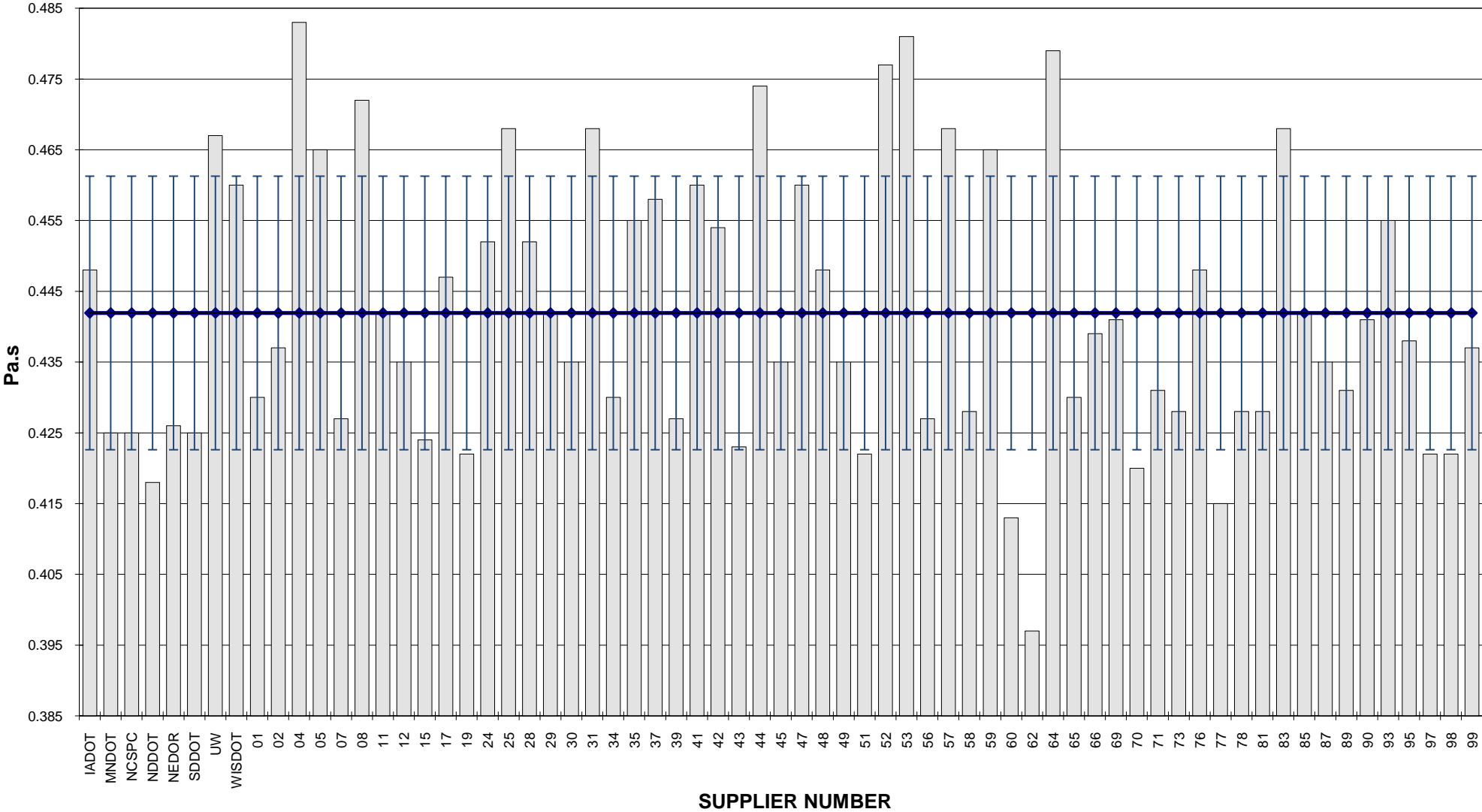


COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
PG 64-22

| Supplier Number | Rotational Viscosity (Pa.s) @135°C | DSR Original (kPa) @64°C | DSR RTFO (kPa) @64°C | DSR PAV (kPa) @25°C | Mass Loss (%) @163°C | BBR S-value (MPa) @-12°C | BBR m-value @-12°C | Strain (%) @-12°C | DTT Stress (MPa) @-12°C | CRITICAL CRACK TEMP (°C) | MSCR % RECOVERY @ 100Pa | MSCR % RECOVERY @ 3200Pa |
|----------------------|------------------------------------|--------------------------|----------------------|---------------------|----------------------|--------------------------|--------------------|-------------------|-------------------------|--------------------------|-------------------------|--------------------------|
| IADOT | 0.448 | 1.47 | 4.16 | 3410 | -0.499 | 164 | 0.326 | | | | 5.15 | 1.81 |
| MNDOT | 0.425 | 1.44 | 4.28 | 3681 | -0.523 | 143 | 0.320 | | | | | |
| NCSPC | 0.425 | 1.57 | 4.44 | 3320 | -0.633 | 160 | 0.337 | | | | 2.42 | 1.45 |
| NDDOT | 0.418 | 1.41 | 4.07 | 3628 | -0.518 | 159 | 0.338 | | | | 6.79 | 1.76 |
| NEDOR | 0.426 | 1.50 | 4.62 | 3827 | -0.444 | 174 | 0.320 | | | | 5.44 | 1.99 |
| SDDOT | 0.425 | 1.37 | 3.91 | 3760 | -0.505 | 158 | 0.326 | | | | 36.68 | 20.70 |
| UW | 0.467 | 1.40 | 4.41 | 2823 | -0.673 | 186 | 0.340 | | | | | |
| WISDOT | 0.460 | 1.35 | 3.57 | 2288 | -0.509 | 146 | 0.340 | | | | | |
| 01 | 0.430 | 1.48 | 4.78 | 3787 | -0.525 | 163 | 0.340 | | | | 56.50 | 21.05 |
| 02 | 0.437 | 1.46 | 4.63 | 4177 | -0.514 | 152 | 0.339 | | | | 5.80 | 2.10 |
| 04 | 0.483 | 1.41 | 3.86 | 3146 | -0.479 | 156 | 0.332 | | | | | |
| 05 | 0.465 | 1.33 | 3.73 | 3829 | -0.501 | 161 | 0.336 | | | | 7.21 | 1.80 |
| 07 | 0.427 | 1.48 | 3.60 | 3905 | -0.618 | 162 | 0.335 | | | | 5.39 | 1.51 |
| 08 | 0.472 | 1.38 | 3.84 | 3822 | -0.500 | 164 | 0.333 | | | | 6.20 | 1.84 |
| 11 | 0.442 | 1.44 | 4.28 | 3980 | -0.514 | 157 | 0.337 | | | | 4.90 | 1.90 |
| 12 | 0.435 | 1.54 | 4.00 | 3520 | -0.566 | 147 | 0.336 | | | | | |
| 15 | 0.424 | 1.45 | 4.24 | 3521 | -0.560 | 147 | 0.348 | | | | 8.24 | 1.96 |
