

M11 EGR OIL FILTERS

Correction Factor Implementation

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M11 EGR Oil Filter History

- **PC-9 Matrix:**
 - Filters made without bead to maintain pleat spacing
- **Post-Matrix:**
 - Filters made with bead
- **Performance differences found between filters**

Filter Plugging Results: Oil E

Units: kPa	N	Mean	Std. Dev.
Unbeaded	10	133	58
Beaded	12	67	14
Units: $\sqrt{\text{---}}$	N	Mean	Std. Dev.
Unbeaded	10	11.28	2.54
Beaded	12	8.14	0.86

Filter Performance Differences

- **Filter Plugging Performance Change**
 - Mean shift in mild direction
 - Large decrease in variation
- **Concerns**
 - Link with CI-4 development broken
 - Test loses ability to discriminate
 - “Poor” oils could pass

Corrective Action / Expected Results

- **Corrective Action**

- Implement a correction factor based upon the filter batch change
- Correction Factor: +3.15 square root units added to oil filter plugging result

- **Expected Results**

- Maintain integrity of CI-4
- Improved precision and discrimination

Implementation of C.F.

- **Adopted by Cummins SP effective February 21, 2002**
- **Notice sent to HDEOCP**
- **M11EGR Information Letter 02-1 issued March 22, 2002**
 - **Cleared June ASTM ballot with no negatives or comments**

Effect of C.F. on Reference Tests

Units: kPa	N	Mean	Std. Dev.
Unbeaded	10	133	58
Beaded C.F.	5	132	22
Units: $\sqrt{\quad}$	N	Mean	Std. Dev.
Unbeaded	10	11.28	2.54
Beaded C.F.	5	11.46	1.00

M11 EGR Oil Filter Summary

- Introduction of beaded filter resulted in a change in test performance
- C.F. implemented to bring test performance back in line with PC-9 matrix
- Early reference results indicate that C.F. is impacting test as desired
 - Severity back to PC-9 levels
 - Improved precision / discrimination