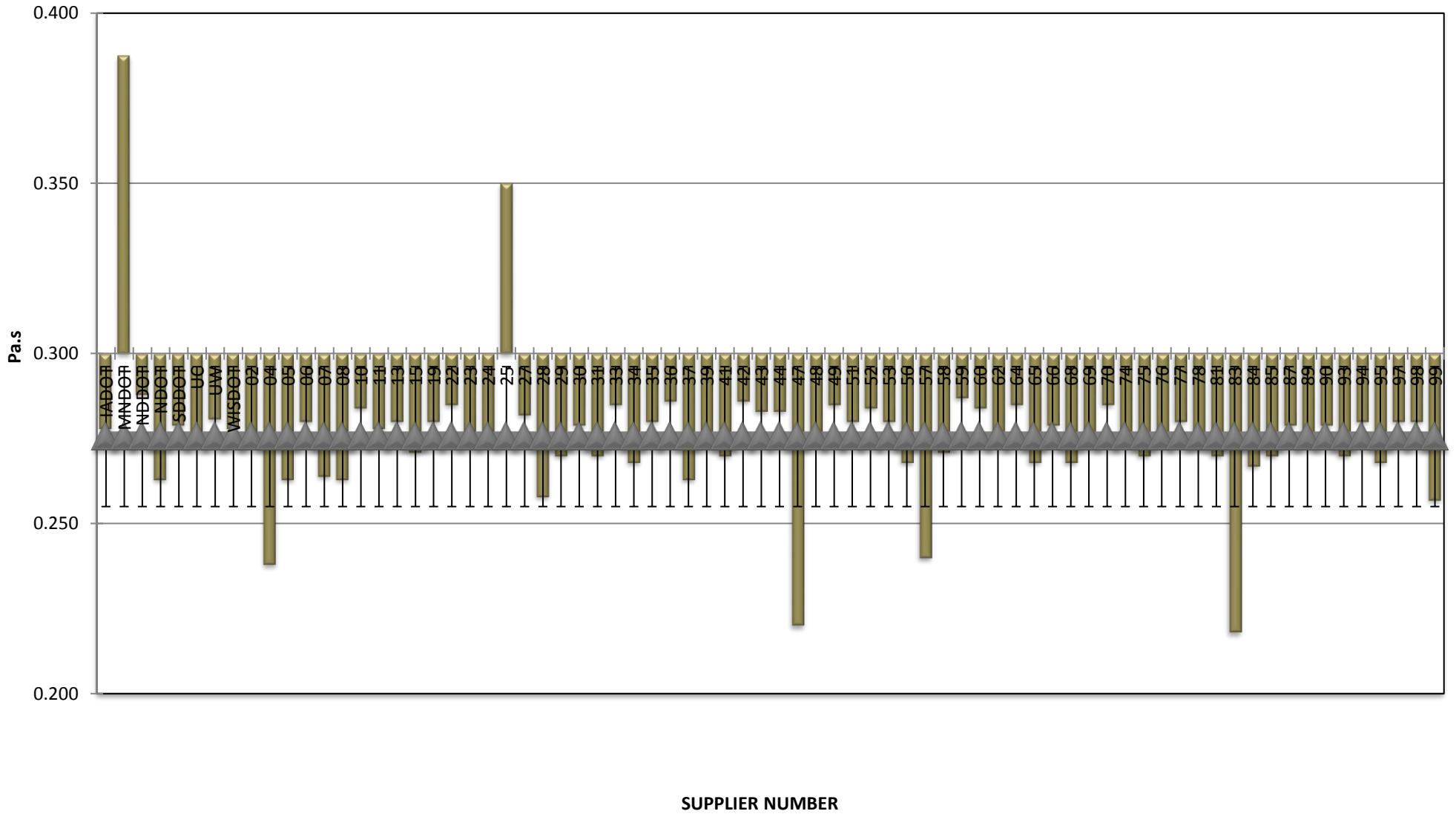


COMBINED STATE BINDER GROUP ROUND ROBIN SUMMARY A 2018-3

Supplier Number	Rotational Viscosity (Pa.s) @135°C	DSR Original (kPa)	DSR RTFO (kPa)	DSR PAV (kPa)	Mass Loss (%) @163°C	BBR S-value (MPa)	BBR m-value	Jnr @ 100 Pa	% Recov. @ 100 Pa	Jnr @ 3200 Pa	% Recov. @ 3200 Pa
IADOT	0.278	1.29		4,670	0.626	249	0.319	2.670	4.09	2.860	1.26
MNDOT	0.388	1.28		4,070	0.799	222	0.314	2.117	5.59	2.362	0.99
NDDOT	0.288	1.52		4,899	0.695	239	0.319	2.439	4.40	2.670	1.20
NDOT	0.263	1.25		4,188	0.549	243	0.316	2.502	3.10	2.812	0.20
SDDOT	0.279	1.26		6,140	0.515	148	0.321	2.800	2.71	3.150	0.00
UC	0.276	1.22		4,414	0.575	237	0.323	2.727	3.60	2.895	0.80
UW	0.281	1.65		4,455	0.124	243	0.319	2.213	3.79	2.501	0.18
WISDOT	0.278	1.35		4,869	0.598	244	0.312	2.520	3.46	2.770	0.45
02	0.275	1.36		3,727	0.648	237	0.328	2.340	3.43	2.550	0.37
04	0.238	1.30		4,775	0.532	252	0.312				
05	0.263	1.18		4,380	0.719	220	0.327	2.660	3.87	2.920	1.13
06	0.280	1.25		4,110	0.763	237	0.320	2.700	4.29	3.020	0.39
07	0.264	1.29		4,553	0.697	226	0.324	2.438	3.00	2.718	0.30
08	0.263	1.09		4,160	0.725	232	0.326	2.620	3.89	2.890	1.18
10	0.284	1.29		4,587	0.738	236	0.315	2.384	3.51	2.687	0.51
11	0.278	1.34		4,223	0.652	237	0.317	2.300	3.59	2.520	0.42
13	0.280	1.23		4,740	0.667	235	0.316	2.427	3.30	2.645	0.54
15	0.271	1.30		4,280	0.663	223	0.328	2.420	4.21	2.670	0.58
19	0.280	1.26		4,824	0.668	221	0.326	2.711	4.50	2.983	1.30
22	0.285	1.26		4,397	0.686	235	0.320	2.409	3.37	2.707	0.63
23	0.273	1.25		5,063	0.780	250	0.323	2.537	4.07	2.768	1.27
24	0.273	1.19		4,950	0.648	250	0.316	2.494	3.36	2.731	0.46
25	0.350	1.33		2,973	0.712	255	0.318	2.118	3.28	2.280	1.66
27	0.282	1.26		4,610	0.728	246	0.325	2.271	4.29	2.512	0.75
28	0.258	1.20		4,673	0.613	230	0.314	2.620	6.38	2.900	1.22
29	0.270	1.33		4,668	0.630	243	0.324	2.580	1.22	2.760	1.19
30	0.279	1.24		4,550	0.690	208	0.317	2.540	3.26	2.774	0.59
31	0.270	1.18		3,830	0.714	230	0.328	2.590	4.75	2.870	1.17
33	0.285	1.29		4,710	0.611	229	0.321	2.396	4.30	2.658	0.53
34	0.268	1.35		4,150	0.627	243	0.324	2.710	3.03	2.930	1.10
35	0.280	1.25		4,350	0.618	243	0.310				
36	0.286	1.29		4,342	0.739	235	0.319	2.384	3.87	2.685	0.11
37	0.263	1.31		4,520	0.465	217	0.327	2.900	3.20	3.100	1.00
39	0.273	1.29		4,350	0.664	231	0.321	2.469	3.37	2.690	0.52
41	0.270	1.20		4,840	0.720	218	0.319	2.790	3.70	3.060	1.23
42	0.286	1.31		4,290	0.838	229	0.314	2.370	3.42	2.582	0.74
