

# C13 Exit Ballot Concerns

- Majority of concerns expressed on Negative and Affirmative ballot responses were related to 2RTC parameter and fall into two areas
  1. Process of arriving at new parameter
    - Not included in MOA
    - Introduced late in process
    - Link to field/engine performance issues/protection not established
  2. Variability of matrix ratings used to establish limits



## 2RTC Concerns – Process of Arriving at Parmeter

1. The MOA specifically required DISCRIMINATION to be demonstrated on named parameters which were imposed by ACC before allowing the C13 test to proceed , all of which were done successfully.
2. After the Matrix completion, the MOA states “The test discrimination parameters, pass-fail criteria and methods of evaluation will be assigned by the appropriate ASTM Surveillance Panel or Test Development Task Force”. The MOA did not exclude new parameters from being introduced.



## 2RTC Concerns – Process of Arriving at Parmeter

3. 2RTC was developed late in process to replace UWD which was removed from the test late in the process due to concerns with correlation to other deposit parameters making it redundant.
  - SP asked that new parameter be sought by Caterpillar that was related to field or other engine experience that addressed any additional needs not captured by TCG and TLC
  - Caterpillar had concerns over deposits lower than the top groove as it related to ring sticking & loss of side clearance
4. 2RTC does not show redundancy to other rated parameters



## 2RTC Concerns – Process of Arriving at Parmeter

5. 2RTC addresses an area of the piston/ring that Caterpillar believes relates to potential field issues with ring sticking
- Field engines with Ring Sticking can exhibit heavy deposits on the top face of the 2<sup>nd</sup> ring on multiple cylinders
  - Previous C12 Bridge engine testing (650 hr/cyclic) did show high 2RTC deposits on a run that had a 30% Cold Stuck Ring (Est. 2RTC rating – 38)
  - Rings from two field engines (that has experienced ring sticking) were rated as part of the recent rating workshop. Average 2RTC values was: 25, (100% stuck, 52 and 67)



## 2RTC Concerns – Variability in Matrix Data

1. A Ring Rating Workshop was held recently to determine if 2RTC can be rated consistently and to finalize the final rating procedures
2. Pre-calibration workshop showed rater variances similar to the overall range experienced in the matrix
3. Post-calibration workshop showed improvement in consistency of ratings
  - Appears that future rating of this parameter should be similar to other deposit ratings in terms of consistency
  - Magnitude of differences between pre and post calibration ratings not very large (unlikely that matrix results would be very different if more consistent procedure would have been used)
4. Limits were set very liberally based on the Matrix data relative to area of concern (due to variability inherent in dataset)
  - 100% Light carbon not desirable
  - Incidence of Heavy carbon highly undesirable

