ 26(L)	◉ 35(L)	◉ 16(L)	◉ 16(C)	◉ 16(B)	◉ 16(A)	◉ 22(E)	○ 26(C)	○ 20(C)	○ 20(E)	○ 20(E)	○ 27(E)	-	○ 20(E)	◉ 22(E)	◉ 22(E)	○ 22(E)
	Nodular Graphite, Malleable Cast Iron	200 - 300 HB	◉ 70(V)	◉ 55(L)	◉ 70(V)	◉ 55(L)	◉ 80(V)	◉ 60(L)	◉ 80(V)	◉ 60(L)	-	○ 26(E)	○ 14(E)	○ 26(E)	◉ 17(E)	○ 16(F)	-	-	○ 17(E)	-	◉ 28(I)	○ 12(D)	○ 13(D)	○ 9(C)	◉ 14(I)	◉ 19(J)	◉ 26(J)	◉ 12(H)	◉ 11(A)	◉ 11(A)	◉ 11(A)	◉ 17(E)	○ 20(B)	○ 16(B)	○ 14(E)	○ 14(E)	○ 19(E)	-	○ 14(E)	◉ 17(E)	◉ 17(E)	◉ 17(E)
TITANIUM	Titanium unalloyed	< 200 HB	○ 50(U)	○ 40(H)	○ 50(U)	○ 40(H)	○ 55(V)	○ 40(L)	○ 55(V)	○ 40(L)	-	-	-	-	-	-	-	○ 35(G)	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 28(G)	-	-	-	-	-	-	-	○ 28(G)	○ 28(G)	○ 28(G)
	Titanium alloyed	< 270 HB	○ 40(U)	○ 30(H)	○ 40(U)	○ 30(H)	○ 45(V)	○ 35(L)	○ 45(V)	○ 35(L)	-	-	-	-	-	-	-	○ 24(G)	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 20(D)	-	-	-	-	-	-	-	○ 20(D)	○ 20(D)	○ 20(D)
	Titanium alloyed	270 - 350 HB	○ 35(T)	○ 25(A)	○ 35(T)	○ 25(A)	○ 40(U)	○ 30(H)	○ 40(U)	○ 30(H)	-	-	-	-	-	-	-	○ 10(E)	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 11(C)	-	-	-	-	-	-	-	○ 11(C)	○ 11(C)	○ 11(C)
NICKEL	Nickel unalloyed	< 150 HB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 22(I)	-	○ 22(I)	-	-	-	-	-	-	-	-	-	-	-	○ 15(G)	-	-	-	-	-	-	-	○ 15(G)	○ 15(G)	○ 15(G)
	Nickel alloyed	< 270 HB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 11(I)	-	○ 11(I)	-	-	-	-	-	-	-	-	-	-	-	○ 7(E)	-	-	-	-	-	-	-	○ 7(E)	○ 7(E)	○ 7(E)
	Nickel alloyed	270 - 350 HB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○ 10(E)	-	○ 10(E)	-	-	-	-	-	-	-	-	-	-	-	○ 6(B)	-	-	-	-	-	-	-	○ 6(B)	○ 6(B)	○ 6(B)
COPPER	Copper	< 100 HB	◉ 100(V)	◉ 75(L)	◉ 100(V)	◉ 75(L)	◉ 125(W)	◉ 95(V)	◉ 125(W)	◉ 95(V)	-	○ 50(G)	○ 33(G)	○ 50(G)	○ 38(H)	○ 36(H)	-	-	○ 38(H)	-	-	○ 35(F)	○ 30(E)	-	○ 65(G)	○ 65(H)	○ 88(H)	○ 65(F)	-	-	-	◉ 38(L)	○ 35(D)	○ 27(D)	○ 35(G)	○ 35(G)	○ 47(G)	○ 35(F)	○ 35(F)	○ 38(L)	◉ 38(L)	○ 38(L)
	Beta Brass, Bronze	< 200 HB	◉ 200(V)	◉ 150(L)	◉ 200(V)	◉ 150(L)	◉ 220(W)	◉ 165(V)	◉ 220(W)	◉ 165(V)	-	○ 33(I)	○ 35(I)	○ 33(I)	○ 40(F)	○ 38(J)	-	-	○ 40(F)	-	-	○ 33(H)	○ 32(H)	-	○ 53(I)	○ 66(J)	○ 89(J)	○ 70(F)	-	-	-	◉ 40(J)	○ 42(E)	○ 33(E)	○ 33(I)	○ 33(I)	○ 45(I)	○ 35(I)	○ 35(I)	○ 40(J)	◉ 40(J)	○ 40(J)
	Alpha Brass	< 200 HB	◉ 200(V)	◉ 150(L)	◉ 200(V)	◉ 150(L)	◉ 220(W)	◉ 165(V)	◉ 220(W)	◉ 165(V)	-	○ 39(H)	○ 27(H)	○ 39(H)	○ 27(H)	○ 27(I)	-	-	○ 27(H)	-	-	○ 27(G)	○ 27(G)	-	○ 34(H)	○ 40(J)	○ 54(J)	○ 34(G)	-	-	-	◉ 27(H)	○ 35(D)	○ 27(D)	○ 27(H)	○ 27(H)	○ 36(H)	○ 35(H)	○ 35(H)	○ 27(H)	◉ 27(H)	○ 27(H)