| 17 | 0.447 | 1.53 | 4.60 | 3803 | -0.516 | 156 | 0.335 | | | | 58.55 | 22.13 |
| 19 | 0.422 | 1.44 | 4.12 | 3340 | -0.659 | 169 | 0.341 | | | | | |
| 24 | 0.452 | 1.43 | 4.07 | 3750 | -0.499 | 166 | 0.342 | 1.81 | 3.36 | -23.7 | 1.97 | 0.00 |
| 25 | 0.468 | 1.39 | 4.13 | 4307 | -0.559 | 163 | 0.338 | | | | | |
| 28 | 0.452 | 1.45 | 4.07 | 4004 | -0.432 | 148 | 0.337 | | | | 3.90 | 1.80 |
| 29 | 0.442 | 1.41 | 4.02 | 4064 | -0.587 | 162 | 0.323 | | | | 5.30 | 1.80 |
| 30 | 0.435 | 1.42 | 4.15 | 3272 | -0.458 | 159 | 0.330 | | | | | |
| 31 | 0.468 | 1.36 | 3.71 | 3760 | -0.405 | 160 | 0.333 | | | | 6.43 | 1.87 |
| 34 | 0.430 | 1.50 | 3.97 | 3612 | -0.473 | 144 | 0.339 | | | | 4.30 | 1.70 |
| 35 | 0.455 | 1.50 | 4.66 | 3780 | 0.689 | 152 | 0.333 | | | | | |
| 37 | 0.458 | 1.38 | 3.70 | 3530 | -0.576 | 180 | 0.322 | | | | 18.29 | 2.03 |
| 39 | 0.427 | 1.37 | 4.11 | 3079 | -0.500 | 153 | 0.345 | | | | 6.37 | 1.30 |
| 41 | 0.460 | 1.35 | 4.00 | 3698 | -0.480 | 155 | 0.336 | | | | 6.61 | 1.84 |
| 42 | 0.454 | 1.43 | 4.00 | 3810 | -0.630 | 156 | 0.341 | | | | 2.15 | 1.69 |
| 43 | 0.423 | 1.45 | 3.91 | 3637 | -0.483 | 160 | 0.342 | | | | | |
| 44 | 0.474 | 1.41 | 3.67 | 3872 | -0.436 | 160 | 0.331 | | | | 6.33 | 1.73 |
| 45 | 0.435 | 1.57 | 4.64 | 3940 | -0.479 | 154 | 0.336 | | | | 60.94 | 22.23 |
| 47 | 0.460 | 1.32 | 3.56 | 3151 | -0.519 | 165 | 0.333 | | | | | |
| 48 | 0.448 | 1.44 | 4.26 | 3626 | -0.476 | 147 | 0.337 | | | | 6.10 | 1.80 |
| 49 | 0.435 | 1.41 | 4.03 | 3700 | -0.569 | 169 | 0.336 | | | | 1.79 | 1.76 |
| 51 | 0.422 | 1.37 | 4.06 | 3400 | -0.624 | 169 | 0.338 | | | | | |
| 52 | 0.477 | 1.39 | 3.86 | 3648 | -0.486 | 161 | 0.331 | | | | 6.30 | 1.78 |
| 53 | 0.481 | 1.42 | 3.93 | 3205 | -0.510 | 158 | 0.320 | | | | | |
| 56 | 0.427 | 1.46 | 4.02 | 3599 | -0.529 | 160 | 0.333 | | | | 5.70 | 1.70 |
| 57 | 0.468 | 1.34 | 3.59 | 3142 | -0.520 | 159 | 0.333 | | | | | |
| 58 | 0.428 | 1.45 | 4.17 | 4010 | -0.603 | 174 | 0.326 | | | | 4.99 | 1.31 |
| 59 | 0.465 | 1.38 | 4.14 | 4240 | -0.574 | 160 | 0.336 | | | | | |
