

709M40 (En 19)

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| BS 970 | SAE (AISI) | WERKSTOFF NO |
| 709 M 40 | 4140 | 1.7225 |

CHEMICAL COMPOSITION

| | |
|------------|---------------|
| CARBON | : 0,35 - 0,45 |
| SILICON | : 0,10 - 0,35 |
| MANGANESE | : 0,50 - 0,80 |
| CHROMIUM | : 0,90 - 1,20 |
| MOLYBDENUM | : 0,20 - 0,40 |
| SULPHUR | : 0,05 MAX |
| PHOSPHORUS | : 0,05 MAX |

MECHANICAL PROPERTIES

| PROPERTY | HARDENED & TEMPERED CONDITION | | | | |
|-------------------------------|-------------------------------|---------|----------|----------|-----------|
| | R | S | T | U | V |
| Limited Ruling Section mm | 254 | 152 | 102 | 64 | 29 |
| Tensile Strength, MPa | 690/850 | 770/930 | 850/1000 | 930/1080 | 1000/1160 |
| Yield Stress, MPa, Min | 480 | 570 | 665 | 740 | 835 |
| Elongation percent, Min | 15 | 15 | 13 | 12 | 12 |
| Izod Impact Value, Joule, Min | 34 | 54 | 54 | 47,5 | 47,5 |
| Brinell Hardness Numbers | 201/255 | 223/277 | 248/302 | 269/321 | 293/341 |

STANDARD STOCK SIZES IN AS ROLLED AND HEAT TREATED CONDITION

| SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m |
|------|--------|------|--------|------|---------|------|---------|
| 20 | 2,466 | 60 | 22,195 | 100 | 61,654 | 170 | 178,179 |
| 25 | 3,853 | 65 | 26,049 | 108 | 71,846 | 180 | 199,757 |
| 30 | 5,549 | 70 | 30,210 | 115 | 81,537 | 190 | 222,570 |
| 35 | 7,553 | 75 | 34,680 | 120 | 88,781 | 200 | 246,614 |
| 40 | 9,865 | 80 | 39,458 | 130 | 104,195 | 210 | 271,893 |
| 45 | 12,485 | 85 | 44,545 | 140 | 120,841 | 220 | 298,403 |
| 50 | 15,413 | 90 | 49,939 | 150 | 138,721 | 230 | 326,148 |
| 55 | 18,650 | 95 | 55,642 | 160 | 157,833 | 250 | 385,336 |

TYPICAL USES:

AXLE SHAFTS, CRANKSHAFTS, CONNECTING RODS, GEARS, HIGH TENSILE BOLTS AND STUDS, PROPELLER SHAFT JOINTS, RIFLE BARRELS AND BREECH MECHANISMS FOR SMALL ARMS PARTS, INDUCTION HARDENED TRACKPINS.

817M40 (En 24)

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| BS 970 | SAE (AISI) | WERKSTOFF NO |
| 817 M 40 | 9850 | 1.6565 |

CHEMICAL COMPOSITION

| | |
|------------|---------------|
| CARBON | : 0,35 - 0,45 |
| SILICON | : 0,10 - 0,35 |
| MANGANESE | : 0,45 - 0,70 |
| NICKEL | : 1,30 - 1,80 |
| CHROMIUM | : 0,90 - 1,40 |
| MOLYBDENUM | : 0,20 - 0,35 |
| SULPHUR | : 0,05 MAX |
| PHOSPHORUS | : 0,05 MAX |

MECHANICAL PROPERTIES

| PROPERTY | HARDENED & TEMPERED CONDITION | | | | | |
|-------------------------------|-------------------------------|----------|-----------|-----------|-----------|---------|
| | T | U | V | W | X | Z |
| Limited Ruling Section mm | 254 | 102 | 64 | 29 | 29 | 29 |
| Tensile Strength, MPa | 850/1000 | 930/1080 | 1000/1160 | 1080/1240 | 1160/1310 | 1540 |
| Yield Stress, MPa, Min | 635 | 740 | 835 | 925 | 1005 | 1130 |
| Elongation percent, Min | 13 | 12 | 12 | 11 | 10 | 5 |
| Izod Impact Value, Joule, Min | 40,7 | 47,5 | 47,5 | 40,7 | 34 | 11 |
| Brinell Hardness Numbers | 248/302 | 269/321 | 293/341 | 311/375 | 341/388 | 444 min |

STANDARD STOCK SIZES IN AS ROLLED AND HEAT TREATED CONDITION

| SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m |
|------|--------|------|--------|------|---------|------|---------|
| 20 | 2,466 | 60 | 22,195 | 100 | 61,654 | 170 | 178,179 |
| 25 | 3,853 | 65 | 26,049 | 108 | 71,846 | 180 | 199,757 |
| 30 | 5,549 | 70 | 30,210 | 115 | 81,537 | 190 | 222,570 |
| 35 | 7,553 | 75 | 34,680 | 120 | 88,781 | 200 | 246,614 |
| 40 | 9,865 | 80 | 39,458 | 130 | 104,195 | 210 | 271,893 |
| 45 | 12,485 | 85 | 44,545 | 140 | 120,841 | 220 | 298,403 |
| 50 | 15,413 | 90 | 49,939 | 150 | 138,721 | 230 | 326,148 |
| 55 | 18,650 | 95 | 55,642 | 160 | 157,833 | 250 | 385,336 |

TYPICAL USES:

AUTOMOBILE MAIN SHAFTS, AXLE SHAFTS, CONNECTING ROD BOLTS, SYNCHRONISING CONES, PUSH RODS, STUDS, DIFFERENTIAL SHAFTS, MOTORCYCLE KICK STARTER RATCHETS, PINION SLEEVES, MANDREL BARS FOR TUBE MANUFACTURING, GUN BARRELS, BREECH MECHANISM PARTS, HIGH DUTY ENGINE CONNECTING RODS, HIGH TEMPERATURE BOLTS IN OIL REFINING AND STEAM INSTALLATIONS, VARIOUS PARTS OF MACHINE TOOLS SUCH AS SPINDLE GEARS, COMPENSATING WASHERS, POWER TRANSMISSION GEARS, SLIDE RACKS AND SLIDE CAMS.

