



Competitive Benchmarking

Litens OAD vs. Facet Reactiv™ Pulleys

Performance and Durability Testing

January 2010



Abstract:

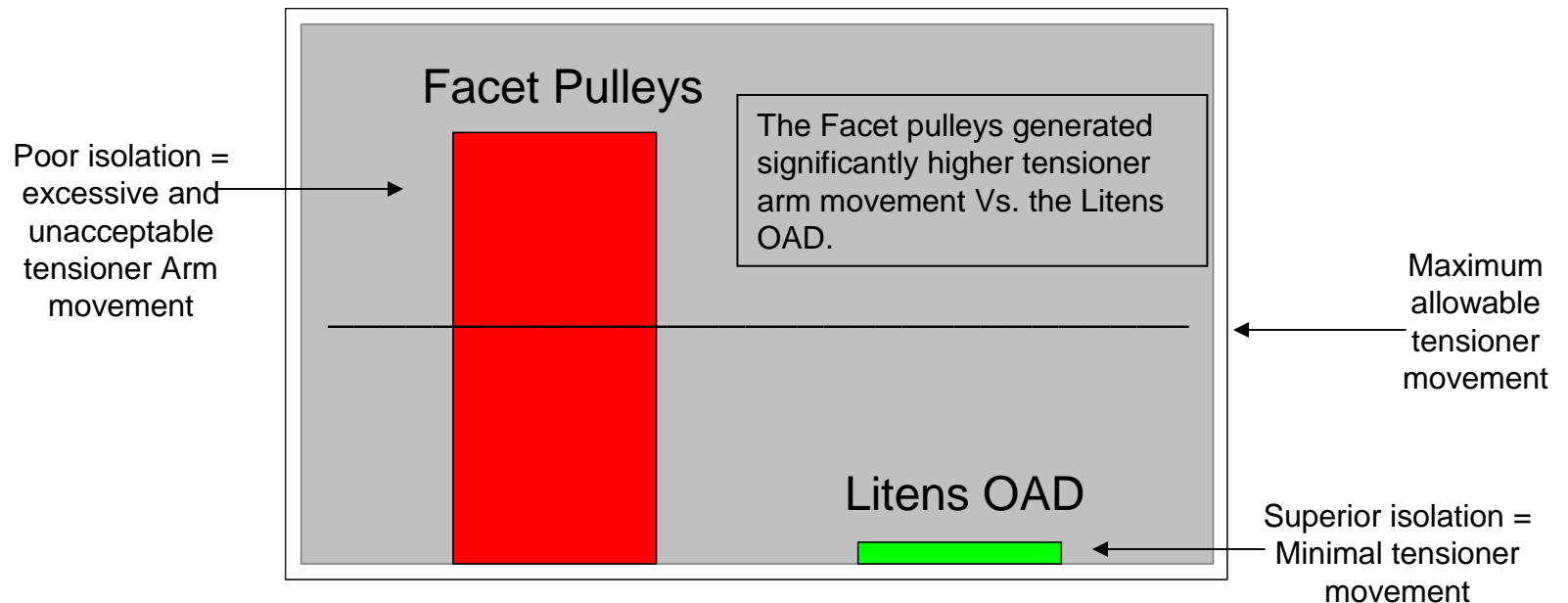
The following is an evaluation of Facet Reactiv™ alternator pulleys to benchmark performance and durability. This competing product from Facet, was obtained through a traditional alternator rebuilding channel.

The Facet alternator pulleys were evaluated at the Litens test facility on a torsional vibration test stand. This equipment has the ability to provide a simulated torsional vibration input, to properly test the parts and replicate real-world engine operation.

The test results reflect Facet alternator pulleys that are designed for an OAD application (Lester # 13870/13871).