	High strength Bronze	< 470 HB	○ 80(U)	○ 60(H)	○ 80(U)	○ 60(H)	◉ 100(V)	◉ 75(L)	◉ 100(V)	◉ 75(L)	-	○ 30(G)	○ 16(G)	○ 30(G)	○ 21(F)	○ 16(H)	-	-	○ 48(I)	-	-	○ 16(F)	○ 16(E)	-	○ 30(G)	○ 31(G)	○ 42(G)	○ 30(G)	-	-	-	◉ 21(F)	○ 20(D)	○ 16(D)	○ 16(G)	○ 16(G)	○ 22(G)	○ 16(F)	○ 16(F)	○ 21(F)	◉ 21(F)	○ 21(F)
ALUMINIUM	Aluminium Magnesium unalloyed	< 100 HB	○ 225(W)	◉ 225(W)	○ 225(W)	◉ 225(W)	○ 250(W)	◉ 250(W)	○ 250(W)	◉ 250(W)	○ 33(J)	○ 41(K)	○ 33(J)	○ 41(K)	○ 33(J)	○ 33(K)	◉ 60(J)	-	○ 33(J)	-	-	○ 33(I)	○ 32(I)	○ 24(H)	○ 60(J)	○ 75(L)	○ 101(L)	○ 53(H)	○ 24(H)	○ 24(H)	○ 24(H)	◉ 33(J)	◉ 42(E)	◉ 33(E)	○ 33(J)	○ 33(J)	○ 45(J)	○ 26(J)	○ 26(J)	○ 33(J)	◉ 33(J)	-
	Aluminium Alloy < 5% Si	< 150 HB	○ 225(W)	◉ 225(W)	○ 225(W)	◉ 225(W)	○ 250(W)	◉ 250(W)	○ 250(W)	◉ 250(W)	○ 30(I)	○ 38(J)	○ 30(I)	○ 38(J)	○ 30(J)	○ 30(J)	◉ 45(N)	-	○ 30(I)	-	-	○ 30(H)	○ 27(H)	○ 22(G)	○ 45(N)	○ 45(N)	○ 61(N)	○ 45(N)	○ 22(G)	○ 22(G)	○ 22(G)	◉ 30(I)	◉ 39(E)	◉ 30(E)	○ 30(I)	○ 30(I)	○ 41(I)	○ 30(I)	○ 30(I)	○ 30(I)	◉ 30(I)	-
	Aluminium Alloy 5 to 10% Si	< 120 HB	◉ 180(V)	◉ 180(V)	◉ 180(V)	◉ 180(V)	◉ 200(V)	◉ 200(V)	○ 200(V)	◉ 200(V)	○ 27(H)	○ 33(I)	○ 27(H)	○ 33(I)	○ 30(H)	○ 30(I)	◉ 40(N)	-	○ 30(H)	-	-	○ 27(G)	○ 27(G)	○ 22(F)	○ 40(N)	○ 40(N)	○ 54(N)	○ 40(N)	○ 22(F)	○ 22(F)	○ 22(F)	◉ 30(H)	◉ 39(D)	◉ 30(D)	○ 27(H)	○ 27(H)	○ 36(H)	○ 28(H)	○ 28(H)	○ 30(H)	◉ 30(H)	-
	Aluminium Alloy > 10% Si		○ 120(V)	◉ 120(V)	○ 120(V)	◉ 120(V)	○ 150(V)	◉ 150(V)	○ 150(V)	◉ 150(V)	○ 24(F)	○ 33(I)	○ 24(F)	○ 33(I)	○ 27(F)	○ 25(I)	◉ 48(I)	-	○ 27(F)	-	-	○ 22(G)	○ 25(E)	○ 20(E)	○ 28(L)	○ 36(J)	○ 49(J)	○ 30(G)	○ 20(E)	○ 20(E)	○ 20(E)	◉ 27(F)	◉ 32(D)	◉ 25(D)	○ 22(H)	○ 22(H)	○ 30(H)	○ 23(H)	○ 23(H)	○ 27(F)	◉ 27(F)	-
SYNTHETIC	Duroplastics (short chipping)		-	-	-	-	-	-	-	-	-	○ 30(I)	○ 30(J)	○ 30(I)	-	○ 30(K)	○ 55(I)	-	-	-	-	○ 30(I)	○ 35(I)	○ 30(H)	○ 55(L)	○ 55(J)	○ 74(J)	○ 55(H)	○ 30(H)	○ 30(H)	○ 30(H)	◉ 35(K)	◉ 39(F)	◉ 30(F)	○ 30(J)	○ 30(J)	○ 41(J)	-	-	○ 35(K)	◉ 35(K)	-
	Thermoplastics (long chipping)		-	-	-	-	-	-	-	-	-	○ 50(H)	○ 28(H)	○ 50(H)	-	○ 35(I)	○ 40(G)	-	-	-	-	○ 28(G)	○ 26(G)	○ 26(F)	○ 40(G)	○ 40(H)	○ 54(H)	○ 40(F)	○ 26(F)	○ 26F)	○ 26(F)	◉ 28(J)	◉ 45(E)	◉ 35(E)	○ 28(H)	○ 28(H)	○ 38(H)	-	-	○ 28(J)	◉ 28(J)	-
	Fibre reinforced synthetic materials		-	-	-	-	-	-	-	-	-	○ 35(F)	-	○ 35(F)	-	-	-	-	-	-	-	○ 14(E)	-	-	-	-	-	-	-	-	◉ 20(H)	-	-	○ 14(F)	○ 14(F)	○ 19(F)	-	-	◉ 20(H)	◉ 20(H)	-

