

**COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1 SUMMARY B**

**PG 64-22**

| <b>Supplier Number</b> | <b>Rotational Viscosity (Pa.s) @135°C</b> | <b>DSR Original (kPa) @64°C</b> | <b>DSR RTFO (kPa) @64°C</b> | <b>DSR PAV (kPa) @25°C</b> | <b>Mass Loss (%) @163°C</b> | <b>BBR S-value (MPa) @-12°C</b> | <b>BBR m-value @-12°C</b> |
|------------------------|---|---------------------------------|-----------------------------|----------------------------|-----------------------------|---------------------------------|---------------------------|
| IADOT                  | 0.448                                     | 1.47                            | 4.16                        | 3410                       | -0.499                      | 164                             | 0.326                     |
| 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                     |
| NDDOT                  | 0.418                                     | 1.41                            | 4.07                        | 3628                       | -0.518                      | 159                             | 0.338                     |
| NEDOR                  | 0.426                                     | 1.50                            | 4.62                        | 3827                       | -0.444                      | 174                             | 0.320                     |
| SDDOT                  | 0.425                                     | 1.37                            | 3.91                        | 3760                       | -0.505                      | 158                             | 0.326                     |
| 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                     |
| 07                     | 0.427                                     | 1.48                            | 3.60                        | 3905                       | -0.618                      | 162                             | 0.335                     |
| 12                     | 0.435                                     | 1.54                            | 4.00                        | 3520                       | -0.566                      | 147                             | 0.336                     |
| 29                     | 0.442                                     | 1.41                            | 4.02                        | 4064                       | -0.587                      | 162                             | 0.323                     |
| 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                     |
| 42                     | 0.454                                     | 1.43                            | 4.00                        | 3810                       | -0.630                      | 156                             | 0.341                     |
| 43                     | 0.423                                     | 1.45                            | 3.91                        | 3637                       | -0.483                      | 160                             | 0.342                     |
| 49                     | 0.435                                     | 1.41                            | 4.03                        | 3700                       | -0.569                      | 169                             | 0.336                     |
| 60                     | 0.413                                     | 1.45                            | 4.20                        | 3790                       | -0.593                      | 178                             | 0.315                     |
| 65                     | 0.430                                     | 1.47                            | 4.19                        | 3603                       | -0.514                      | 149                             | 0.339                     |
| 69                     | 0.441                                     | 1.56                            | 3.59                        | 3884                       | -0.533                      | 161                             | 0.332                     |
| 70                     | 0.420                                     | 1.37                            | 3.88                        | 3482                       | -0.505                      | 157                             | 0.341                     |
| 77                     | 0.415                                     | 1.57                            | 4.07                        | 4000                       | -0.183                      | 174                             | 0.329                     |
| 95                     | 0.438                                     | 1.35                            | 4.28                        | 3621                       | -0.482                      | 162                             | 0.337                     |
| A                      | 0.422                                     | 1.42                            | 4.18                        | 3418                       | -0.631                      | 168                             | 0.338                     |
| B                      | 0.437                                     | 1.53                            | 4.67                        | 3843                       | -0.507                      | 158                             | 0.337                     |
| C                      | 0.442                                     | 1.48                            | 4.12                        | 3825                       | -0.479                      | 151                             | 0.330                     |
| E                      | 0.428                                     | 1.48                            | 4.19                        | 3581                       | -0.551                      | 149                             | 0.343                     |
| F                      | 0.430                                     | 1.46                            | 4.19                        | 3,754                      | -0.512                      | 154                             | 0.339                     |
| J                      | 0.469                                     | 1.38                            | 3.80                        | 3777                       | -0.462                      | 160                             | 0.333                     |
| L                      | 0.467                                     | 1.39                            | 4.14                        | 4274                       | -0.567                      | 162                             | 0.337                     |
| M                      | 0.470                                     | 1.36                            | 3.67                        | 3146                       | -0.506                      | 160                             | 0.333                     |
| O                      | 0.445                                     | 1.38                            | 4.28                        | 3,822                      | -0.450                      | 140                             | 0.346                     |
| P                      | 0.431                                     | 1.43                            | 4.09                        | 3541                       | -0.482                      | 161                             | 0.335                     |
| S                      | 0.480                                     | 1.60                            | 3.88                        | 3282                       | -0.515                      | 158                             | 0.320                     |
| T                      | 0.431                                     | 1.42                            | 3.97                        | 2995                       | -0.452                      | 155                             | 0.343                     |
| U                      | 0.454                                     | 1.45                            | 4.26                        | 3760                       | -0.542                      | 165                             | 0.342                     |
| V                      | 0.428                                     | 1.46                            | 4.20                        | 4010                       | -0.607                      | 174                             | 0.326                     |
| <b>Average</b>         | 0.439                                     | 1.45                            | 4.09                        | 3,614                      | -0.492                      | 160                             | 0.334                     |
| <b>Std. Dev.</b>       | 0.0176                                    | 0.0665                          | 0.2801                      | 369.84                     | 0.2186                      | 10.38                           | 0.0079                    |
| <b>Coef. of Var.</b>   | 4.001                                     | 4.594                           | 6.849                       | 10.235                     | 44.426                      | 6.477                           | 2.367                     |