43	0.283	1.34		4,470	0.602	236	0.326	2.663	2.91	2.900	0.37
44	0.283	1.26		4,454	0.697	231	0.318	2.374	3.37	2.652	0.44
47	0.220	1.33		4,731	0.400	254	0.315				
48	0.275	1.32		4,120	0.611	241	0.311	2.440	3.92	2.670	1.27
49	0.285	1.31		4,610	0.805	234	0.320	2.298	3.58	2.505	0.85
51	0.280	1.25		4,294	0.658	224	0.322	2.701	4.00	2.947	1.30
52	0.284	1.27		4,305	0.742	235	0.320	2.379	3.44	2.679	0.56
53	0.280	1.37		4,390	0.667	232	0.318	2.580	2.73	2.890	-0.30
56	0.268	1.39		4,720	0.612	245	0.312	2.350	3.94	2.580	0.62
57	0.240	1.32		4,840	0.504	256	0.312				
58	0.271	1.28		5,195	0.688	240	0.324	2.575	3.20	2.812	0.43
59	0.287	1.32		3,546	0.456	244	0.323	2.130	6.43	2.390	1.53
60	0.284	1.27		4,840	0.709	213	0.319	2.383	4.15	2.640	0.62
62	0.274	1.25		4,450	0.625	246	0.314	3.000	2.63	3.290	-0.01
64	0.285	1.39		4,345	0.660	241	0.320	2.520	2.85	2.830	-0.25
65	0.268	1.20		4,310	0.717	246	0.323	2.650	3.76	2.920	1.33
66	0.279	1.23		4,418	0.639	221	0.310	2.370	5.50	2.620	1.34
68	0.268	1.33		4,647	0.642	244	0.321	2.420	6.37	2.672	1.75
69	0.273	1.26		4,382	0.586	249	0.320	2.588	4.10	2.765	0.90
70	0.285	1.27		4,821	0.006	237	0.319	2.452	6.45	2.811	1.40
74	0.275	1.25		4,670	0.766	238	0.322	2.496	3.25	2.730	0.44
75	0.270	1.35		4,710	0.630	241	0.313	2.220	4.13	2.430	0.78
76	0.273	1.30		5,250	0.599	239	0.323	2.660	2.89	2.891	0.32
77	0.280	1.33		5,620	0.664	231	0.313	2.352	3.03	2.557	0.58
78	0.272	1.27		4,920	0.731	255	0.320	2.500	3.67	0.588	0.59
81	0.270	1.26		5,350	0.709	248	0.320	2.366	3.59	2.577	0.65
83	0.218	1.23		4,520	0.585	256	0.315	2.570	4.13	2.830	1.26
84	0.267	1.26		5,144	0.650	238	0.325	2.580	3.81	2.857	0.43
85	0.270	1.26		4,970	0.607	239	0.321	2.557	3.28	2.794	0.43
87	0.279	1.27		4,790	0.651	243	0.314	2.516	3.36	2.747	0.60
89	0.273	1.31		4,700	0.681	202	0.319	2.470	2.89	2.680	0.45
90	0.279	1.23		4,945	0.701	240	0.310	2.460	5.05	2.710	1.30
93	0.270	1.27		5,079	0.734	248	0.321	2.336	4.80	2.562	1.38
94	0.280	1.30		4,043	0.711	202	0.320	2.290	3.72	2.500	1.49
95	0.268	1.28		4,395	0.631	225	0.322	2.625	3.70	2.812	0.50
97	0.280	1.22		4,708	0.675	214	0.326	2.683	3.90	2.930	1.30
98	0.280	1.29		4,600	0.658	200	0.333	2.722	3.80	2.947	1.30
99	0.257	1.22		4,686	0.619	231	0.307	2.500	2.81	2.730	1.24
Average	0.276	1.28		4,572	0.641	234	0.319	2.499	3.80	2.715	0.79
Std. Dev.	0.021	0.07		446	0.125	16	0.005	0.177	0.93	0.318	0.47

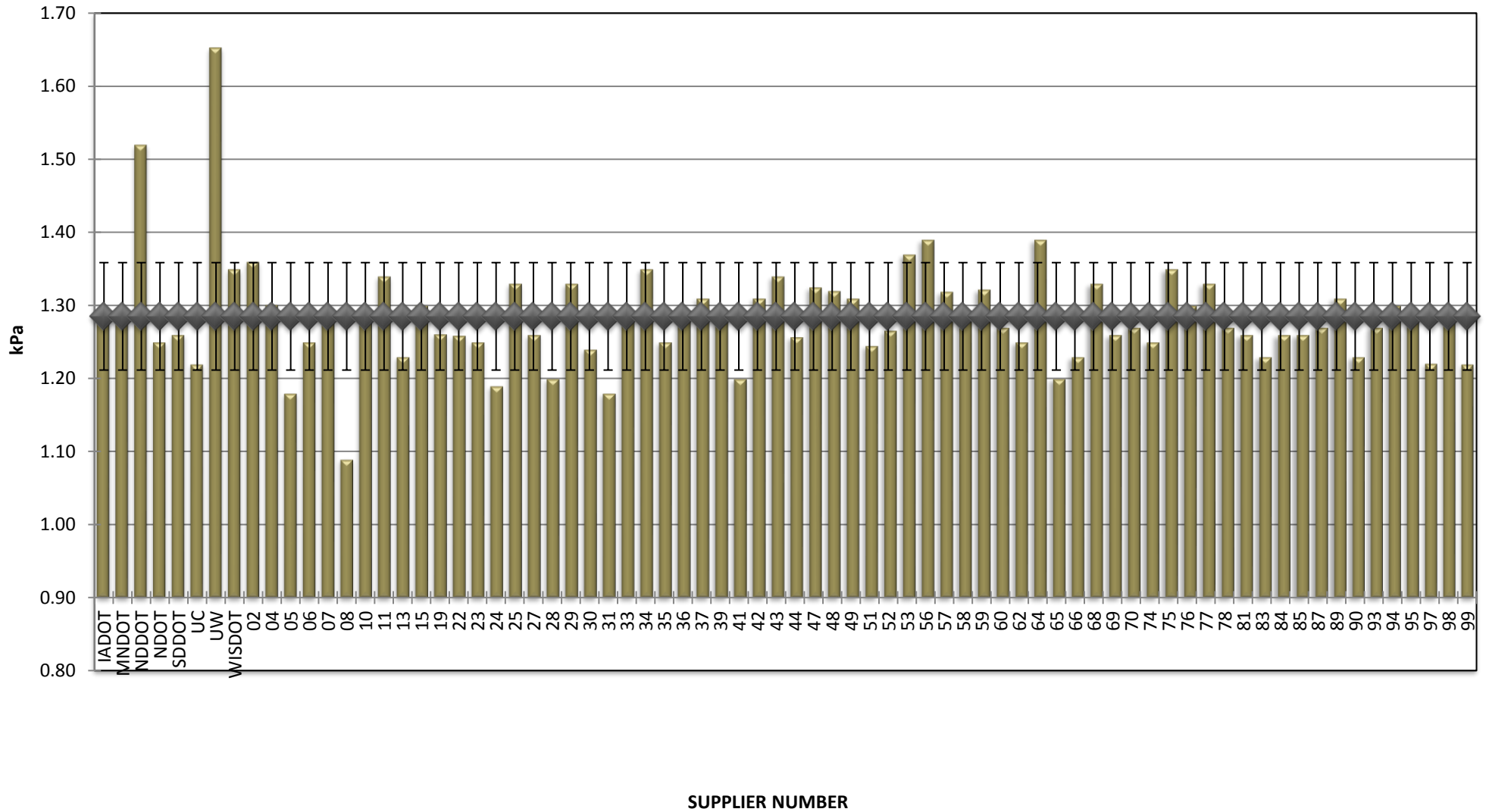
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3