SURFACE TREATMENTS

Bright Finish
A bright finish tool has no surface treatment and is suitable for general purpose use.

Blue Finish
A blue finish is achieved by steam tempering - a thermal process which imparts a non-metallic surface to the tool. This surface is porous and by absorbing lubricant, helps prevent rusting, reduces friction and cold welding, resulting in increased tool life. Steam tempered products can successfully be used at slightly increased machining rates or on more difficult to machine materials.

Gold Oxide Finish
This is a metallic brown coloured surface treatment achieved by a low temperature temper and is normally only used on cobalt products for identification purposes.

Nitriding
Nitriding imparts a hard surface to the tool and is used for prolonging tool life and machining difficult to machine materials. Because nitriding makes the edge more brittle, care must be exercised in the type of application.
Nitrided tools are normally also steam tempered.

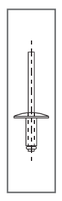
Titanium Nitride Coating (TiN)
TiN coating is a very hard, gold coloured surface coating a few microns thick which is applied by means of a complex process, called Physical Vapour Deposition (PVD), by advanced modern equipment. The coating is non-metallic and therefore reduces cold welding.
In certain applications increased speed and feed rates can be achieved because of:
(a) The hardness of the coating.
(b) The reduction in cutting force required due to a decrease in friction between the tool and the workpiece.
Tool performance will deteriorate after re-sharpening.