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| A       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 19      | 0.422      | 1.44 | 4.12     | 3340   | -0.659    | 169     | 0.341   |
| 51      | 0.422      | 1.37 | 4.06     | 3400   | -0.624    | 169     | 0.338   |
| 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   |
| Average | 0.422      | 1.42 | 4.18     | 3,418  | -0.631    | 168     | 0.338   |

| B       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 01      | 0.430      | 1.48 | 4.78     | 3787   | -0.525    | 163     | 0.340   |
| 17      | 0.447      | 1.53 | 4.60     | 3803   | -0.516    | 156     | 0.335   |
| 45      | 0.435      | 1.57 | 4.64     | 3940   | -0.479    | 154     | 0.336   |
| Average | 0.437      | 1.53 | 4.67     | 3,843  | -0.507    | 158     | 0.337   |

| C       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 28      | 0.452      | 1.45 | 4.07     | 4004   | -0.432    | 148     | 0.310   |
| 66      | 0.439      | 1.50 | 4.12     | 3779   | -0.464    | 148     | 0.337   |
| 90      | 0.441      | 1.44 | 4.06     | 3879   | -0.473    | 153     | 0.338   |
| 99      | 0.437      | 1.51 | 4.23     | 3639   | -0.546    | 154     | 0.335   |
| Average | 0.442      | 1.48 | 4.12     | 3825   | -0.479    | 151     | 0.330   |

| E       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 15      | 0.424      | 1.45 | 4.24     | 3521   | -0.560    | 147     | 0.348   |
| 89      | 0.431      | 1.50 | 4.14     | 3640   | -0.541    | 150     | 0.338   |
| Average | 0.428      | 1.48 | 4.19     | 3581   | -0.551    | 149     | 0.343   |

| F       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 02      | 0.437      | 1.46 | 4.63     | 4177   | -0.514    | 152     | 0.339   |
| 11      | 0.442      | 1.44 | 4.28     | 3980   | -0.514    | 157     | 0.337   |
| 34      | 0.430      | 1.50 | 3.97     | 3612   | -0.473    | 144     | 0.339   |
| 48      | 0.448      | 1.44 | 4.26     | 3626   | -0.476    | 147     | 0.337   |
| 56      | 0.427      | 1.46 | 4.02     | 3599   | -0.529    | 160     | 0.333   |
| 62      | 0.397      | 1.47 | 3.98     | 3528   | -0.568    | 163     | 0.347   |
| Average | 0.430      | 1.46 | 4.19     | 3,754  | -0.512    | 154     | 0.339   |

| J       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 05      | 0.465      | 1.33 | 3.73     | 3829   | -0.501    | 161     | 0.336   |
| 08      | 0.472      | 1.38 | 3.84     | 3822   | -0.500    | 164     | 0.333   |
| 31      | 0.468      | 1.36 | 3.71     | 3760   | -0.405    | 160     | 0.333   |
| 41      | 0.460      | 1.35 | 4.00     | 3698   | -0.480    | 155     | 0.336   |
| 44      | 0.474      | 1.41 | 3.67     | 3872   | -0.436    | 160     | 0.331   |
| 52      | 0.477      | 1.39 | 3.86     | 3648   | -0.486    | 161     | 0.331   |
| 83      | 0.468      | 1.41 | 3.78     | 3808   | -0.424    | 159     | 0.334   |
| Average | 0.469      | 1.38 | 3.80     | 3777   | -0.462    | 160     | 0.333   |

| L       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 25      | 0.468      | 1.39 | 4.13     | 4307   | -0.559    | 163     | 0.338   |
| 59      | 0.465      | 1.38 | 4.14     | 4240   | -0.574    | 160     | 0.336   |
| Average | 0.467      | 1.39 | 4.14     | 4274   | -0.567    | 162     | 0.337   |