| 60 | 0.413 | 1.45 | 4.20 | 3790 | -0.593 | 178 | 0.315 | | | | | |
| 62 | 0.397 | 1.47 | 3.98 | 3528 | -0.568 | 163 | 0.347 | | | | 4.30 | 1.70 |
| 64 | 0.479 | 1.77 | 3.82 | 3359 | -0.519 | 158 | 0.319 | | | | | |
| 65 | 0.430 | 1.47 | 4.19 | 3603 | -0.514 | 149 | 0.339 | | | | 6.16 | 1.85 |
| 66 | 0.439 | 1.50 | 4.12 | 3779 | -0.464 | 148 | 0.337 | | | | 4.90 | 1.80 |
| 69 | 0.441 | 1.56 | 3.59 | 3884 | -0.533 | 161 | 0.332 | | | | 5.32 | 1.42 |
| 70 | 0.420 | 1.37 | 3.88 | 3482 | -0.505 | 157 | 0.341 | | | | | |
| 71 | 0.431 | 1.45 | 4.28 | 3978 | -0.478 | 161 | 0.336 | | | | | |
| 73 | 0.428 | 1.43 | 3.83 | 3374 | -0.510 | 162 | 0.338 | | | | | |
| 76 | 0.448 | 1.38 | 4.25 | 3576 | -0.442 | 140 | 0.346 | | | | 4.20 | 1.10 |
| 77 | 0.415 | 1.57 | 4.07 | 4000 | -0.183 | 174 | 0.329 | | | | 82.10 | 4.11 |
| 78 | 0.428 | 1.47 | 4.20 | 4010 | -0.608 | 176 | 0.326 | | | | 4.79 | 1.27 |
| 81 | 0.428 | 1.47 | 4.23 | 4010 | -0.610 | 173 | 0.326 | | | | 4.96 | 1.24 |
| 83 | 0.468 | 1.41 | 3.78 | 3808 | -0.424 | 159 | 0.334 | | | | 7.45 | 1.78 |
| 85 | 0.442 | 1.38 | 4.30 | 4067 | -0.457 | 139 | 0.346 | | | | 4.70 | 1.20 |
| 87 | 0.435 | 1.47 | 3.83 | 2911 | -0.403 | 156 | 0.341 | | | | 4.89 | 1.07 |
| 89 | 0.431 | 1.50 | 4.14 | 3640 | -0.541 | 150 | 0.338 | | | | 7.51 | 1.90 |
| 90 | 0.441 | 1.44 | 4.06 | 3879 | -0.473 | 153 | 0.338 | | | | 4.60 | 1.70 |
| 93 | 0.455 | 1.47 | 4.45 | 3770 | -0.584 | 163 | 0.341 | 1.17 | 2.83 | -23.40 | 3.31 | 0.00 |
| 95 | 0.438 | 1.35 | 4.28 | 3621 | -0.482 | 162 | 0.337 | | | | | |
| 97 | 0.422 | 1.46 | 4.49 | 3580 | -0.652 | 165 | 0.336 | | | | | |
| 98 | 0.422 | 1.42 | 4.05 | 3350 | -0.589 | 168 | 0.337 | | | | | |
| 99 | 0.437 | 1.51 | 4.23 | 3639 | -0.546 | 154 | 0.335 | | | | 5.40 | 1.80 |
| Average | 0.442 | 1.44 | 4.09 | 3642 | -0.502 | 160 | 0.335 | 1.49 | 3.10 | -23.55 | 11.62 | 3.46 |
| Std. Dev. | 0.0193 | 0.0722 | 0.2856 | 349.24 | 0.1657 | 9.4522 | 0.0071 | 0.4525 | 0.3748 | 0.2121 | 17.9999 | 5.8110 |
| Coef. of Var. | 4.375 | 5.009 | 6.988 | 9.588 | 32.991 | 5.926 | 2.121 | 30.372 | 12.109 | -0.901 | 154.889 | 167.904 |