835M30 (En 30B)

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| BS 970 | SAE (AISI) | WERKSTOFF NO |
| 835 M 30 | - | 1.6747 |

CHEMICAL COMPOSITION

| | |
|------------|---------------|
| CARBON | : 0,26 - 0,34 |
| SILICON | : 0,10 - 0,35 |
| MANGANESE | : 0,40 - 0,60 |
| NICKEL | : 3,90 - 4,30 |
| CHROMIUM | : 1,10 - 1,40 |
| MOLYBDENUM | : 0,20 - 0,40 |
| SULPHUR | : 0,05 MAX |
| PHOSPHORUS | : 0,05 MAX |

MECHANICAL PROPERTIES

| PROPERTY | CONDITION Z |
|-------------------------------|-------------|
| Limited Ruling Section mm | 152 |
| Tensile Strength, MPa, Min | 1540 |
| Yield Stress, MPa, Min | 1125 |
| Elongation percent, Min | 7 |
| Izod Impact Value, Joule, Min | 20 |
| Brinell Hardness Numbers | 444 min |

STANDARD STOCK SIZES IN THE ANNEALED CONDITION

| SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m |
|------|--------|------|--------|------|---------|------|---------|
| 20 | 2,466 | 60 | 22,195 | 100 | 61,654 | 170 | 178,179 |
| 25 | 3,853 | 65 | 26,049 | 108 | 71,846 | 180 | 199,757 |
| 30 | 5,549 | 70 | 30,210 | 115 | 81,537 | 190 | 222,570 |
| 35 | 7,553 | 75 | 34,680 | 120 | 88,781 | 200 | 246,614 |
| 40 | 9,865 | 80 | 39,458 | 130 | 104,195 | 210 | 271,893 |
| 45 | 12,485 | 85 | 44,545 | 140 | 120,841 | 220 | 298,403 |
| 50 | 15,413 | 90 | 49,939 | 150 | 138,721 | 230 | 326,148 |
| 55 | 18,650 | 95 | 55,642 | 160 | 157,833 | 250 | 385,336 |

TYPICAL USES:

GEARS, SHAFTS, HIGH DUTY BOLTS, HIGH DUTY SPINDLES AND OTHER PARTS DEMANDING MAXIMUM STRENGTH, TOUGHNESS OR WEAR RESISTANCE.

THIS STEEL IS STOCKED IN THE ANNEALED CONDITION, TO RENDER MACHINING POSSIBLE, AND MUST BE HEAT TREATED AS FOLLOWS:

HARDEN IN AIR (OR OIL FOR LARGER SECTIONS OVER 2½" DIAMETERS) FROM A TEMPERATURE OF 810° / 830° C. TEMPER, IF DESIRED, AT A SUITABLE TEMPERATURE NOT EXCEEDING 250° C.

655M13 (En 36B)

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| BS 970 | SAE (AISI) | WERKSTOFF NO |
| 655 M 13 | 3316 | 1.5752 |

CHEMICAL COMPOSITION

| | |
|------------|---------------|
| CARBON | : 0,12 - 0,18 |
| SILICON | : 0,10 - 0,35 |
| MANGANESE | : 0,30 - 0,60 |
| NICKEL | : 3,00 - 3,75 |
| CHROMIUM | : 0,60 - 1,10 |
| SULPHUR | : 0,05 MAX |
| PHOSPHORUS | : 0,05 MAX |

MECHANICAL PROPERTIES

| PROPERTY | |
|-------------------------------|------|
| Tensile Strength, MPa, Min | 1000 |
| Elongation percent, Min | 9 |
| Izod Impact Value, Joule, Min | 30 |

STANDARD STOCK SIZES IN THE AS ROLLED CONDITION

| SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m | SIZE | Kg/m |
|------|--------|------|--------|------|---------|------|---------|
| 20 | 2,466 | 60 | 22,195 | 100 | 61,654 | 170 | 178,179 |
| 25 | 3,853 | 65 | 26,049 | 108 | 71,846 | 180 | 199,757 |
| 30 | 5,549 | 70 | 30,210 | 115 | 81,537 | 190 | 222,570 |
| 35 | 7,553 | 75 | 34,680 | 120 | 88,781 | 200 | 246,614 |
| 40 | 9,865 | 80 | 39,458 | 130 | 104,195 | 210 | 271,893 |
| 45 | 12,485 | 85 | 44,545 | 140 | 120,841 | 220 | 298,403 |
| 50 | 15,413 | 90 | 49,939 | 150 | 138,721 | 230 | 326,148 |
| 55 | 18,650 | 95 | 55,642 | 160 | 157,833 | 250 | 385,336 |

TYPICAL USES:

HIGH DUTY GEARS FOR AIRCRAFT, AUTO AND HEAVY VEHICLE TRANSMISSION COMPONENTS, STEERING WORMS, TRACK ROD PINS, GUDGEON PINS, TIMING WHEELS, BREECH MECHANISMS AND SMALL ARMS PARTS.