| M       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 04      | 0.483      | 1.41 | 3.86     | 3146   | -0.479    | 156     | 0.332   |
| 47      | 0.460      | 1.32 | 3.56     | 3151   | -0.519    | 165     | 0.333   |
| 57      | 0.468      | 1.34 | 3.59     | 3142   | -0.520    | 159     | 0.333   |
| Average | 0.470      | 1.36 | 3.67     | 3146   | -0.506    | 160     | 0.333   |

| O       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 76      | 0.448      | 1.38 | 4.25     | 3576   | -0.442    | 140     | 0.346   |
| 85      | 0.442      | 1.38 | 4.30     | 4067   | -0.457    | 139     | 0.346   |
| Average | 0.445      | 1.38 | 4.28     | 3822   | -0.450    | 140     | 0.346   |

| P       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 30      | 0.435      | 1.42 | 4.15     | 3272   | -0.458    | 159     | 0.330   |
| 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   |
| Average | 0.431      | 1.43 | 4.09     | 3541   | -0.482    | 161     | 0.335   |

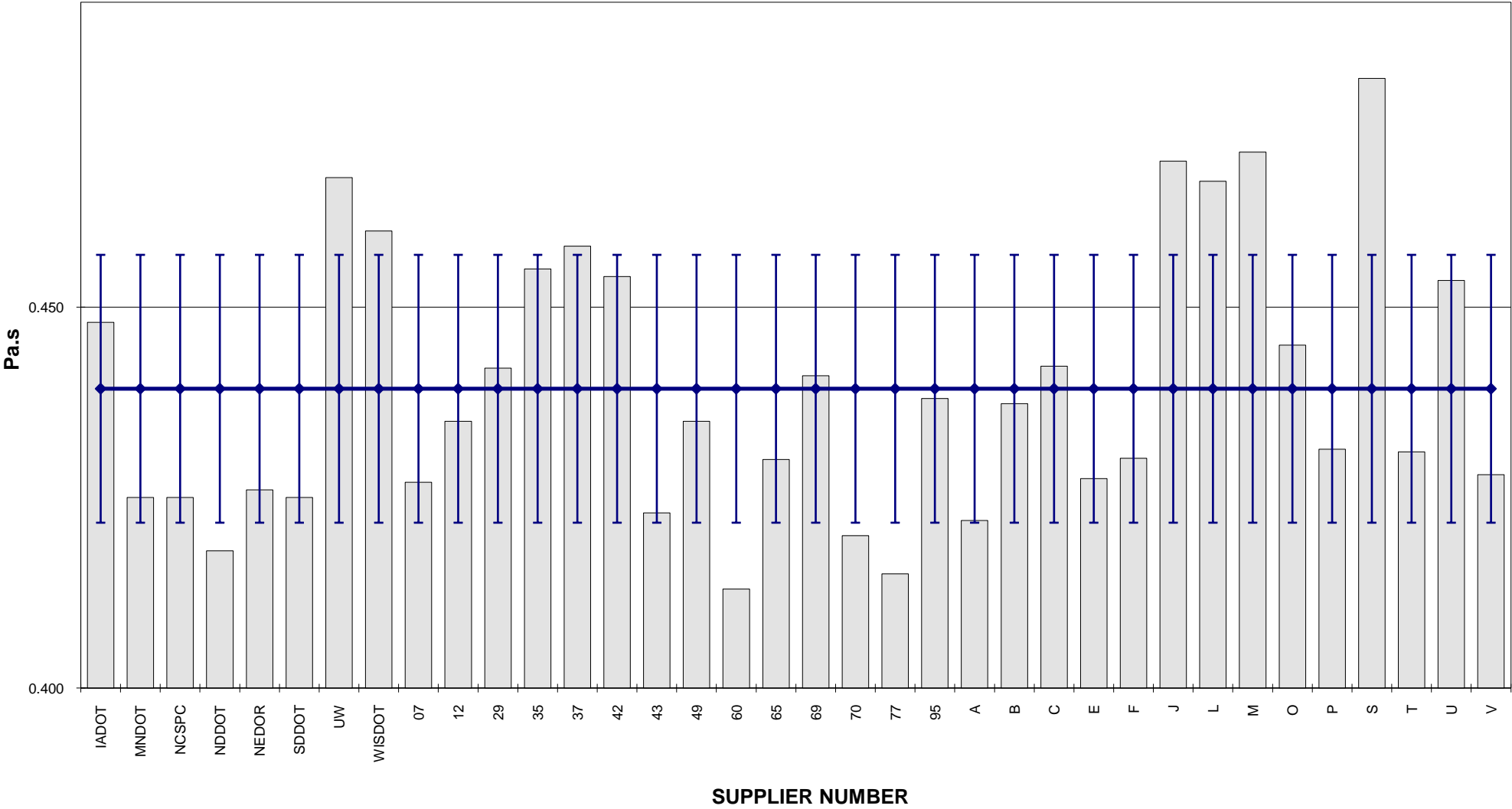
| S       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 53      | 0.481      | 1.42 | 3.93     | 3205   | -0.510    | 158     | 0.320   |
| 64      | 0.479      | 1.77 | 3.82     | 3359   | -0.519    | 158     | 0.319   |
| Average | 0.480      | 1.60 | 3.88     | 3282   | -0.515    | 158     | 0.320   |