ROTATIONAL VISCOSITY



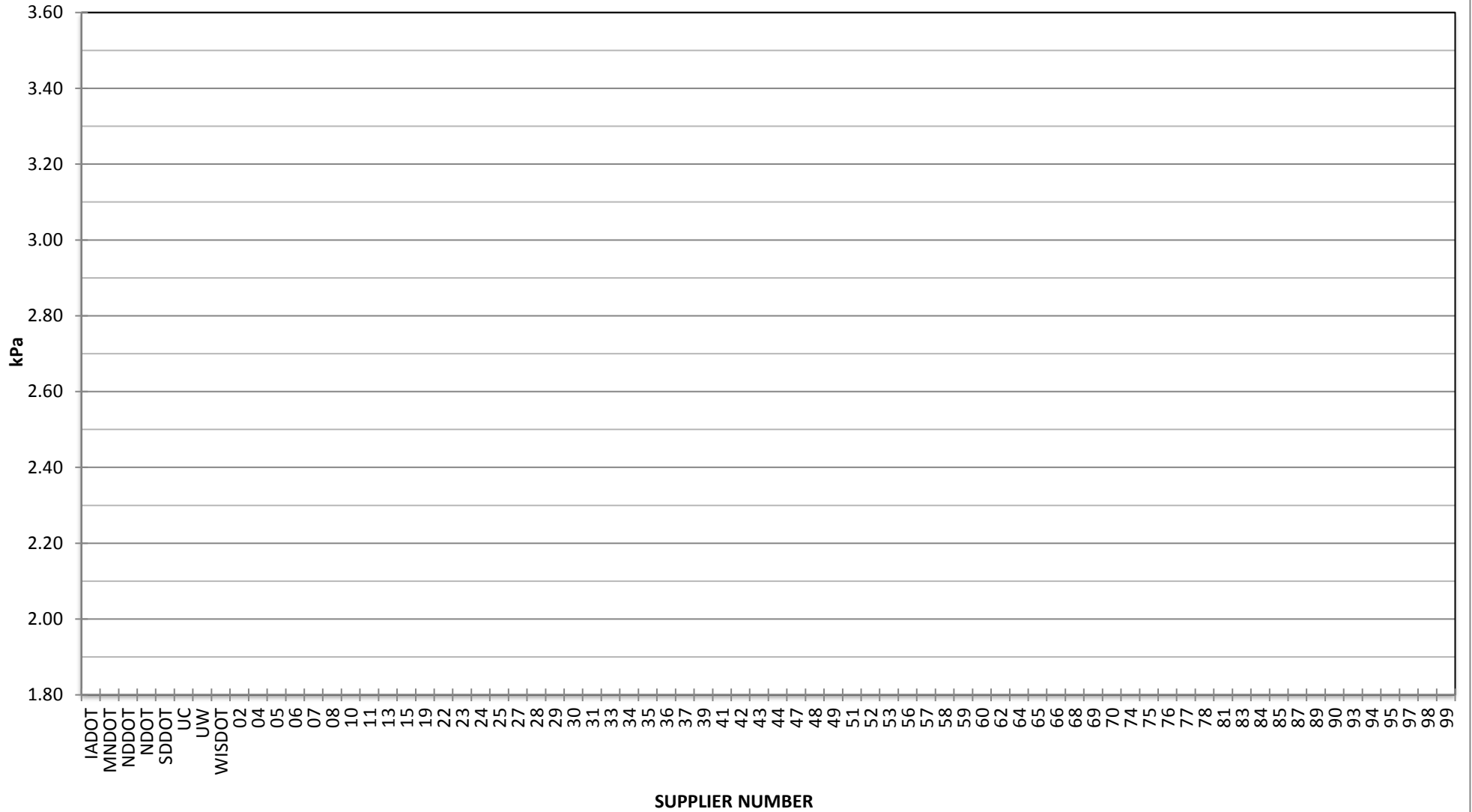
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

DSR - ORIGINAL



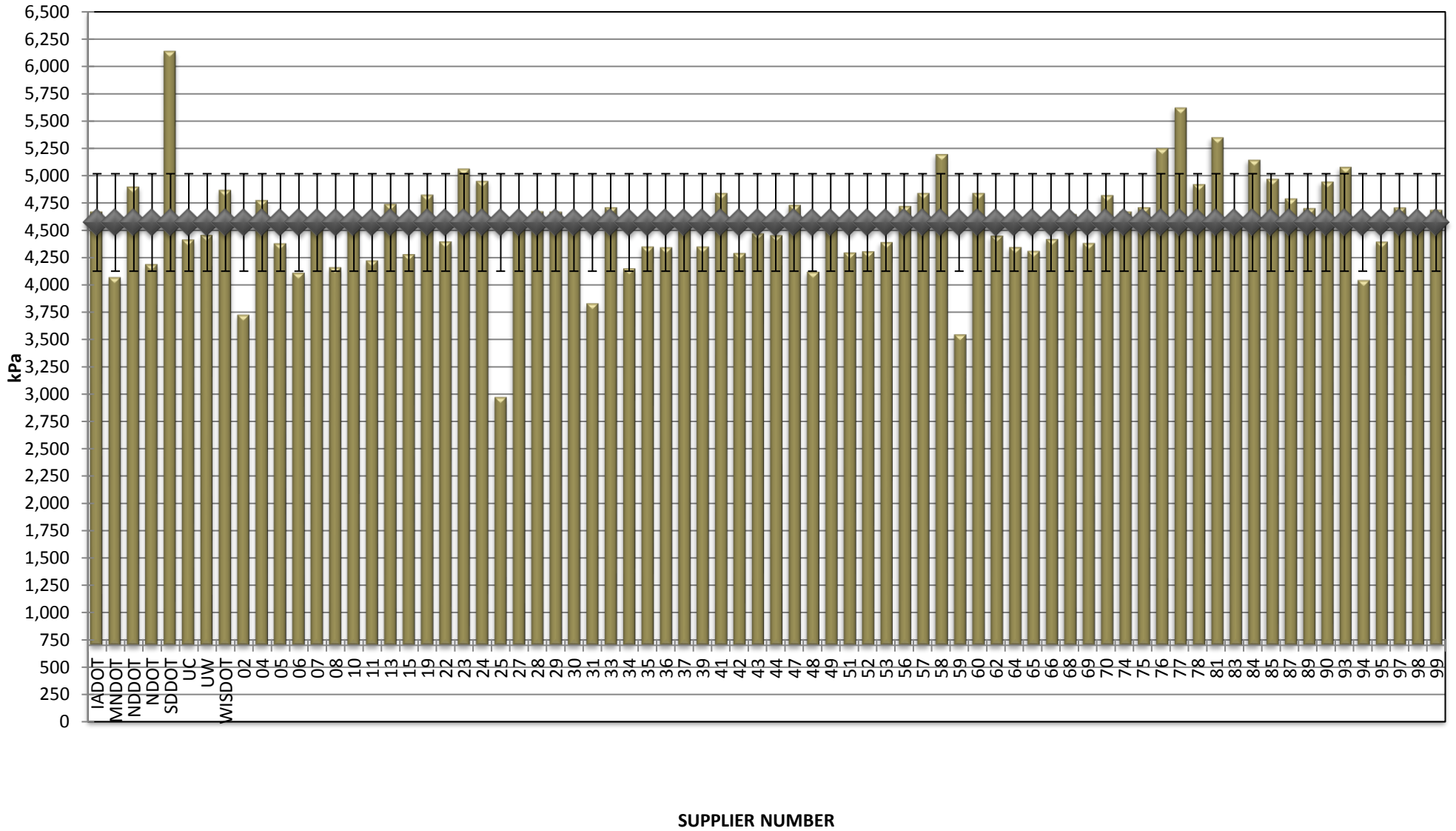
COMBINED STATE BINDER GROUP ROUND ROBIN
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DSR - RTFO



