Hardfaced Coatings – Bond Strength on Dura-Bar

Dura-

Hardfaced coatings are effectively applied to Dura-Bar, for many applications such as plungers and pony rods, with excellent bond strength. In support, Extreme Coatings, in St. Petersburg, Florida, performed the hardcoating and then IMR Laboratories, located in Lansing, New York, performed independent testing of bond strength per ASTM 633-13.

Bond coat - parent metal interface failure

IMR tested samples of Dura-Bar 65-45-12 ductile iron, 1018 carbon steel and 4140 steel, having 2 types of hardfaced coatings and 2 different application methods. See the drawing of the Test Setup at right, and the tables below for the bond bar data and test results.

Sample Tensile Strength Load (lb) Bond Bar 11,800 9,212 Crosshead Speed: 0.04 in/min. Pulling fixture → Epoxy failure Epoxy: FM1000, Lot# 6248 Top coat failure (Top) (Middle of coating) Method: ASTM C 633-13 Bond coat → Bond coat →					
Bond Bar 11,800 9,212 Crosshead Speed: 0.04 in/min. Epoxy: FM1000, Lot# 6248 Method: ASTM C 633-13 Bond cat → Image: Construction of coating) Bond cat → Image: Construction of coating) Bond coat → Image: Construction of coating)	Sample	Tensile Strength	Load (lb)		Possible failure
Crosshead Speed: 0.04 in/min. Epoxy: FM1000, Lot# 6248 Method: ASTM C 633-13 Pulling fixture→ Epoxy → Top coat → (Middle of coating) Bond coat → (Bottom of coating)	Bond Bar	11,800	9,212		locations
Parent metal →	Crosshead Sp Epoxy: FM100 Method: ASTN	eed: 0.04 in/min. 10, Lot# 6248 A C 633-13		Pulling fixture → Epoxy → Top coat → Bond coat →	Epoxy failure Top coat failure (Top) (Middle of coating) (Bottom of coating) Bond coat - top coat interface failure Internal bond coat failure

Parent Material	Hardfaced Coating	Application Method	Bond Tensile Strength*	Load (lb)	Cross Sectional Area (in2)	Mode of Failure
4140 Steel	Tungsten Carbide	HVOF	11,641	9,051	0.7776	Ероху
C1018 Steel	Tungsten Carbide	HVOF	11,414	8,929	0.7823	Ероху
Dura-Bar 65-45-12	Tungsten Carbide	HVOF	12,080	9,355	0.744	Ероху
Dura-Bar 65-45-12	Nickel Based Spray Fusible	Flame Spray and Fuse	11,788	9,166	0.7776	Ероху
Dura-Bar 65-45-12	Nickel Based Spray Fusible	Flame Spray and Fuse	11,453	8,960	0.7823	Ероху
C1018 Steel	Nickel Based Spray Fusible	Flame Spray and Fuse	11,119	8,680	0.7807	Ероху
C1018 Steel	Nickel Based Spray Fusible	Flame Spray and Fuse	10,653	8,266	0.776	Ероху
4140 Steel	Nickel Based Spray Fusible	Flame Spray and Fuse	10,815	8,486	0.7846	Ероху
4140 Steel	Nickel Based Spray Fusible	Flame Spray and Fuse	10,141	7,901	0.7791	Ероху

*Bond tensile strength results exceed 10,000 psi minimum in accordance with ASTM C 633-13.

Contact Dura-Bar today to discuss your application and the benefits you can take advantage of.

