



Technical Information

Material analysis

NIHARD 4

From today's series of wear resistant alloys, *NIHARD 4* is the toughest, most resistant one. *NIHARD 4* is similar to ASTM specification A532 class 1, type D.

Apart from its wear resistance, it also provides best resistance against shock impacts. This makes *NIHARD 4* extremely suitable for dredging pumps, where rocks and other hard solids are likely to get in the pump.

The presence of chrome and nickel gives *NIHARD 4* more resistance against corrosion than cast iron. PH range: 5-8

NIHARD 4 consists of chrome-iron carbides $(Cr,Fe)_7C_3$, embedded in a martensitic/bainitic base structure.

Chemical analysis	
C	2.6 - 3.2 %
Si	1.8 - 2.0 %
Mn	0.4 - 0.6 %
S	max. 0.1 %
P	max. 0.06 %
Ni	5.0 - 6.5 %
Cr	8.0 - 9.0 %

Mechanical analysis	
Brinell hardness	550 - 700 HBr
Rockwell hardness	53 - 63 HRc
Tensile strength	10 - 12 x 10 ⁶ lb/ft ²
Modulus of elasticity	4 x 10 ⁹ lb/ft ²
Bending strength	45 - 55 lb-ft
Impact value	47 - 31 lb-ft

Wear figures for various materials tested with wet quartz-sand.

Material	HBr	Wear factor
Armo-steel	90	1.4
Cast iron	200	1.0 - 1.5
Carbon steel (0.2 % C)	107	1.0 (reference material)
Bainitic cast iron	380 - 430	0.75
12 % chrome iron	400 - 500	0.4 - 0.75
NIHARD 4	550 - 700	0.25 - 0.6