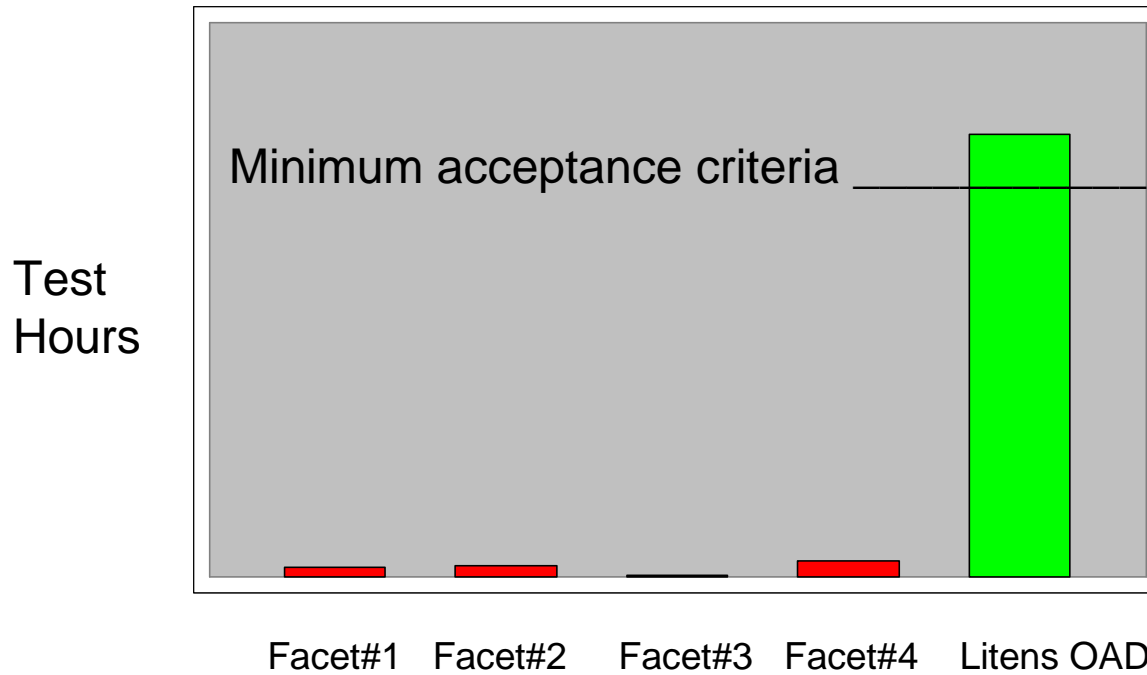
Lugging Test



- Graphical depiction of tensioner arm amplitude
- Test simulates low rpm engine characteristic



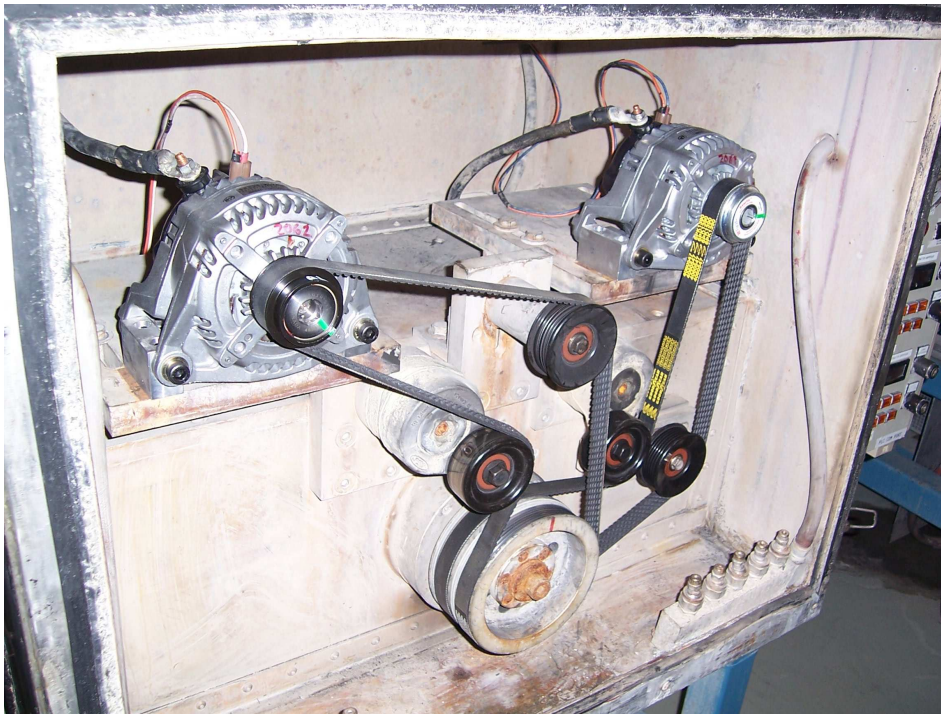
Lugging Test



- Lugging test simulates low rpm/high engine torsional event.
- Considered worst case for alternator vibration control devices by OEM; part of OEM product sign-off for production implementation.



Photos of a Facet Pulley and Litens OAD on test stand



This test machine allows for the exact same vibration levels to be inputted into both parts simultaneously.

Photos of tested internal components Facet Pulleys



Completely failed damping elements
very early into the test.

Note: Noise generated from metal to metal contact after
damping elements failed.



This picture shows pulley
separation during the test.

Photos of tested internal components Facet Pulleys



The damping elements within this part lasted only minutes prior to heat damage. Elements were completely melted.

Test Conclusions



- 1) The Facet pulleys as mentioned do not have an overrun feature as required by OE. An overrun feature is required for sudden engine decelerations, such as engine shutdowns and transmission shifts.
- 2) The isolation performance was substandard. It was evident that the Facet pulleys were always operating in its resonant frequency (All 4 parts tested exhibited this characteristic).
- 3) The durability of the Facet pulleys were extremely low for the standard lugging test conditions (all parts tested).
- 4) The Facet pulleys became noisy only a few minutes into the lugging test (all parts tested).
- 5) The Facet pulleys impacted themselves onto the alternator during the test (all parts tested).
- 6) Test machine tensioner came loose during the test due to the poor isolation of the Facet pulleys.