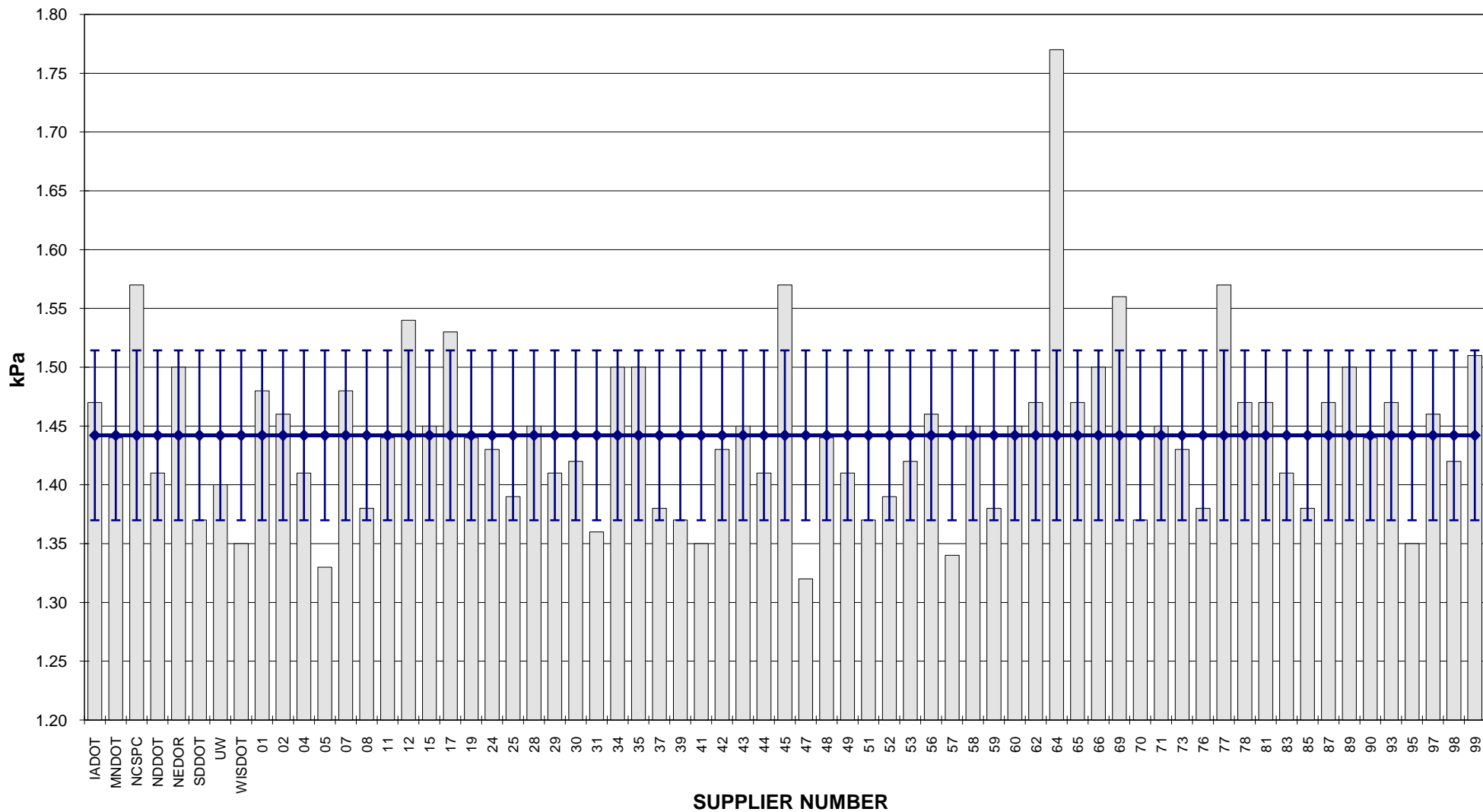
COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
PG 64-22