| T       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 39      | 0.427      | 1.37 | 4.11     | 3079   | -0.500    | 153     | 0.345   |
| 87      | 0.435      | 1.47 | 3.83     | 2911   | -0.403    | 156     | 0.341   |
| Average | 0.431      | 1.42 | 3.97     | 2995   | -0.452    | 155     | 0.343   |

| U       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 24      | 0.452      | 1.43 | 4.07     | 3750   | -0.499    | 166     | 0.342   |
| 93      | 0.455      | 1.47 | 4.45     | 3770   | -0.584    | 163     | 0.341   |
| Average | 0.454      | 1.45 | 4.26     | 3760   | -0.542    | 165     | 0.342   |

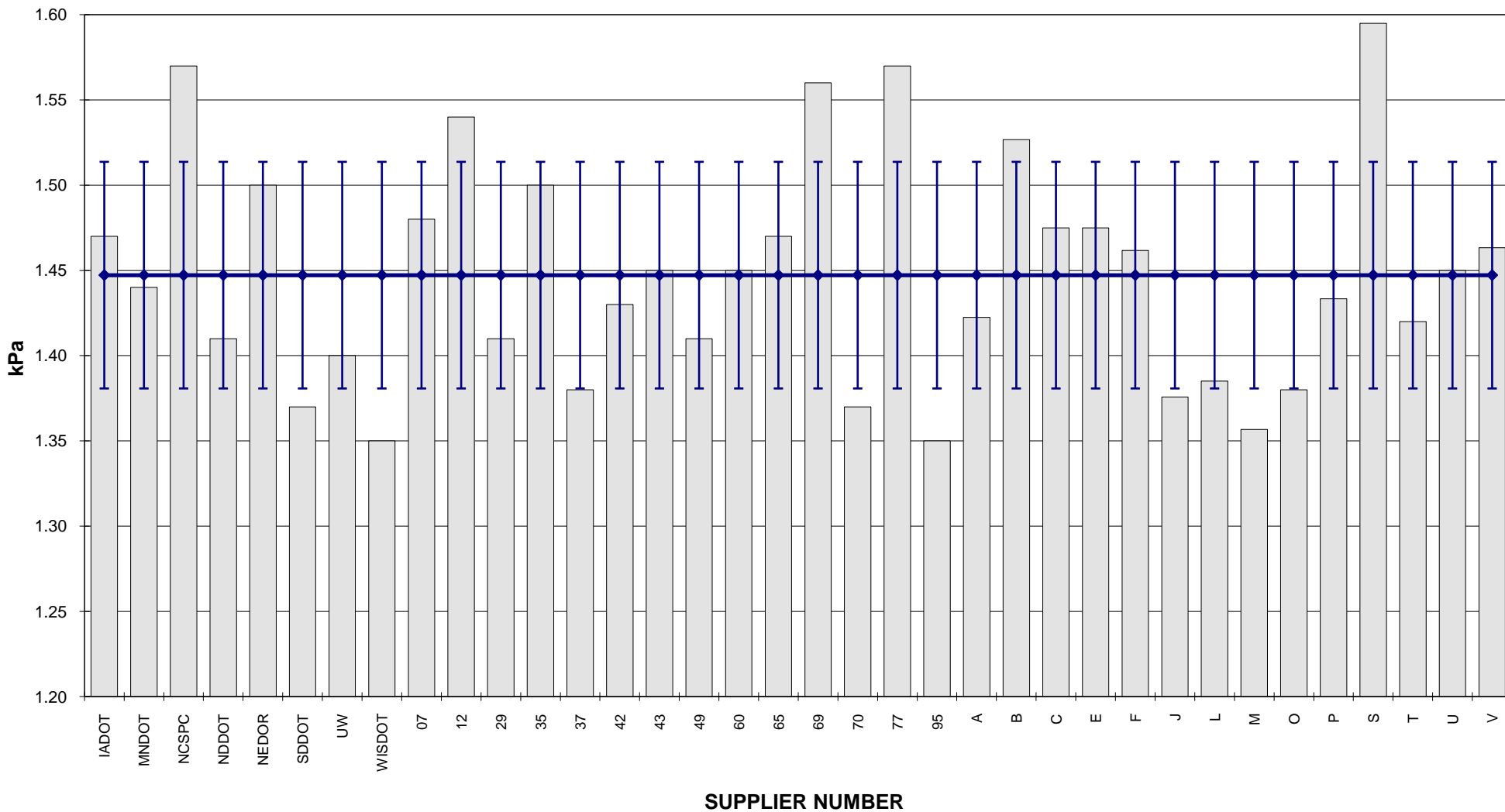
| V       | Rot. Visc. | ODSR | RTFO DSR | PAVDSR | Mass Loss | S-value | m-value |
|---------|------------|------|----------|--------|-----------|---------|---------|
| 58      | 0.428      | 1.45 | 4.17     | 4010   | -0.603    | 174     | 0.326   |
| 78      | 0.428      | 1.47 | 4.20     | 4010   | -0.608    | 176     | 0.326   |
| 81      | 0.428      | 1.47 | 4.23     | 4010   | -0.610    | 173     | 0.326   |
| Average | 0.428      | 1.46 | 4.20     | 4010   | -0.607    | 174     | 0.326   |