TiCN (Titanium Carbonitride)
The addition of carbon to TiN results in a significant increase in the hardness of TiCN over TiN. TiCN also has a much lower coefficient of friction which enhances the surface finish of components machined with TiCN coated tools, higher productivity can be achieved on a wide range of materials but, in particular stainless steel, titanium and nickel based alloys. It is now generally accepted that TiCN coating has been superseded by TiAlN for most machining applications.

TiAlN (Titanium Aluminium Nitride)
In addition to a higher hardness than both TiN and TiCN the aluminium in the coating imparts a much greater oxidation stability. This is as a result of a very thin film of (Aluminium Oxide) being formed on the surface of the TiAlN. The film is self repairing, leading to additional increased service life. These improvements allow the coating to withstand much higher temperatures which in turn allows increased cutting conditions, especially useful when machining Cast Iron and tough steels.

DRILL SIZES FOR ALUMINIUM & STEEL BLIND (POP) RIVETS

Rivet Body Diameter (mm)	Drill Size (mm)
2.4	2.5
3.2	3.3
4	4.1
4.8	4.9
6.4	6.5



Note:
For grooved and peeled rivets add 0.2mm to drill sizes (up to 4.8mm diameter)

PERIPHERAL SPEED TO rpm CONVERSION CHART

Metres per min.	5	10	20	30	40	50	60	70	80	90	100
Dia. mm	Revolutions per Minute										
1	1591	3182	6364	9546	12728	15910	19092	22274	25456	28638	31820
2	795	1590	3182	4770	6360	7950	9540	11130	12720	14310	15900
3	530	1060	2120	3180	4240	5300	6360	7420	8480	9540	10600
4	398	795	1590	2385	3180	3975	4770	5565	6360	7155	7950
5	318	636	1272	1908	2544	3180	3816	4452	5088	5724	6360
6	265	530	1060	1590	2120	2650	3180	3710	4240	4770	5300
7	227	455	910	1365	1820	2275	2730	3185	3640	4095	4550
8	199	398	796	1194	1592	1990	2388	2786	3184	3582	3980
9	177	353	706	1059	1412	1765	2118	2471	2824	3177	3530
10	159	318	636	954	1272	1590	1908	2226	2544	2862	3180
11	145	289	578	867	1156	1445	1734	2023	2312	2601	2890
12	133	265	530	795	1060	1325	1590	1855	2120	2385	2650
13	122	245	490	735	980	1225	1470	1715	1960	2205	2450
14	114	227	454	681	908	1135	1362	1589	1816	2043	2270
15	106	212	424	636	848	1060	1272	1484	1696	1908	2120
16	100	199	398	597	796	995	1194	1393	1592	1791	1990
18	89	177	354	531	708	885	1062	1239	1416	1593	1770
20	80	159	318	477	636	795	954	1113	1272	1431	1590
22	73	145	290	435	580	725	870	1015	1160	1305	1450
24	67	133	266	399	532	665	798	931	1064	1197	1330
26	61	122	244	366	488	610	732	854	976	1098	1220
28	57	113	228	342	456	570	684	798	912	1026	1140
30	53	106	212	318	424	530	636	742	848	954	1060
35	45	91	182	273	364	455	546	637	728	819	910
40	40	80	160	240	320	400	480	560	640	720	800
45	35	70	140	210	280	350	420	490	560	630	700
50	32	64	128	192	256	320	384	448	512	576	640
63	25	50	100	150	200	250	300	350	400	450	500
75	21	42	84	126	168	210	252	294	336	378	420
100	16	32	64	96	128	160	192	224	256	288	320

DRILL FEEDS (mm / rev.)