ROTATIONAL VISCOSITY



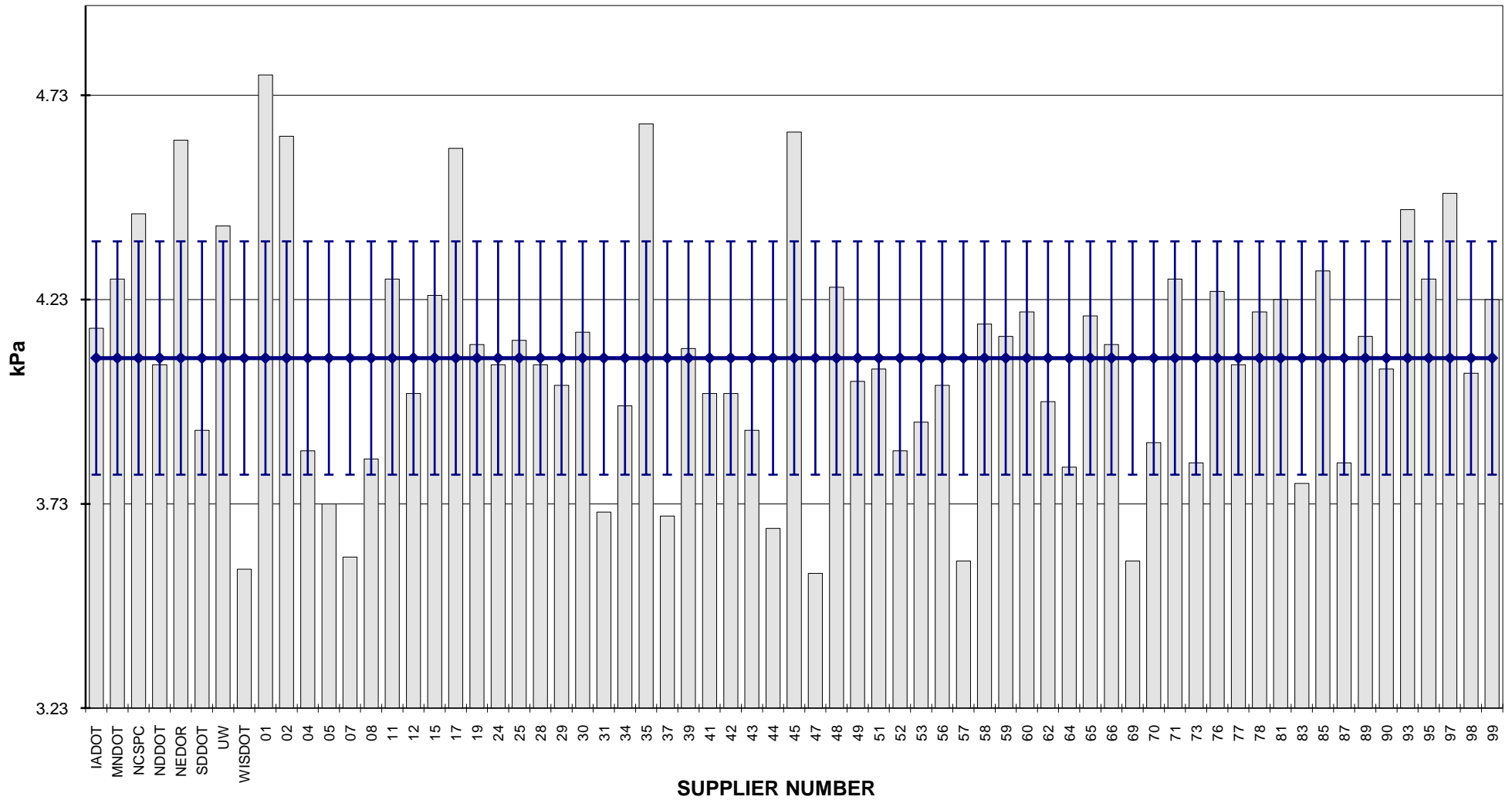
**COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
PG 64-22**