### ROTATIONAL VISCOSITY



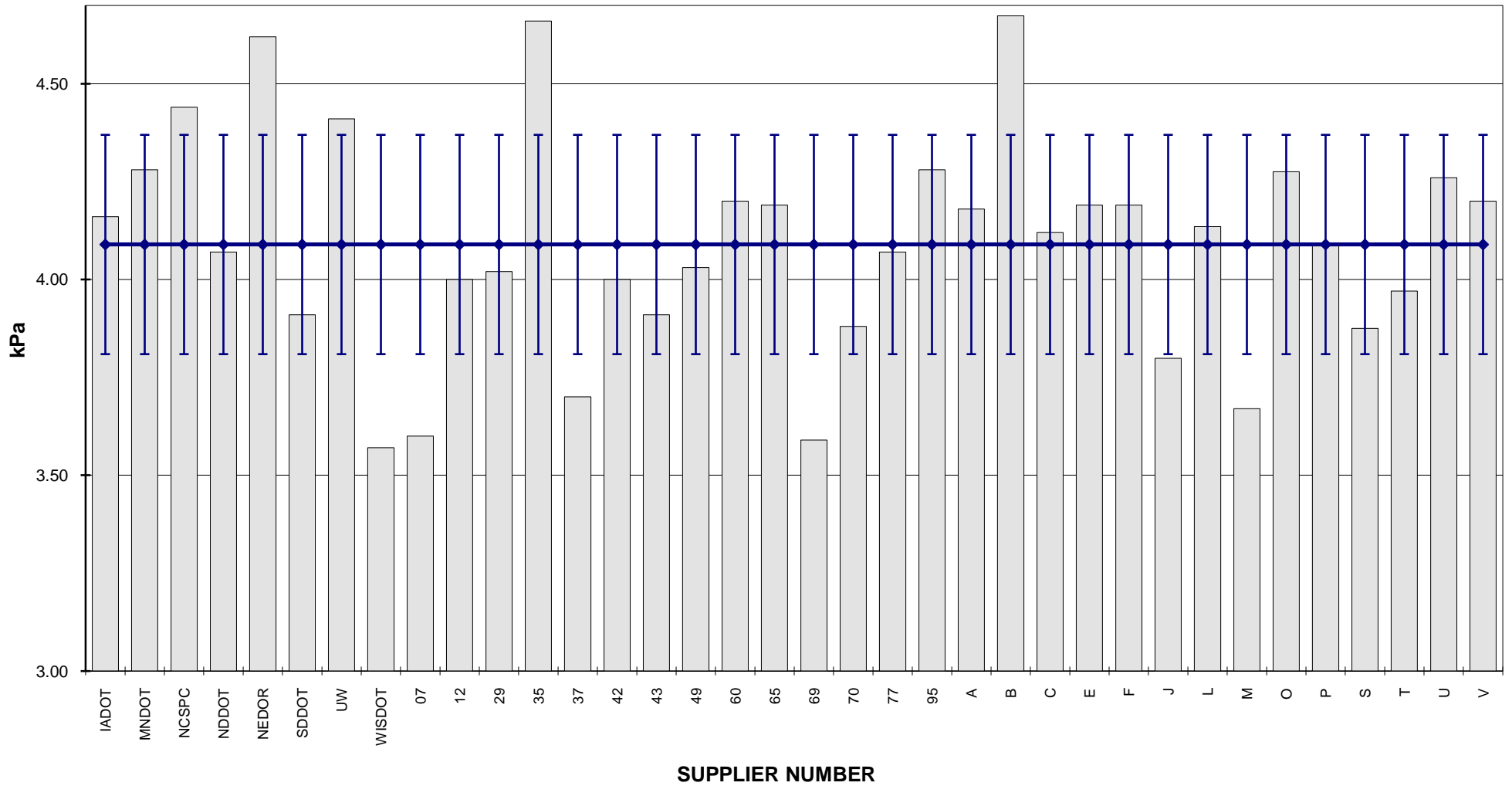
**COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1  
SUMMARY B  
PG 64-22**

