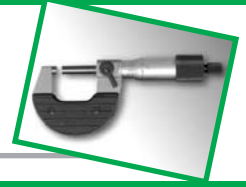




IPD TECH BULLETIN

Approximate Progression Of Cylinder Liner Finish On Detroit Diesel® Engines

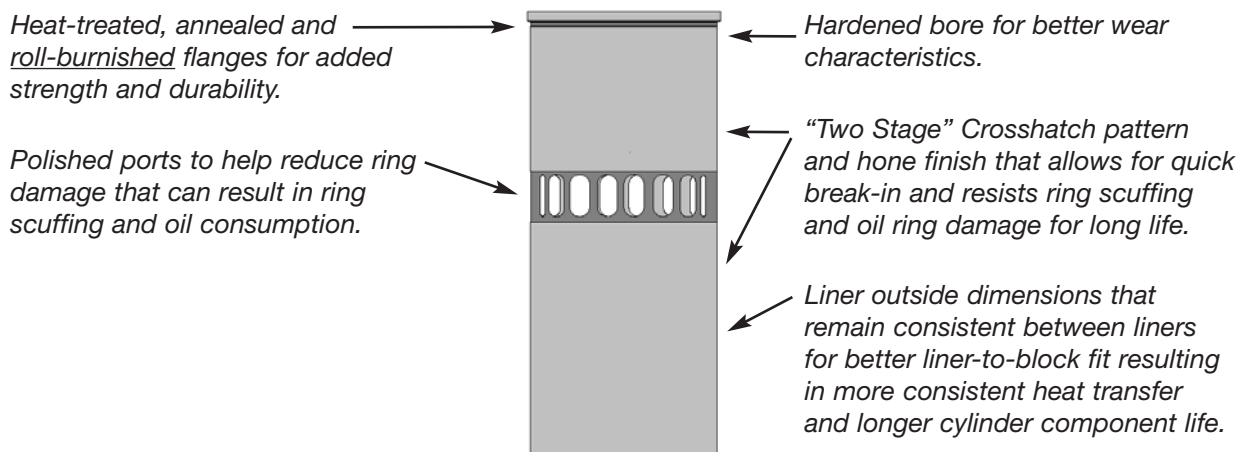


MAY. 2000

IPD-TB-0002

The following is a very approximate progression of the various finishes that have been used on Detroit Diesel 2 cycle engines over the years by a variety of manufacturers, and our opinion of the results. There are other factors and measurements other than RA finish; this is intended only as a comparison of the thinking through the years.

- 1940's:** Crosshatch was peaked honed to around 35RA.
- Many low HP applications.
 - Crosshatch worked ok until 60's when HP increased.
- 1970's:** Crosshatch was peaked honed to around 60-70RA.
- This was an attempt to seat the fire rings and reduce the ring scuffing and port clipping caused by the increased horsepower. Engines tended to slobber oil until the oil rings broke in if ever.
 - Many combinations of oil rings and fire rings were used over the years to help the slobbering problem.
- 1980's:** Plateau honing came into the mix using a rougher RA but a deeper R3Z pattern.
- In many applications the fire and compression rings now would not seat, causing high base pressures, forcing oil out the air box drains.
- 1990's:** Brush honing was the next attempt.
- However the surface may still have been too aggressive for the sensitive oil ring scrappers and added to the problem of seating the fire and compression rings.
 - This may have contributed to the excessive slobbering until the oil rings wore themselves in, if ever.
- 1999:** IPD introduces an innovative "Two-Stage" Honing Pattern
- This technique utilizes the best of the patterns used:
 - Rougher finish above the ports to seat the compression and fire rings.
 - Smoother R3Z finish below the ports to reduce damage to the oil ring edges.
 - Standard OEM run-in procedures are required to experience Reliability and Durability with the innovative IPD liner.



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