Ø	1	2	3	4	5	6	8	10	12	15	16	20	25	30	40	50
A	0.009-0.015	0.017-0.029	0.022-0.036	0.024-0.040	0.027-0.045	0.032-0.053	0.041-0.068	0.047-0.078	0.052-0.086	0.062-0.103	0.065-0.108	0.083-0.138	0.094-0.156	0.101-0.169	0.116-0.194	0.131-0.219
B	0.011-0.018	0.021-0.035	0.028-0.046	0.031-0.051	0.035-0.058	0.040-0.066	0.050-0.084	0.060-0.100	0.068-0.113	0.077-0.129	0.081-0.135	0.101-0.169	0.115-0.191	0.124-0.206	0.141-0.235	0.156-0.260
C	0.011-0.019	0.024-0.040	0.033-0.055	0.038-0.063	0.042-0.070	0.048-0.080	0.060-0.100	0.074-0.123	0.083-0.138	0.094-0.156	0.098-0.163	0.120-0.200	0.135-0.225	0.146-0.244	0.165-0.275	0.180-0.300
D	0.012-0.020	0.029-0.048	0.040-0.066	0.045-0.075	0.051-0.085	0.059-0.098	0.074-0.123	0.089-0.149	0.098-0.163	0.112-0.186	0.116-0.194	0.141-0.235	0.158-0.263	0.171-0.285	0.190-0.316	0.206-0.344
E	0.013-0.021	0.032-0.054	0.047-0.078	0.053-0.089	0.060-0.100	0.069-0.115	0.086-0.144	0.105-0.175	0.113-0.188	0.130-0.216	0.135-0.225	0.161-0.269	0.180-0.300	0.195-0.325	0.214-0.356	0.233-0.388
F	0.014-0.023	0.038-0.063	0.055-0.091	0.063-0.105	0.071-0.119	0.082-0.136	0.104-0.173	0.124-0.206	0.134-0.223	0.152-0.253	0.158-0.263	0.186-0.310	0.206-0.344	0.221-0.369	0.240-0.400	0.257-0.429
G	0.014-0.024	0.042-0.070	0.063-0.105	0.072-0.120	0.082-0.136	0.095-0.158	0.120-0.200	0.143-0.238	0.154-0.256	0.173-0.289	0.180-0.300	0.210-0.350	0.233-0.388	0.248-0.413	0.266-0.444	0.281-0.469
H	0.015-0.025	0.050-0.083	0.077-0.128	0.087-0.145	0.098-0.163	0.113-0.188	0.143-0.238	0.171-0.285	0.182-0.304	0.203-0.339	0.210-0.350	0.240-0.400	0.266-0.444	0.281-0.469	0.299-0.498	0.314-0.523
I	0.016-0.026	0.057-0.095	0.089-0.149	0.101-0.168	0.113-0.188	0.130-0.216	0.165-0.275	0.199-0.331	0.210-0.350	0.233-0.388	0.240-0.400	0.270-0.450	0.300-0.500	0.315-0.525	0.330-0.550	0.345-0.575
J	0.018-0.030	0.063-0.105	0.101-0.169	0.114-0.190	0.128-0.213	0.148-0.246	0.188-0.313	0.224-0.373	0.236-0.394	0.262-0.436	0.270-0.450	0.304-0.506	0.334-0.556	0.349-0.581	0.364-0.606	0.377-0.629
K	0.020-0.033	0.069-0.115	0.113-0.188	0.128-0.213	0.143-0.238	0.165-0.275	0.210-0.350	0.248-0.413	0.263-0.438	0.291-0.485	0.300-0.500	0.338-0.563	0.368-0.613	0.383-0.638	0.398-0.663	0.409-0.681
L	0.021-0.035	0.076-0.126	0.124-0.206	0.140-0.233	0.156-0.260	0.180-0.300	0.229-0.381	0.270-0.450	0.289-0.481	0.314-0.524	0.323-0.538	0.364-0.606	0.394-0.656	0.409-0.681	0.426-0.710	0.441-0.735
M	0.023-0.038	0.083-0.138	0.135-0.225	0.152-0.253	0.169-0.281	0.195-0.325	0.248-0.413	0.293-0.488	0.315-0.525	0.338-0.563	0.345-0.575	0.390-0.650	0.420-0.700	0.435-0.725	0.454-0.756	0.473-0.788
N	0.024-0.040	0.089-0.149	0.146-0.244	0.164-0.273	0.182-0.303	0.210-0.350	0.266-0.444	0.315-0.525	0.341-0.569	0.361-0.601	0.368-0.613	0.416-0.694	0.446-0.744	0.461-0.769	0.482-0.803	0.504-0.840
S	0.006-0.010	0.011-0.018	0.015-0.025	0.019-0.031	0.023-0.038	0.028-0.046	0.038-0.063	0.060-0.100	0.075-0.125	0.092-0.154	0.098-0.163	0.113-0.188	-	-	-	-
T	0.011