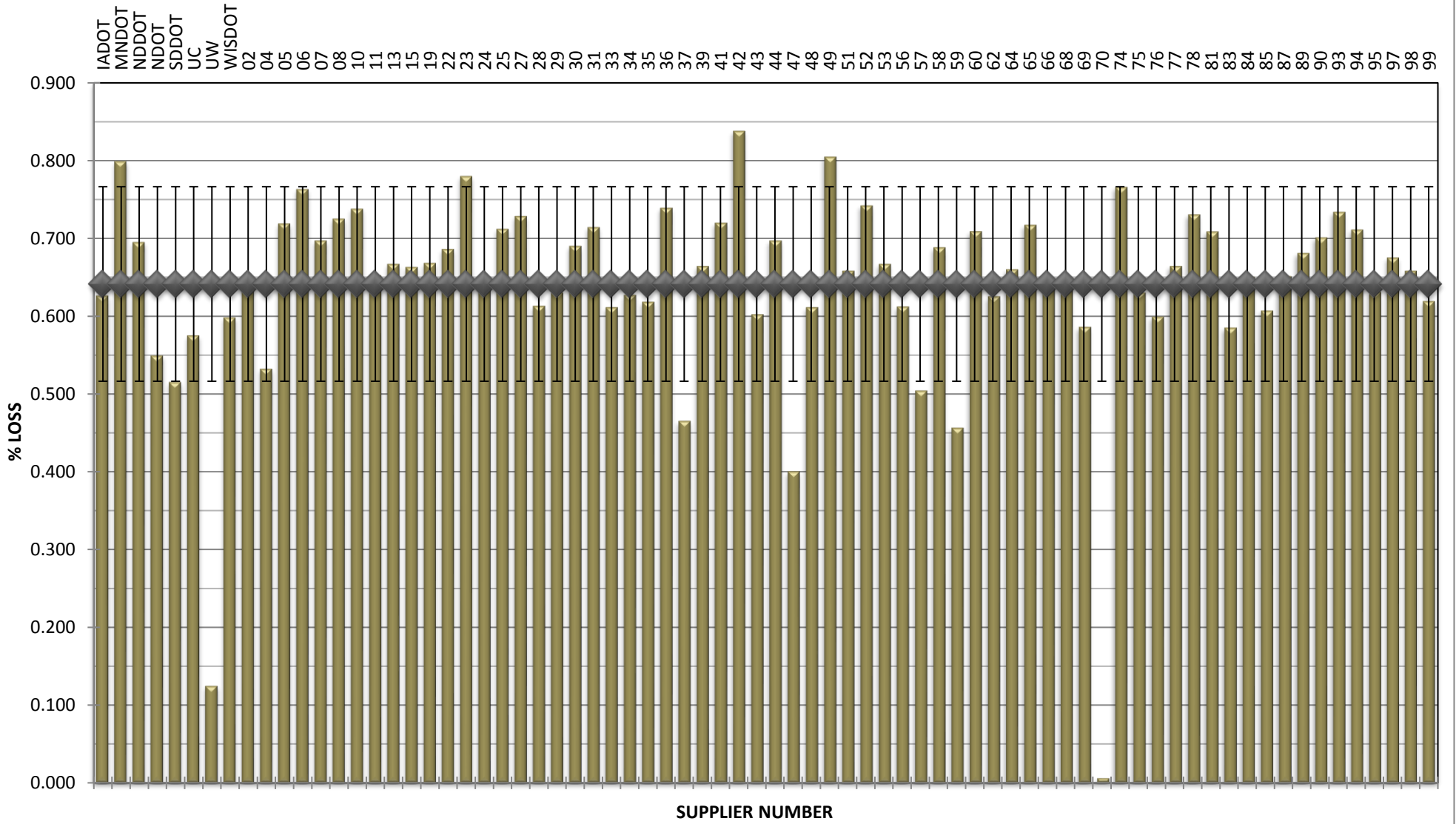
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

DSR - PAV



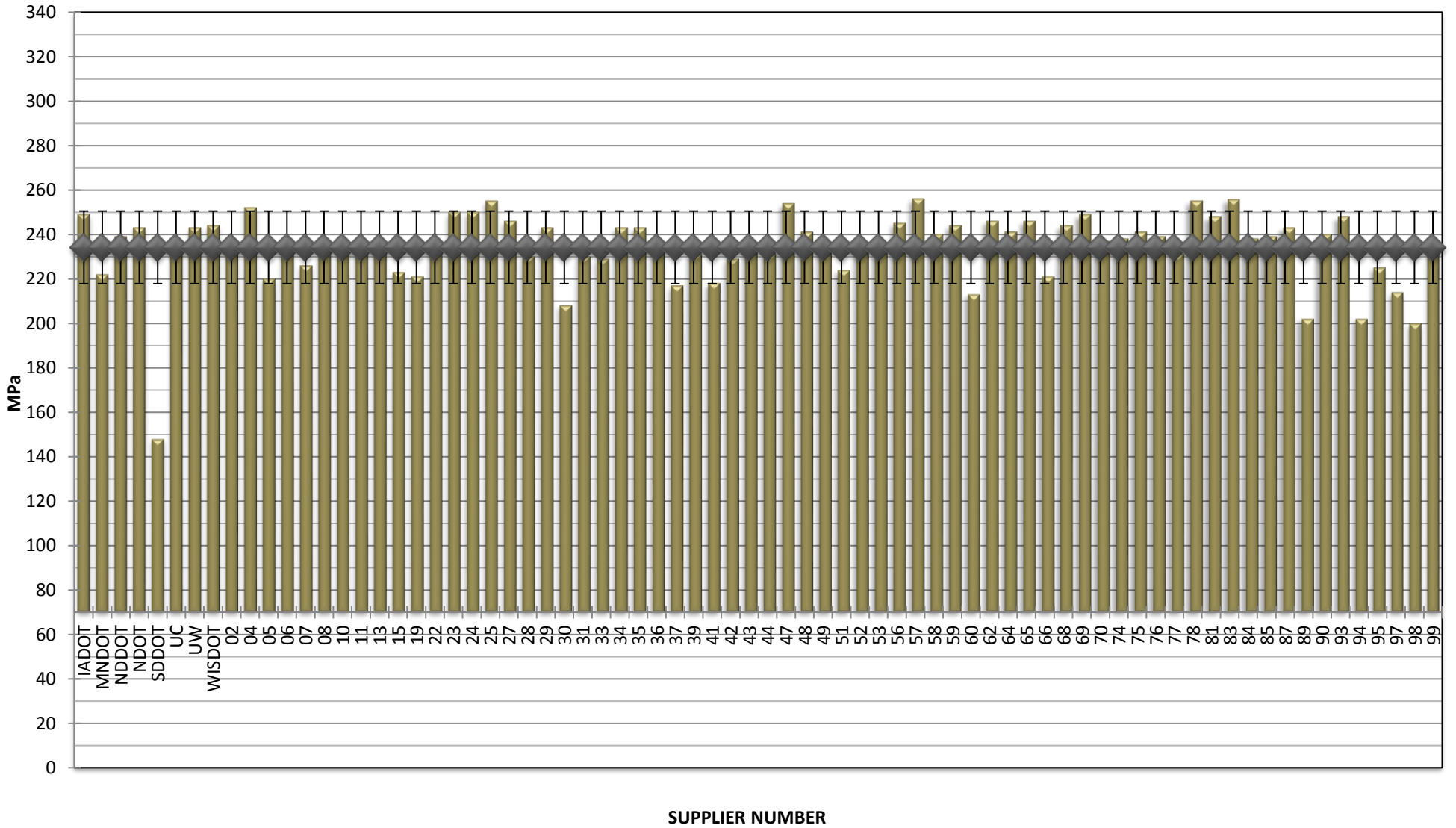
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