**DSR - ORIGINAL**

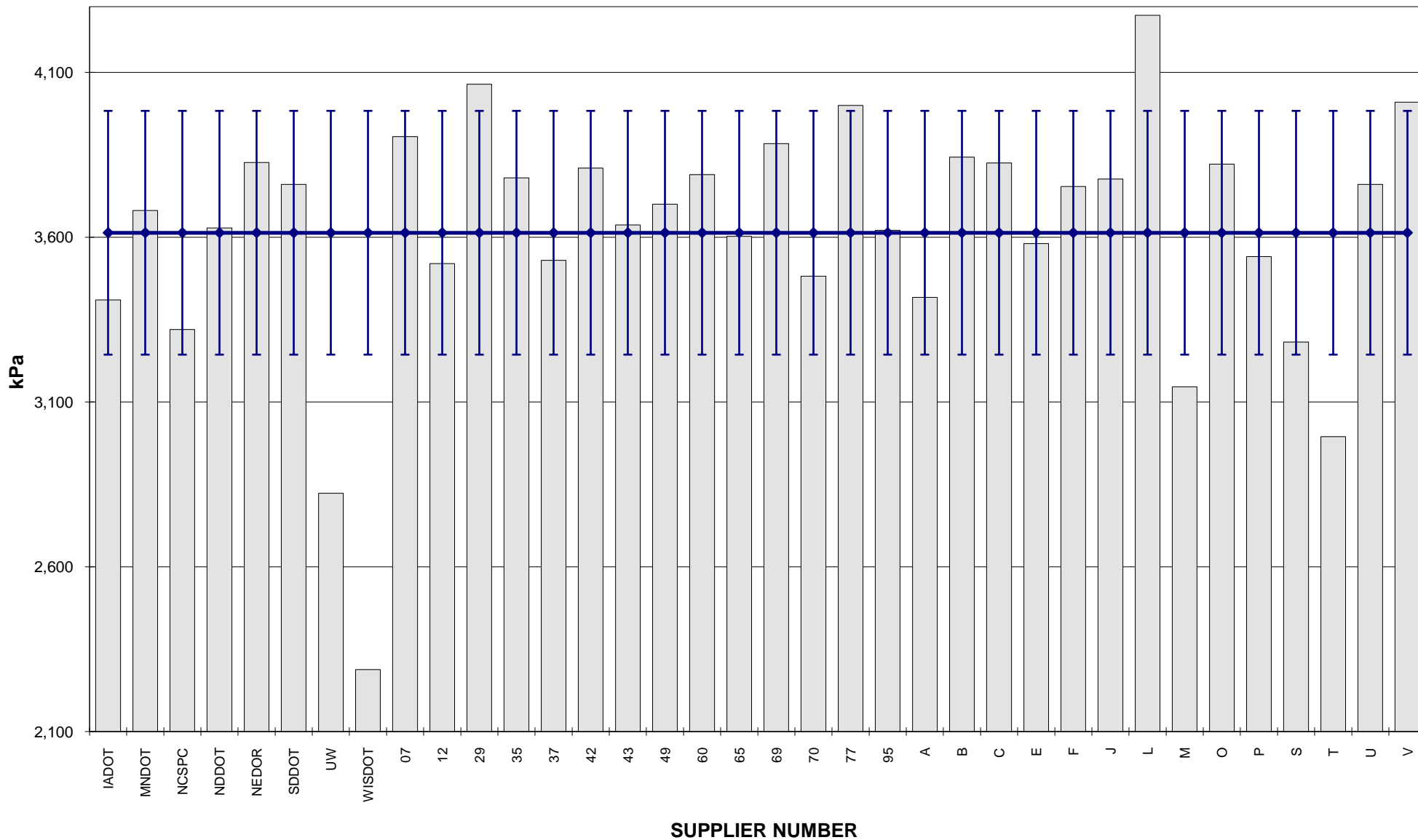


COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1  
SUMMARY B  
PG 64-22