DSR - ORIGINAL

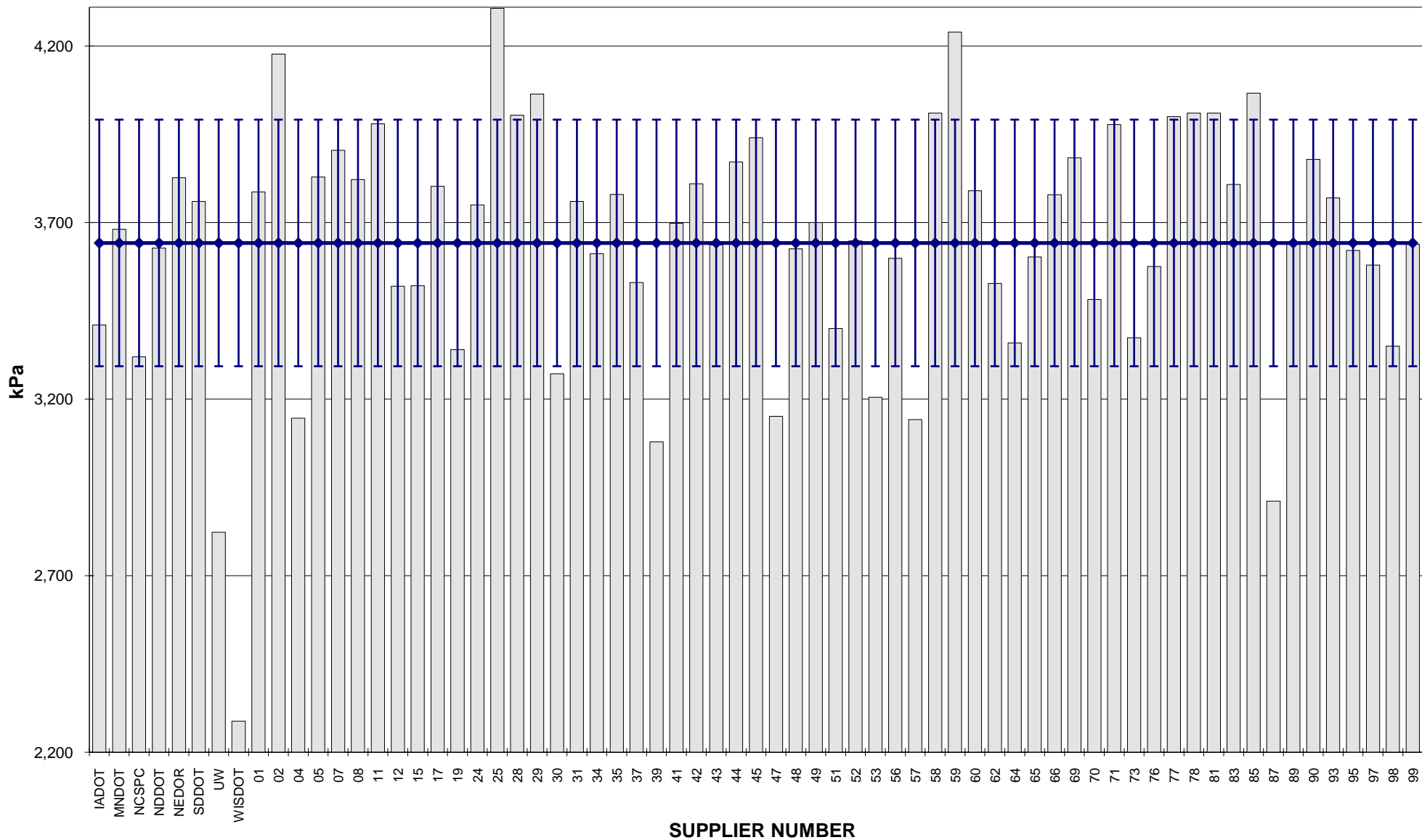


COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
 SUMMARY A
 PG 64-22

DSR - RTFO



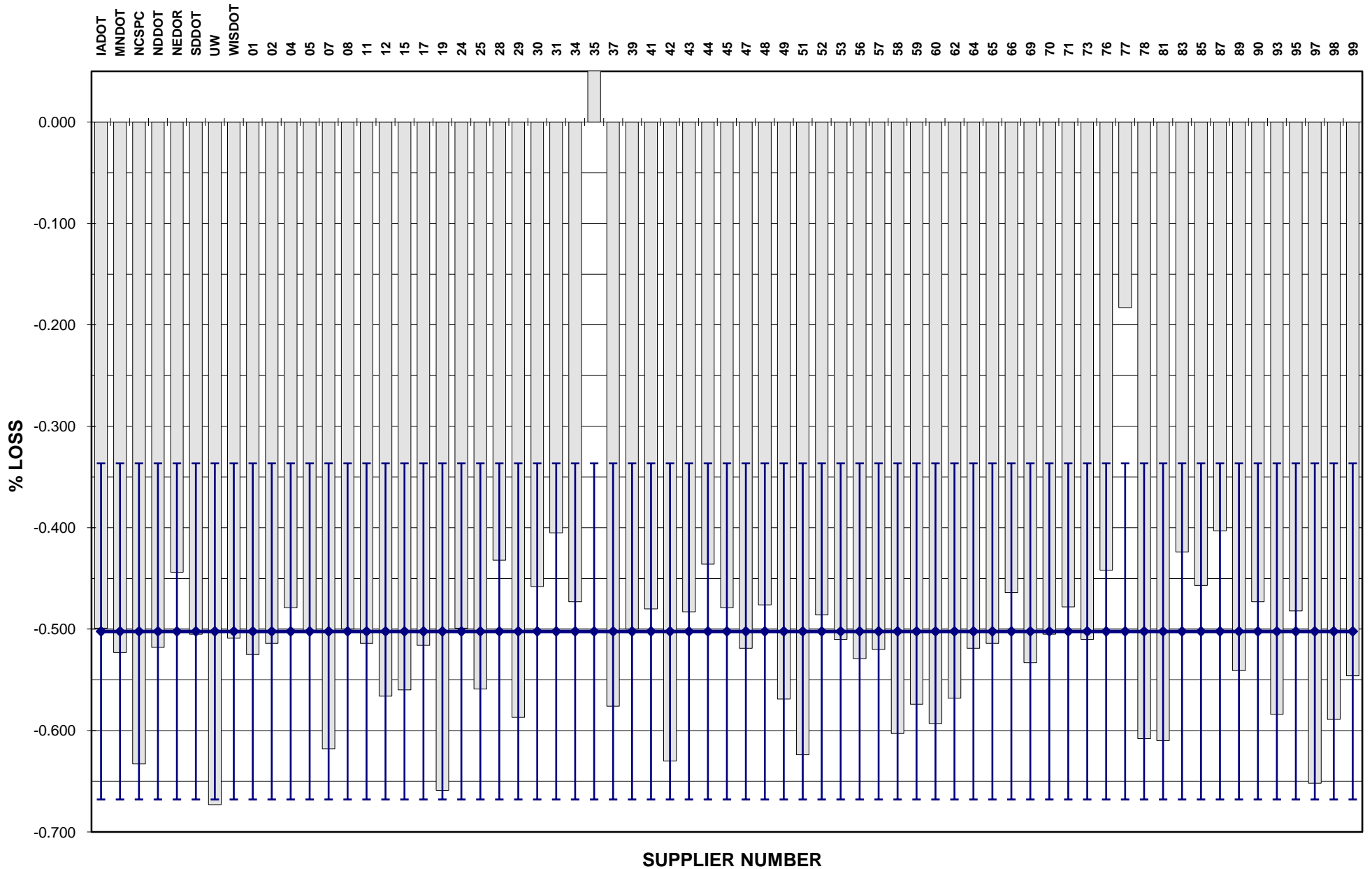
COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
 PG 64-22
DSR - PAV



COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1

SUMMARY A

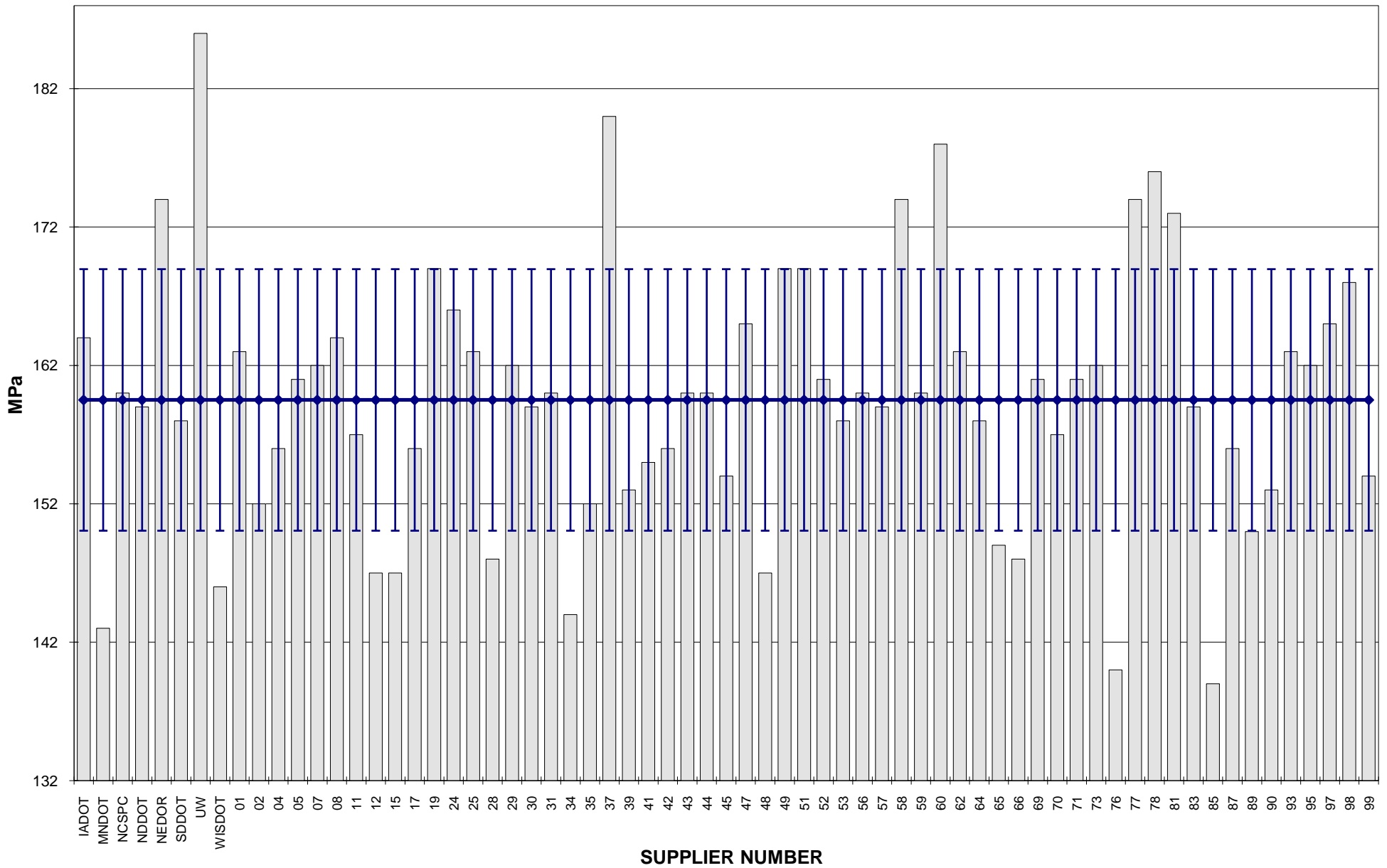
PG 64-22
RTFO MASS LOSS



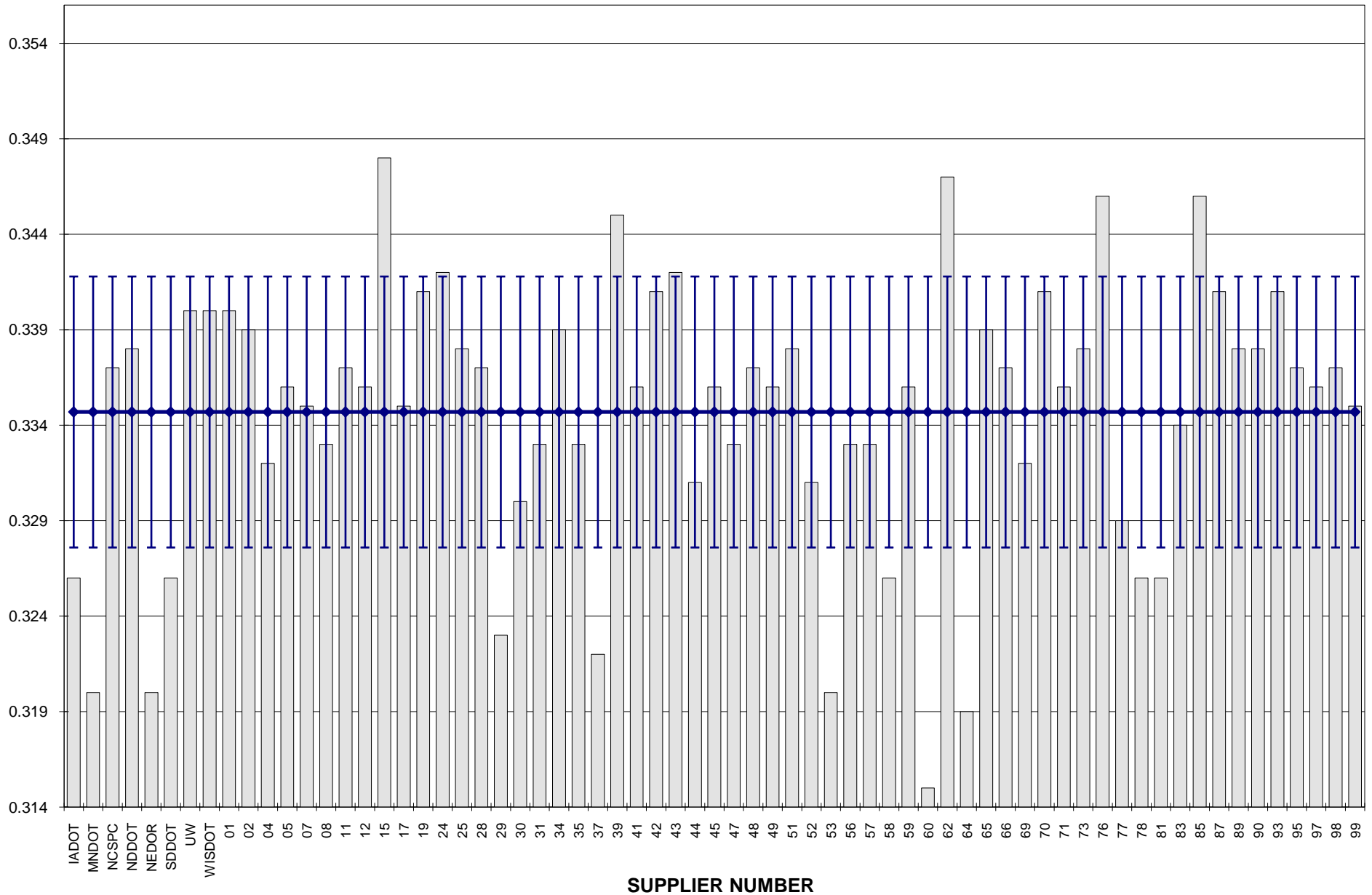
COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1

