

Crosshead Hardness Measurements

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03/24/2010



ISM Engine Crossheads Hardness Measurement



- Four New made ISM engine crossheads were tested for surface hardness and case depth hardness @:
 - **CTC Metallurgical Lab**
- Another Four Crossheads (New Made) was tested for surface Hardness and case depth @:
 - **Supplier Lab**
- **Based of the results from Both Labs the crossheads hardness met Cummins Spec.**



Metallurgical Lab CTC Results

Wear Pad Hardness Result

| Part | HR15N Spec (88 - 93) | | |
|------|----------------------|-----------|-----------|
| | Reading 1 | Reading 2 | Reading 3 |
| AA | 93 | 92.7 | 92.6 |
| J | 92.2 | 92.6 | 92.7 |
| F | 92.6 | 92 | 92.2 |
| GG | 92.3 | 92.6 | 92.3 |

The results indicated that the crossheads hardness are in the spec

Metallurgical Lab CTC Results



5 mm
┌───┐

Measured Case depth
54.6 HRC @ 299 Microns



By Cummins Spec the Case depth should
be 50 HRC min @ 229 Microns

5 mm
┌───┐

Metallurgical Lab CTC Results



5 mm

Measured Case depth
57 HRC @ 300 Microns



5 mm

Metallurgical Lab CTC Results



Measured Case depth
54.2 HRC @ 299 Microns



Metallurgical Lab CTC Results



Measured Case depth
52.4 HRC @ 298 Microns





ISM Engine Crosshead Hardness Measurement by the Supplier

five crossheads for 15N hardness were tested after heat treatment and cleaning processes :

Wear Pad Hardness Result

91.1
91.2
91.5
90.7
90.9

ISM Engine Crosshead Hardness Measured by the Supplier

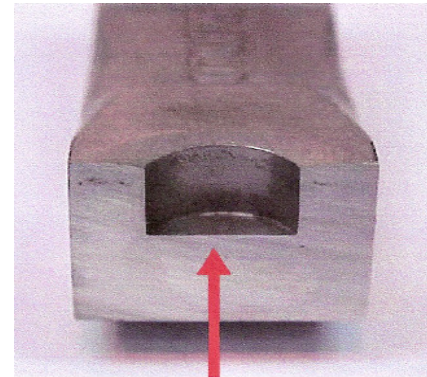


Certification No. IS00126644

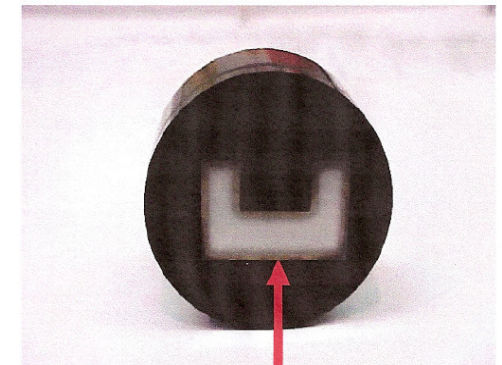
Certification Date: 02/19/10

SET VALUES:

Effective Case W: 0.012" min
Effective Case B: 0.009" min
Surface Hardness: HR15N 88 - 93
Core Hardness: HRB 75 min



Sectioned pocket



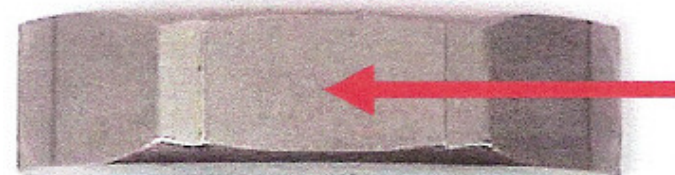
Sectioned pocket etched to illustrate case depth

RESULTS:

Part Number: 3070175
Effective Case W: 0.014" - 0.020"
Effective Case B: 0.012" - 0.019"
Surface Hardness: HR15N 90 - 91
Core Hardness: HRB 88 - 91



Effective case depth measured in pockets



Surface hardness measured on wear pad