RTFO MASS LOSS



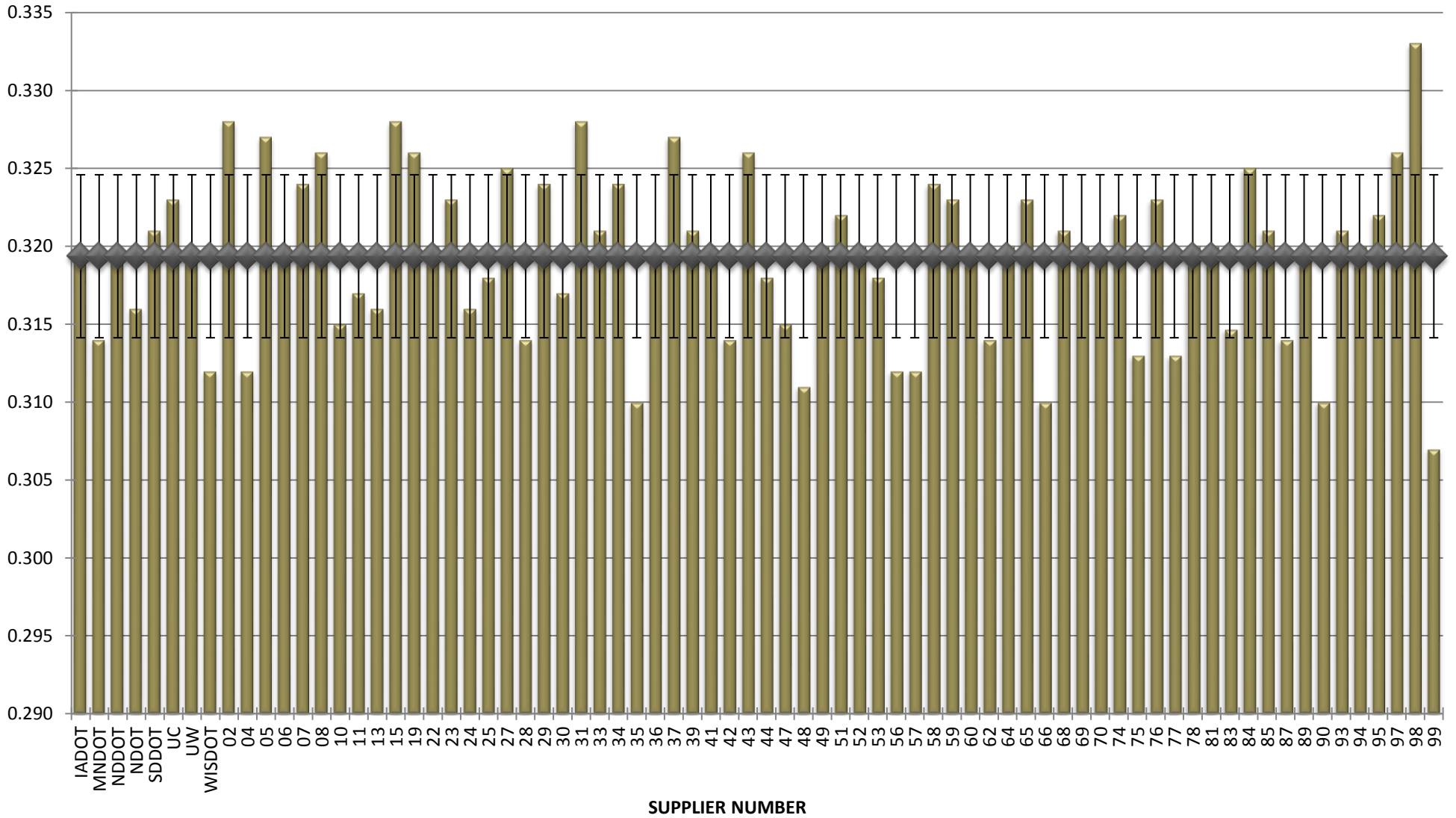
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

BBR STIFFNESS



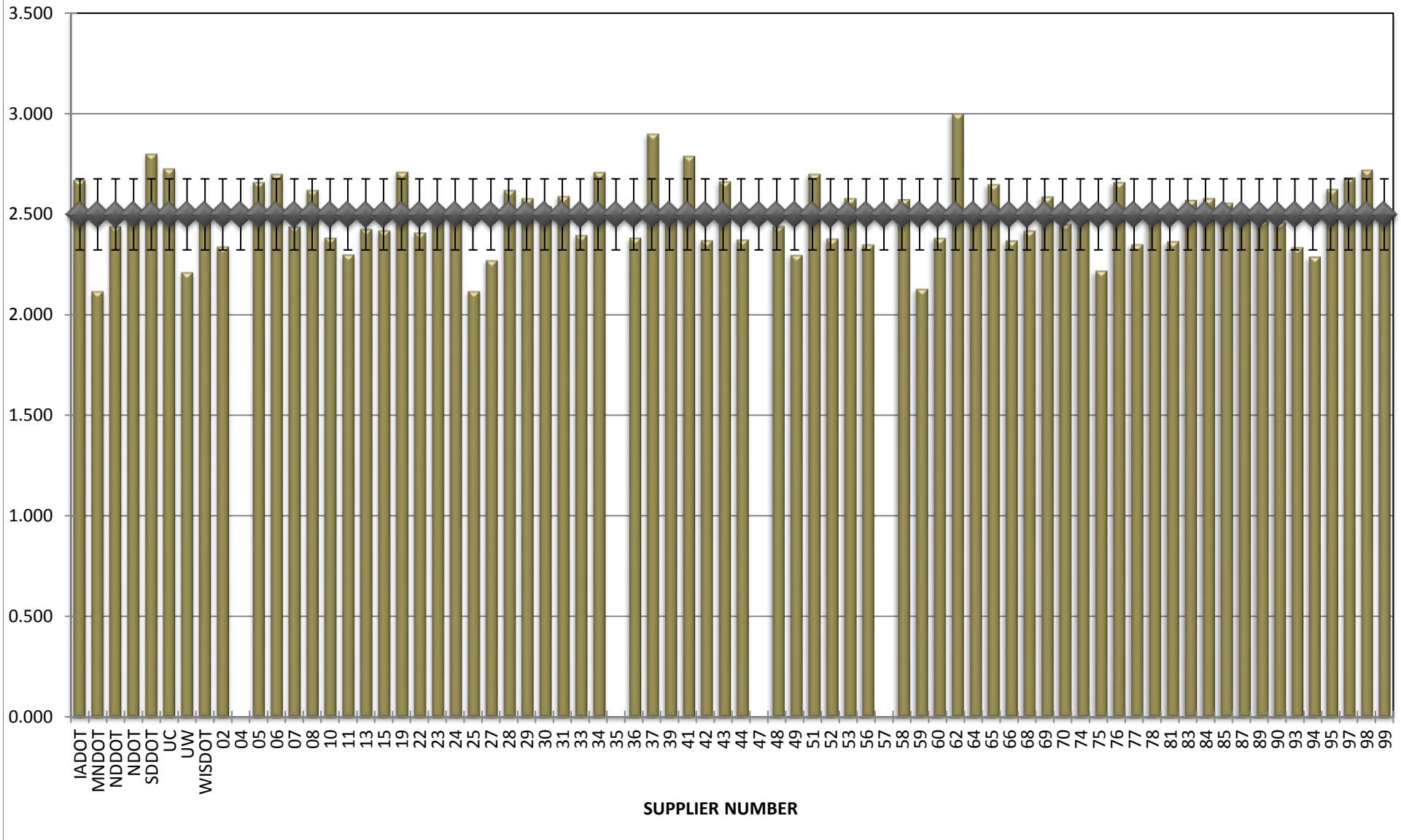
**COMBINED STATE BINDER GROUP ROUND ROBIN
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BBR m-VALUE