SUMMARY A

PG 64-22
BBR STIFFNESS



COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
 PG 64-22
BBR m-VALUE



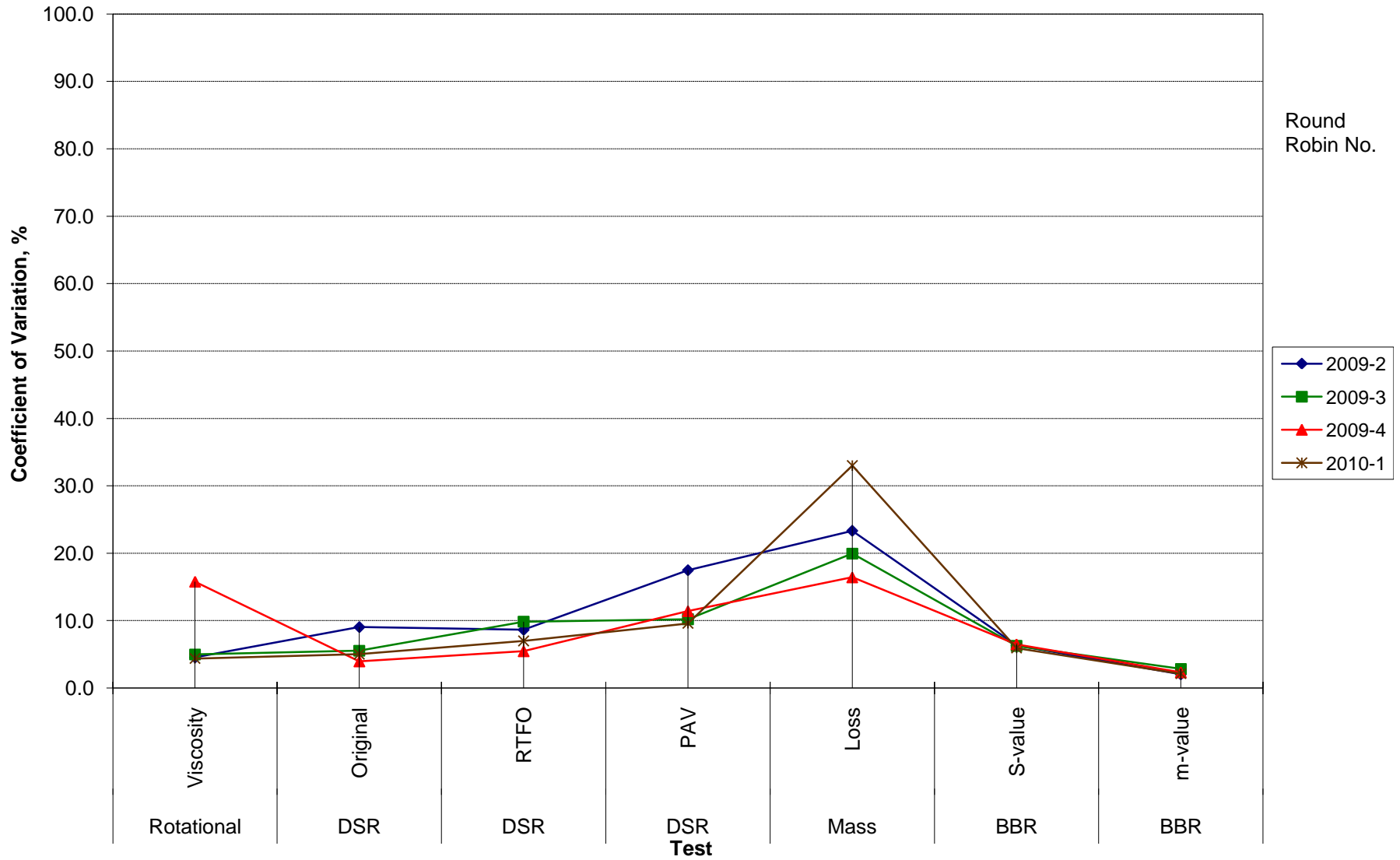
**COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
64-22**

COEFFICIENT OF VARIATION

| Round Robin No. | Number of Participants | Coefficient of Variation, % | | | | | | | |
|-----------------|------------------------|-----------------------------|--------------|----------|---------|-----------|-------------|-------------|------------|
| | | Rotational Viscosity | DSR Original | DSR RTFO | DSR PAV | Mass Loss | BBR S-value | BBR m-value | DTT Strain |
| 2009-2 | 68 | 4.542 | 9.035 | 8.636 | 17.479 | 23.331 | 6.328 | 2.031 | 11.122 |
| 2009-3 | 68 | 4.973 | 5.526 | 9.847 | 10.209 | 19.936 | 6.241 | 2.833 | 78.105 |
| 2009-4 | 66 | 15.785 | 3.944 | 5.455 | 11.405 | 16.430 | 6.485 | 2.318 | 29.809 |
| 2010-1 | 67 | 4.375 | 5.009 | 6.987 | 9.588 | 32.991 | 5.926 | 2.121 | 30.372 |

COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
64-22

COEFFICIENT OF VARIATION



**COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1
SUMMARY A
PG 64-22**

STATISTICS WITH OUTLIERS REMOVED:

| | Rotational Viscosity (Pa.s) @135°C | DSR Original (kPa) @64°C | DSR RTFO (kPa) @64°C | DSR PAV (kPa) @25°C | Mass Loss (%) @163°C | BBR S-value (MPa) @-12°C | BBR m-value @-12°C |
|----------------------|---|---|---|--|---|---|-----------------------------------|
| Average | 0.563 | 1.29 | 2.84 | 2,605 | -0.296 | 209 | 0.320 |
| Std. Dev. | 0.0291 | 0.0508 | 0.1551 | 232.30 | 0.0448 | 13.52 | 0.0068 |
| Coef. of Var. | 4.375 | 4.185 | 6.987 | 8.423 | 14.530 | 5.926 | 2.121 |