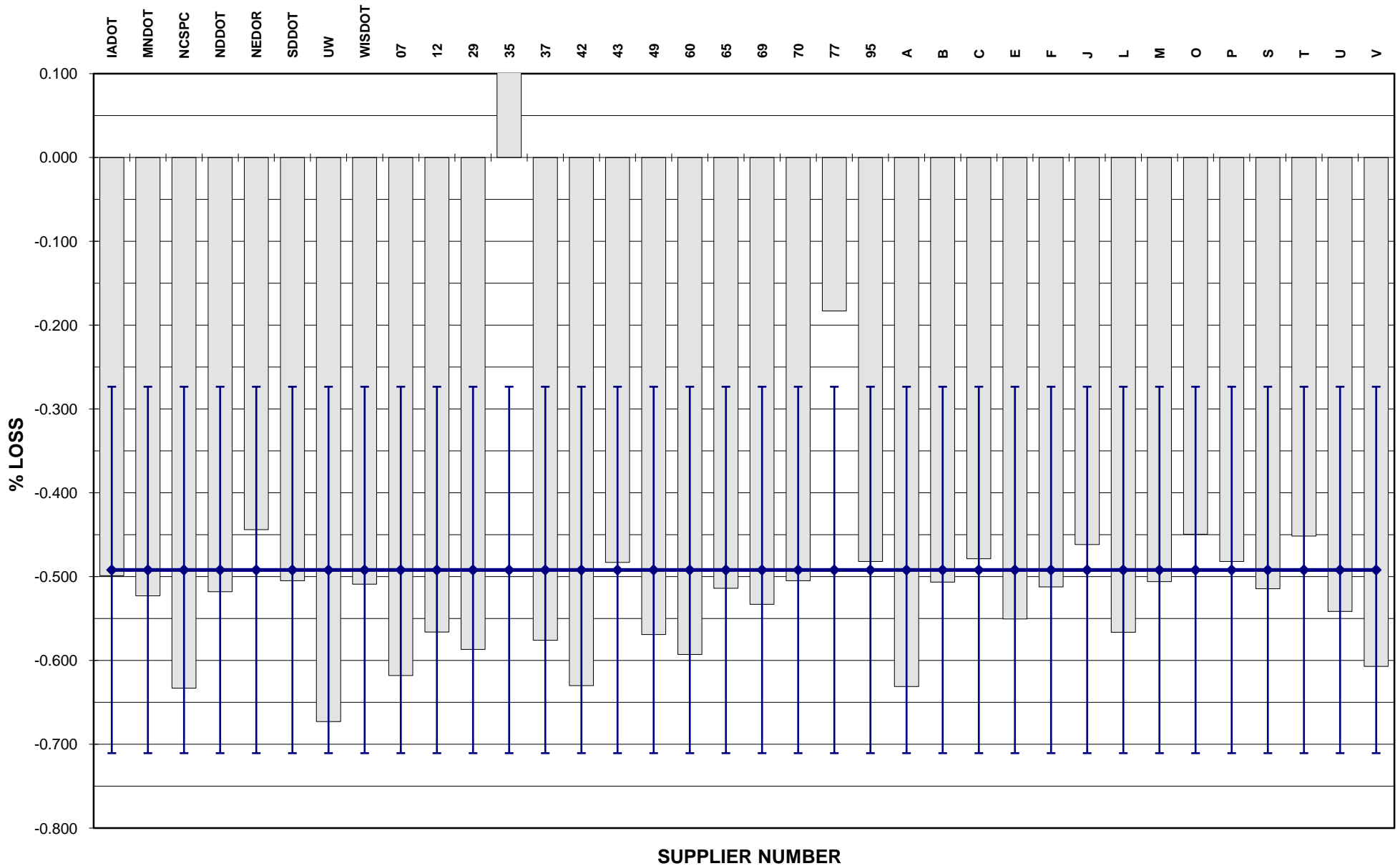
DSR - RTFO



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



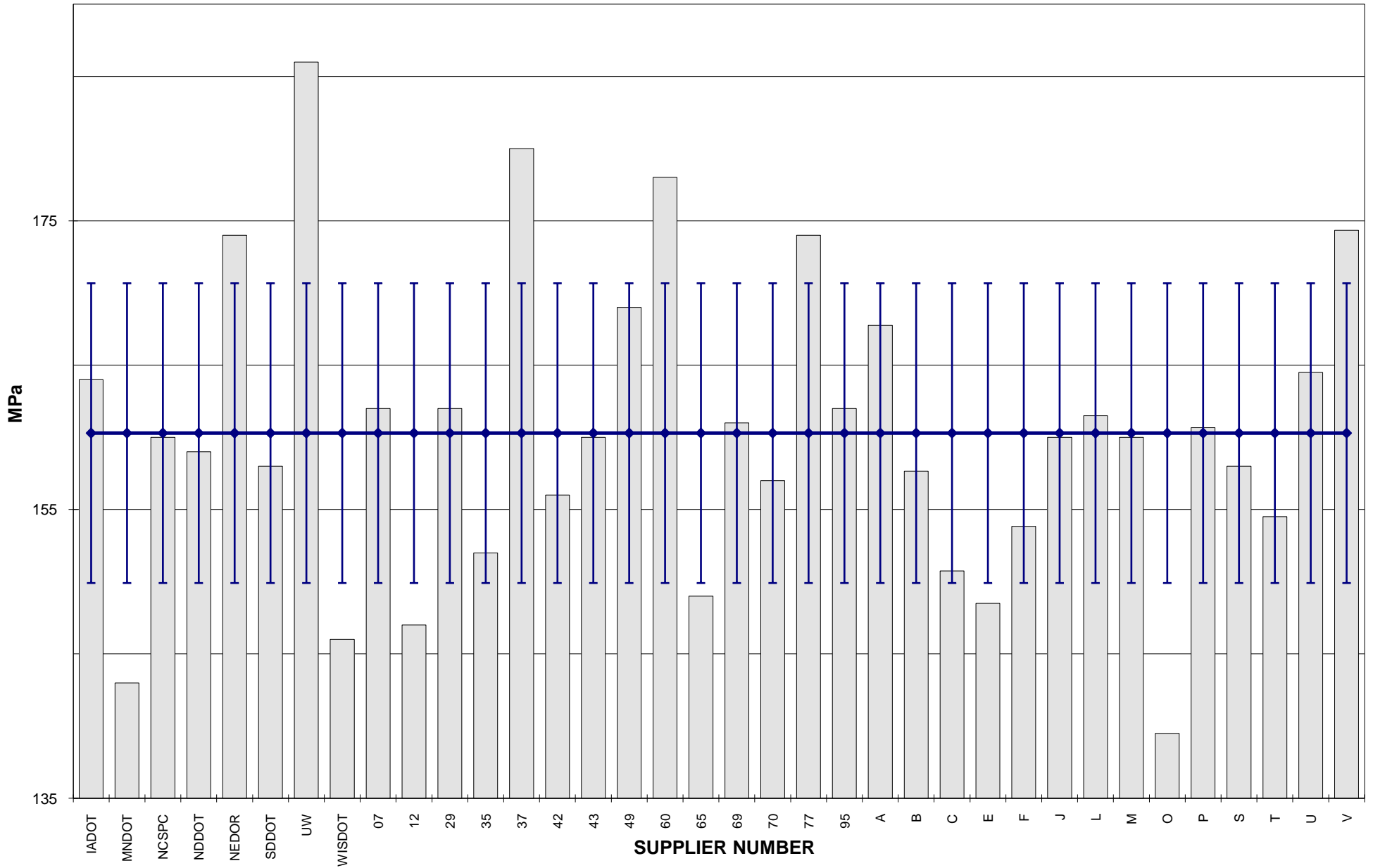
### RTFO MASS LOSS



COMBINED STATE BINDER GROUP ROUND ROBIN 2010-1

SUMMARY B

PG 64-22  
BBR STIFFNESS





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

