

THE STEEL SUPPLY COMPANY

Electreat 45, 50, and 60®

Electreat is a trade name for a unique group of steels that are produced to meet the demanding physical needs required by industry for extra service piston rods or linear bearing shafts. Our metallurgist worked with the producing mills nearly a half century ago to produce a grade of steel that would take the high heat needed to create a case hardened material while at the same time maintaining machinability.

Electreat 45 and 50 are produced from 1045/1050 grade carbon steel. Diameters from 3/8" through and including 4-1/2", and metric diameters from 12mm through and including 110mm, are provided as #2 Chrome Piston Steel Electreat 50®. This is a precision ground shafting which is then induction hardened to Rockwell C 50-62 levels with a minimum case depth of .030", polished, hard chrome plated and polished to a 16 maximum RMS (Ra 14.5) finish. All of the diameters in this size range are produced with 100,000 PSI (690 Mpa) minimum yield strength material certified to ASTM specification A311, Class B. Electreat 45 is supplied in diameters 4-3/4" through and including 6", and metric diameters from 115mm through and including 150mm. The process is the same as above but these diameters, due to manufacturing limitations, are supplied with 75,000 PSI (520 Mpa) minimum yield strength certified to ASTM specification A-108. Electreat T45 is provided on larger rounds from 6-1/2" diameter through and including 12" diameter, and metric diameters from 160mm through and including 200mm. Again, the processes are the same as is ASTM A-108, however, the yield strength drops to 40,000 PSI (275 Mpa) on these large rounds.

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Electreat 60 is generally provided using a 1060 base material per ASTM specification A-29 and with a minimum yield strength of 50,000 PSI (345 Mpa). The hardness provided is a minimum of Rockwell C-60 with a case depth of .030” minimum. This product is provided as very close tolerance Turned, Ground and Polished shafting and is rarely chrome plated due to tolerance requirements. The main application for Electreat 60 is linear bearing shafting.

Although all Electreat products are readily machined using tooling and procedures generally accepted, there are some precautions to be observed. The outer case of the material is so hard that tooling and equipment must be rigid and in excellent condition to withstand the pressures involved.

Carbide, CBN, or ceramic inserts are best. A surface feed of approximately 100 SFM, and a feed rate of .004 IPR are considered good starting points. The tool may also be angled to the direction of the cut to spread the forces and wear along the tool edge to affect a much longer tool life.

Threads may be cut on the outside diameter using conventional single point methods. Once beneath the hardened surface, conventional techniques for machining 1045 to 1060 grades of steel should be realized. Consider, too, that all hardened shafting will have a transition area for depth.

Flame hardening is seldom used but may be required in special instances. Induction hardening offers controlled hardness with shallow case and a narrow transition band. Flame hardness reduces this control and offers a high hardness coupled with a much deeper case.