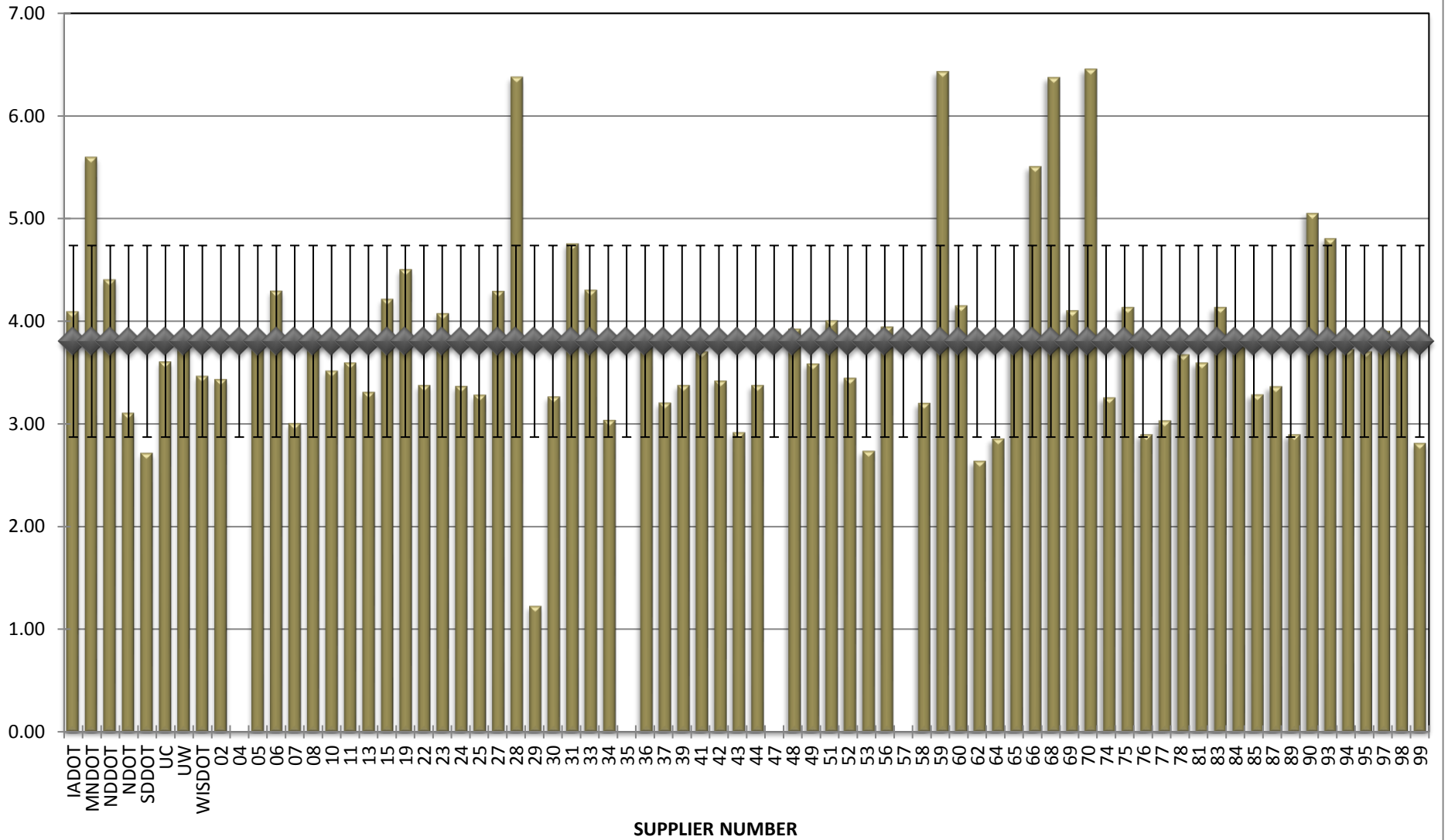
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

