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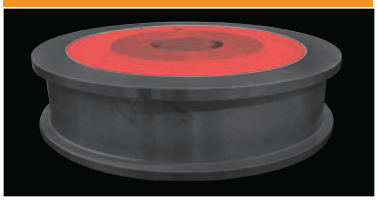
McKEES ROCKS FORGINGS

Rim Toughened AISI-1070



- Rim Toughening is the most popular form of heat treating for Crane Wheels, Industrial Car Wheels, and Sheaves.
- The process involves the uniform heating of the entire wheel and then selectively quenching the rim while the wheel is spinning.
- The most common hardness range for the wheels heat treated in this manner is 321-363 BHN, but other ranges can be achieved as well.
- The depth of hardness achieved with this process can reach 1-1/2 inches making it the deepest penetrating of the common wheel heat treating practices.
- The depth of hardness and level of hardness achieved using this process create an extremely tough and durable wheel for moderately loaded wheel applications.
- Rim Toughening is the process that is specified in ASTM A-504 Class C.

Recommended Usage:

- Cranes with moderate wheel loads as defined in the "AIST Technical Report #6, Allowable Wheel Loads Guide for Heat Treated (320 BHN Minimum) Crane Wheels".
- Applications with high flange impact loads due to bad rail joints.
- Applications with consistently high flange pressure due to severe end truck or rail misalignment – These flanges will bend rather than break.

Rim Toughened Wheel Section
(Based on a 27" Wheel Sample)

Deep Hardened™ AISI-1070

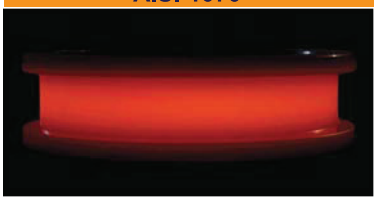
- The "Deep Hardening" heat treating process produces Crane Wheels, Industrial Car Wheels, Sheaves and Rollers with a surface hardness up to 60 Rockwell C-scale (Rc).
- The process involves the full normalizing of the forging followed by a selective heating of the rim area and then aggressive quenching in a polymer solution.
- The depth of hardness produced in this process exceeds that which is produced by the traditional carburizing process and meets or exceeds the depth of hardness requirements of the "AIST Technical Report # 6, for Case Hardened Wheels".
- The hardness level and depth of hardness achieved in this process provide the maximum load bearing capability and abrasion resistance of any of the processes that we offer.
- This process yields the best sub-surface hardness depth in the wheel tread of any 'Case Hardened' wheel which gives it the maximum resistance to tread spalling.

Recommended Usage:

- Cranes with extremely high wheel loads as defined in the "AIST Technical Report #6, Allowable Wheel Loads Guide for Case Hardened (56-60 Rc) Crane Wheels".
- Cranes or Industrial Cars that operate in areas with high levels of abrasive dust or dirt or other abrasive environments.
- Applications with reasonable end truck and rail alignment that can take advantage of the significant depths of hardness in the tread and flange.

Deep Hardened™ Wheel Section
(Based on a 27" Wheel Sample)

Differentially Hardened AISI-1070



- The "Differential Hardening" heat treating process produces Crane Wheels, Industrial Car Wheels, and Sheaves with a tread and inner flange surface hardness up to 60 Rockwell C-scale (Rc).
- The process involves the full normalizing of the forging followed by a selective heating of the rim and inside flange area and then aggressive quenching in a polymer solution.
- The depth of hardness produced in this process exceeds that which is produced by the traditional carburizing process and meets or exceeds the depth of hardness requirements of the "AIST Technical Report # 6, for Case Hardened wheels."
- By only heating the inside of the flanges, the core and outside of the flanges remain ductile and resistant to breakage.
- This process yields the best combination of maximum wheel load bearing capability and flange toughness in the industry.

Recommended Usage:

- Cranes with extremely high wheel loads as defined in the "AIST Technical Report #6, Allowable Wheel Loads Guide for Case Hardened (56-60 Rc) Crane Wheels".
- Cranes that operate in areas with high levels of abrasive dust or dirt or other abrasive environments.
- Applications with questionable end truck and rail alignment that may cause crane skewing resulting in significant flange pressure.
- Older cranes that have lost the ability to track correctly during normal operation which results in significant contact between the wheel flanges and rail head.

Differentially Hardened Wheel Section
(Based on a 27" Wheel Sample)

Super Tough AISI-4140

- The AISI-4140 "Super Tough" Crane Wheel is capable of supporting extremely high wheel loads while still maintaining superior flange toughness and ductility.
- The process involves the full normalizing of the forging followed by selective heating of the rim area and agressive quenching in a polymer solution.
- The alloy steel allows for significantly greater toughness and impact resistance than a similar hardness carbon steel wheel.
- Laboratory testing shows that flanges on AISI-4140 "Super Tough" Wheels have 50% greater flange strength and 50% greater impact strength than carbon steel wheel flanges.
- The increased hardenability of the Alloy Steel allows for deeper hardness penetration and increased spalling resistance.
- The depth of hardness achieved with the "Super Tough" wheel is 50% greater than with a carbon steel wheel (greater than 40 Rc at .350 inch).
- Available in a variety of hardness ranges up 56 Rc (575 BHN) to meet your most demanding needs.

Recommended Usage:

- Older cranes with poorly aligned runways.
- Applications with heavy loads and high flange wear.
- Applications that have experienced flange breakage.

AISI-4140 Super Tough Wheel Section
(Based on a 24" Wheel Sample)

Making Wheels Is All We Do... Of Course We're The Best!