Carbidic Austempered Ductile Iron (CADI)

Properties

Carbidic Austempered Ductile Iron (CADI) is produced by austempering ductile iron that has a controlled volume of carbides present within it. The resulting microstructure consists of carbides within an ausferrite (ADI) matrix. The amount of carbide present is dependent upon the end use with a typical range of 10-30% carbide. The properties of the ausferrite surrounding the carbide are determined by the selection of the heat treatment parameters.

CADI is used in applications where wear resistance is of primary concern. It is more wear resistant than Grade 5 ADI, less expensive and tougher than 18% chrome white iron and can replace Mn steel at an equal or lower cost. CADI is also less expensive and can compete with some Abrasion Resistant Irons.

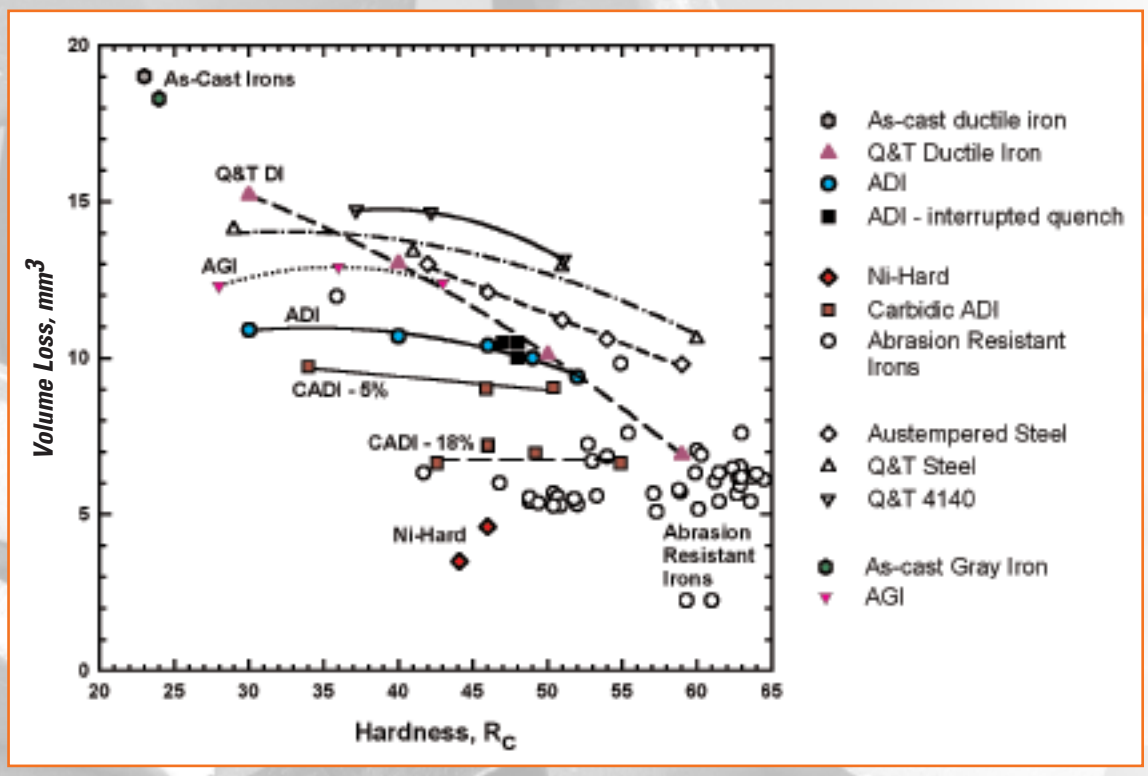

Fig. 1. Pin Abrasion Data for various cast irons, Austempered Ductile Irons, steel and abrasion resistant irons. Abrasion resistant iron data from the Abrasion - Resistant Cast Iron Handbook.

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Wet Sand/Rubber Wheel Wear Testing

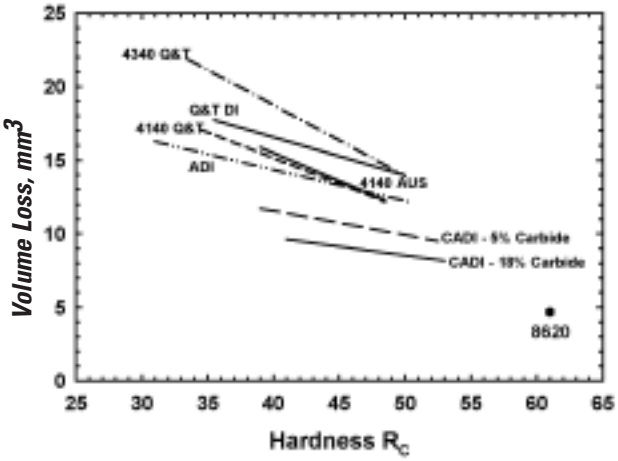

Fig. 2. Wet Sand/Rubber Wheel Abrasion results for various ductile iron, Austempered Ductile Irons and steel.

Dry Sand/Rubber Wheel Wear Testing

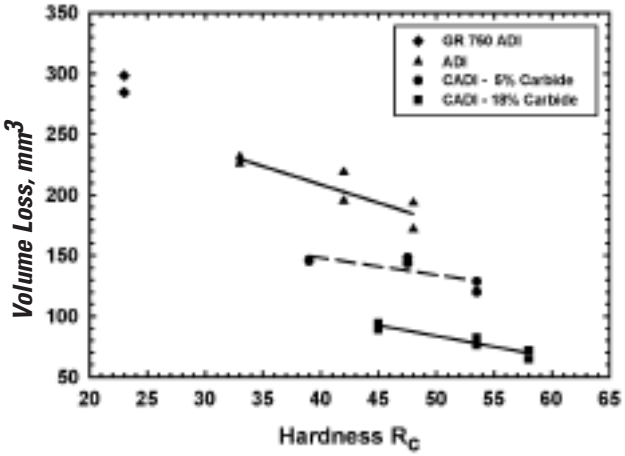

Fig. 3. Dry Sand/Rubber Wheel Abrasion results for various Austempered Ductile Irons.

Test Methods

- ***Pin Abrasion - ASTM G132-96 (2001)***
- ***Wet Sand/Rubber Wheel (WSRW) ASTM G105-02***
- ***Dry Sand/Rubber Wheel (DSRW) ASTM G65-00***

Impact Properties of CADI

The impact properties of CADI are dependent upon the volume fraction of carbide present and the relative fineness of the ausferrite. Typical ranges are 4-20 ft-lbs (5-27 J) for unnotched Charpy impact testing at ambient temperature. Abrasion Resistant Irons exhibit 2 ft-lbs (3J) under the same testing conditions.

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