Jnr @ 100 Pa



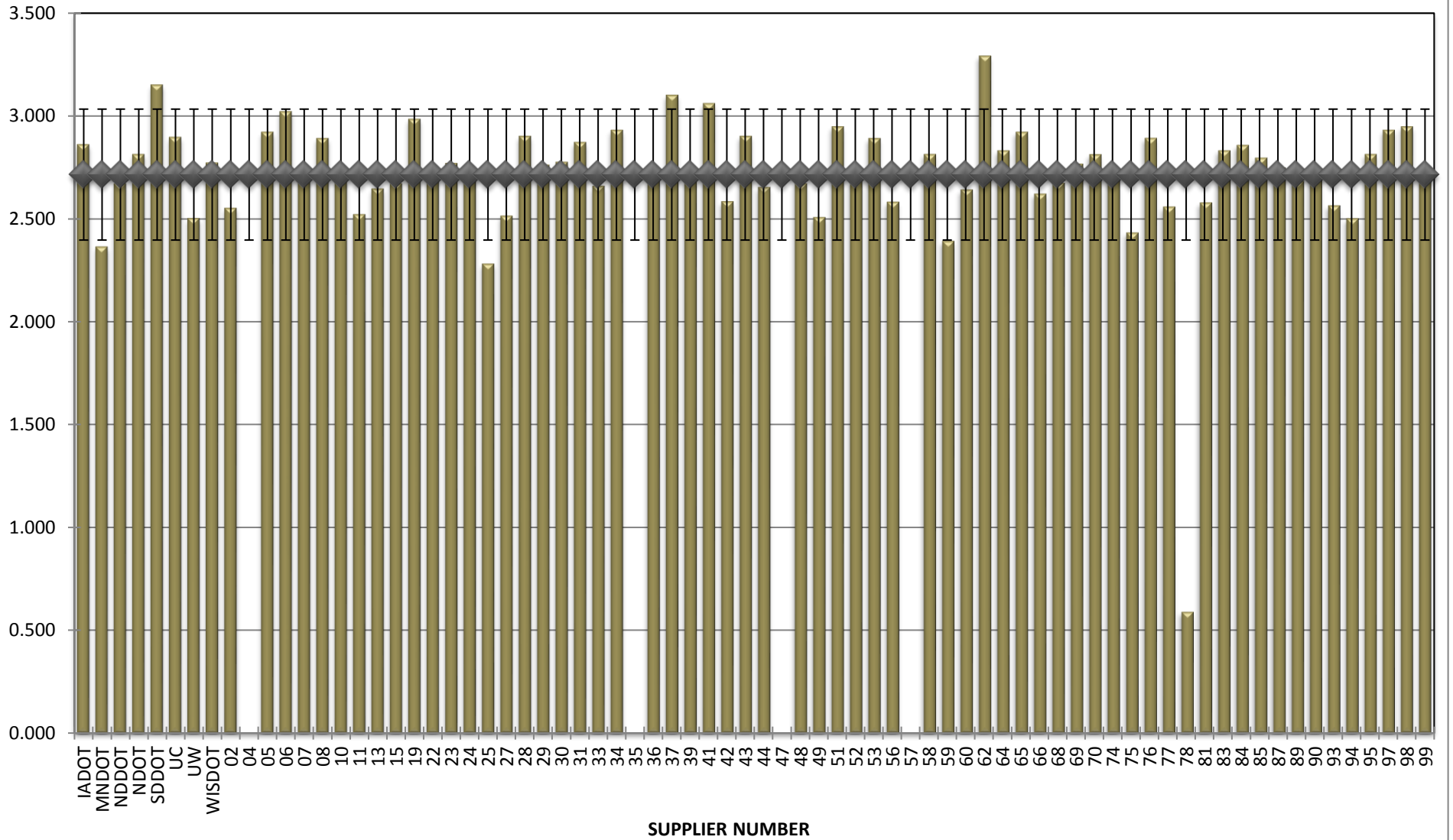
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

% Recovery @ 100 Pa



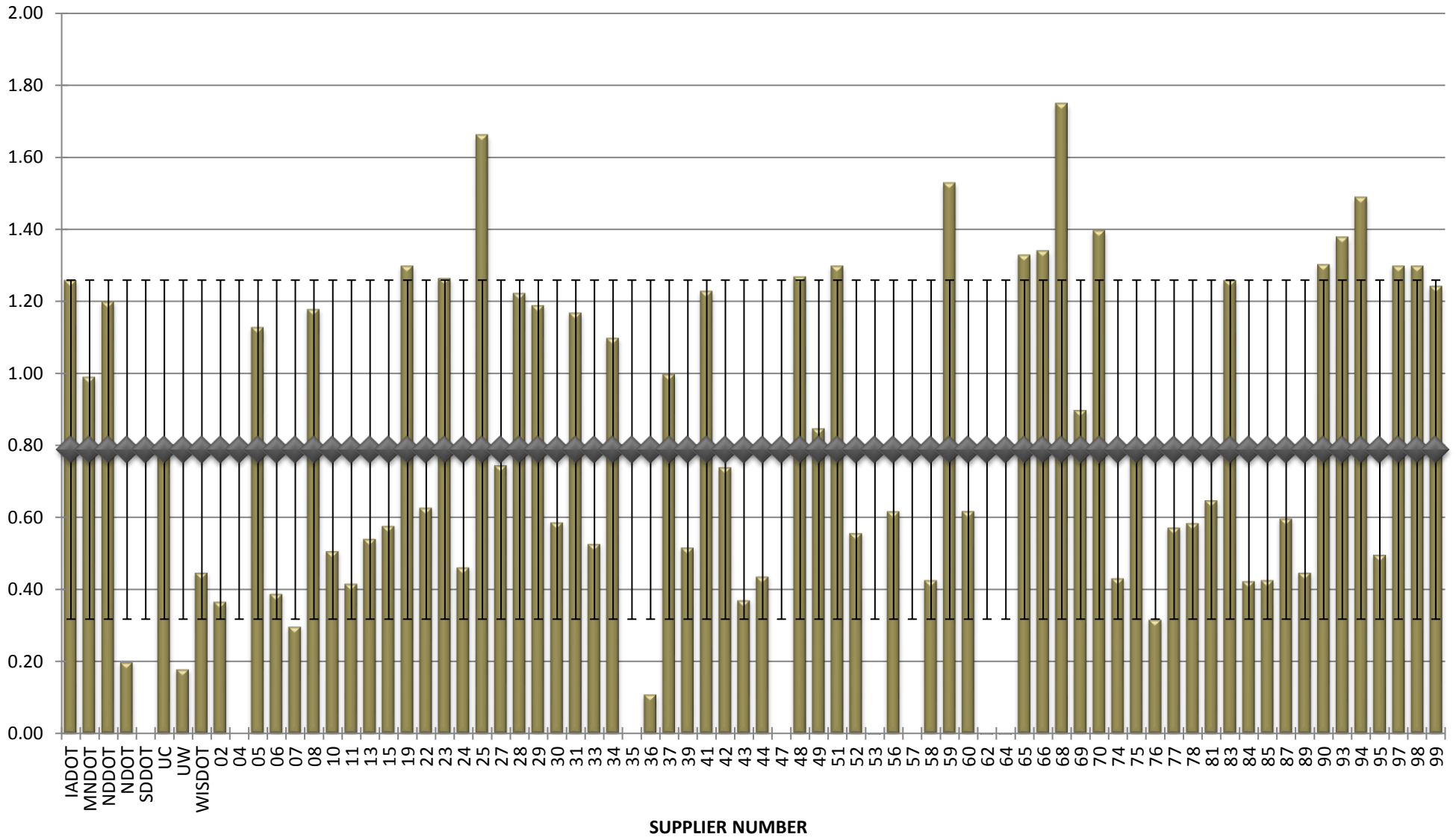
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

Jnr @ 3200 Pa



**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-3**

% Recovery @ 3200 Pa



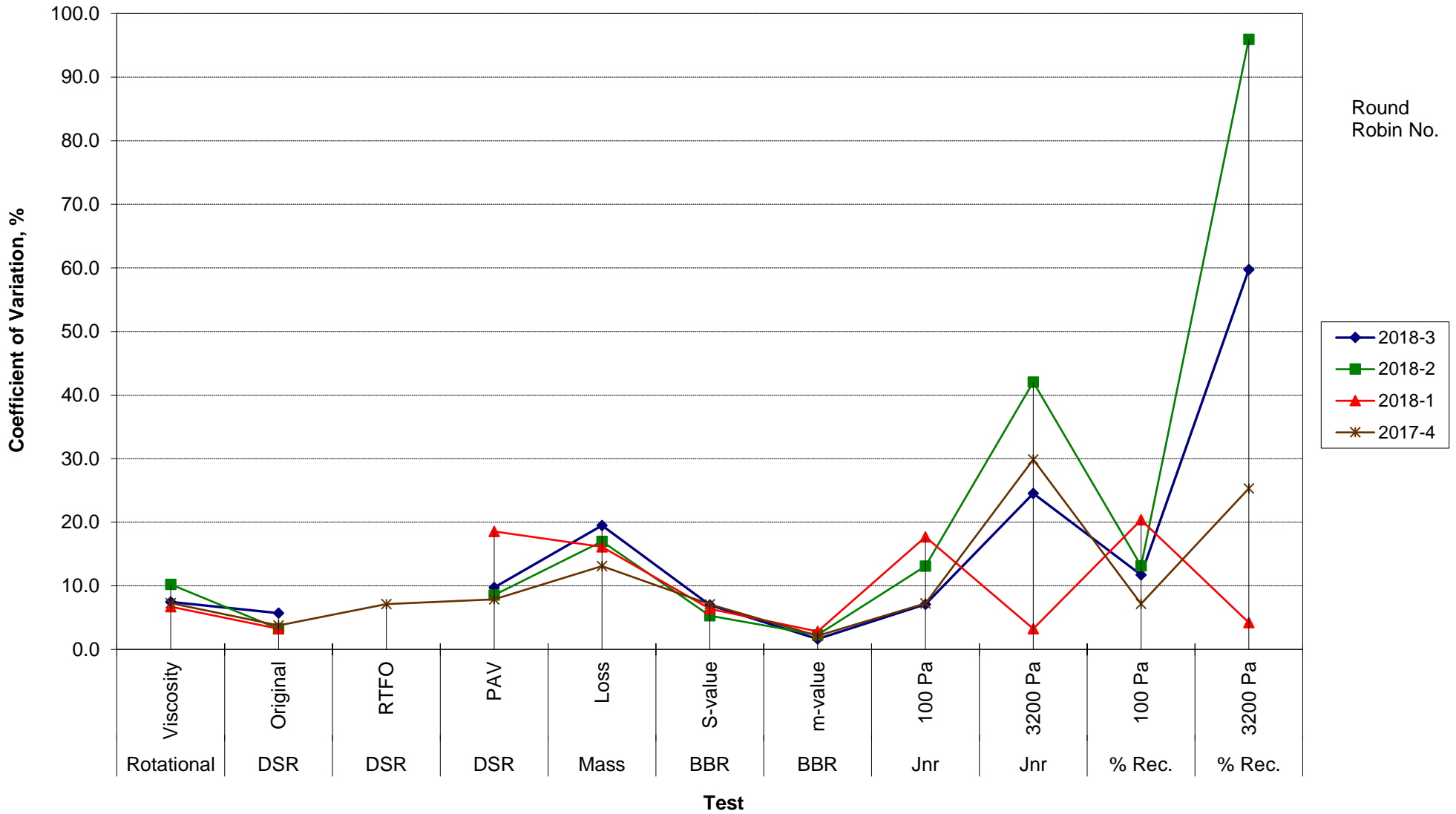
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

COEFFICIENT OF VARIATION

R R No.	Number of Participants	Coefficient of Variation, %											
		Rotational Viscosity	DSR Original	DSR RTFO	DSR PAV	Mass Loss	BBR S-value	BBR m-value	Jnr 100 Pa	Jnr 3200 Pa	% Rec. 100 Pa	% Rec. 3200 Pa	DTT Strain
2018-3	74	7.461	5.724		9.759	19.499	6.972	1.638	7.072	24.530	11.724	59.744	24.227
2018-2	65	10.240	3.225		8.545	16.987	5.302	2.286	13.090	42.048	13.138	95.949	25.749
2018-1	72	6.703	3.226		18.537	16.120	6.396	2.814	17.680	3.241	20.369	4.218	18.381
2017-4	72	7.295	3.762	7.122	7.869	13.091	7.085	2.139	7.236	29.865	7.175	25.328	38.605

**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A
PG**

COEFFICIENT OF VARIATION



**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A
PG**

STATISTICS WITH OUTLIERS REMOVED:

	Rotational Viscosity (Pa.s) @135°C	DSR Original (kPa)	DSR RTFO (kPa)	DSR PAV (kPa)	Mass Loss (%) @163°C	BBR S-value (MPa)	BBR m-value	Jnr @ 100Pa	% RECOV. @ 100Pa	Jnr @ 3200Pa	% RECOV. @ 3200Pa
Average	0.273	1.28		4,572	0.641	235	0.319	2.499	3.80	2.746	0.79
Std. Dev.	0.0132	0.0530		366.13	0.0798	12.87	0.0052	0.1767	0.9333	0.1878	0.4917
Coef. of Var.	4.821	4.151		8.007	12.439	5.468	1.638	7.072	24.530	6.840	62.387

**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

COEFFICIENT OF VARIATION

R R No.	Number of Participants	Coefficient of Variation, %											
		Rotational Viscosity	DSR Original	DSR RTFO	DSR PAV	Mass Loss	BBR S-value	BBR m-value	Jnr 100 Pa	Jnr 3200 Pa	% Rec. 100 Pa	% Rec. 3200 Pa	DTT Strain
2014-1	72	10.760	5.843	7.228	18.189	14.368	7.133	2.186	20.363	20.016	12.070	4.720	8.048
2014-2	52	9.206	5.504	8.472	11.343	23.598	4.651	2.543	19.850	17.336	5.312	4.362	30.979
2014-3	73	6.670	4.095	5.347	15.777	23.221	6.408	2.506	8.817	5.915	7.950	5.335	37.884
2014-4	69	7.780	2.733	8.730	11.549	15.452	8.069	2.975	11.001	11.328	4.454	6.044	20.593
2015-1	72	4.15	3.659	6.878	11.854	14.423	10.602	2.986	21.946	4.132	16.523	2.826	18.552
2015-2	66	48.6813	3.5255	9.2076	13.885	72.575464	5.750708	2.142825	29.61683	5.154988	26.72097	4.610388	36.64349
2015-3	69	13.3356	4.4147	8.0174	7.8859	15.285329	6.038911	2.054348	8.053945	18.90702	12.53481	30.53914	50.36555
2015-4	72	6.93449	3.3122	7.0742	11.465	15.349729	6.549548	2.640035	15.25514	4.718882	8.41301	4.678398	73.56208
2016-1	62	26.2663	3.967	6.9128	10.424	20.650786	7.371125	3.279961	25.7382	4.753085	29.48599	6.309624	21.62796
2016-2	74	9.35379	4.3545	6.6077	9.769	15.131773	8.633694	2.198488	14.13471	16.1848	13.86873	23.11892	70.70604
2016-3	64	12.5161	22.641	21.497	16.608	14.221102	5.999379	2.33875	55.38365	4.044346	115.6536	4.750328	41.51925
2016-4	72	28.1722	2.9891	6.2693	9.9115	17.39022	6.764994	4.719315	14.48671	3.160854	10.95691	2.507913	15.86679
2017-2	72	8.1892	2.9418	6.9766	12.404	25.015248	5.960391	2.305579	15.32323	20.04762	9.000087	20.78232	38.9118
2017-3	68	5.07204	7.8037	5.3053	16.576	12.811858	7.65849	2.261035	14.54116	3.656197	11.69038	4.017192	32.22362
2017-4	72	7.29502	3.7618	7.1225	7.8688	13.091449	7.085242	2.138683	7.235638	29.86519	7.175334	25.32789	38.60541
2018-1	72	6.70339	3.2264		18.537	16.120244	6.395676	2.814315	17.6796	3.240715	20.36877	4.21767	18.38078
2018-2	65	10.2401	3.2247		8.5454	16.987038	5.301906	2.285746	13.08987	42.04845	13.138	95.94854	25.74922
2018-3	74	7.46112	5.7239		9.7593	19.498873	6.97184	1.638225	7.07208	24.52983	11.72352	59.74421	24.22734