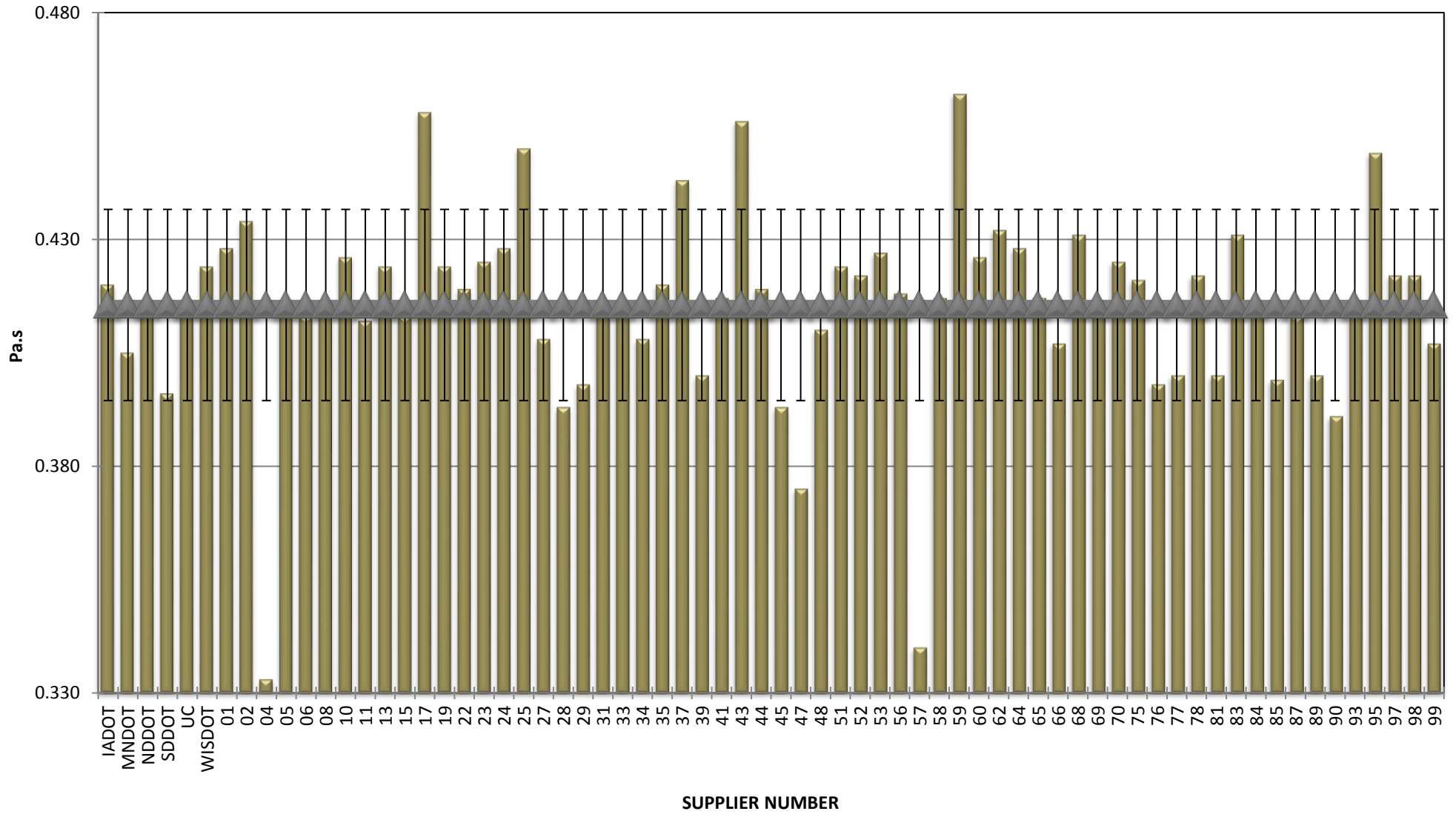


COMBINED STATE BINDER GROUP ROUND ROBIN SUMMARY A 2017-3

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	0.420	1.71	4.080	2,880	0.587	235	0.321	0.410	73.28	0.650	60.26
MNDOT	0.405	0.73	4.460	3,100	0.728	268	0.303	0.395	70.53	0.510	64.24
NDDOT	0.415	1.79	3.970	2,528	0.615	236	0.324	0.481	69.20	0.629	62.10
SDDOT	0.396	1.68	3.700	2,520	0.381	215	0.322	0.633	63.35	0.864	56.81
UC	0.415	1.51	3.660	2,878	0.601	243	0.309	0.458	71.70	0.708	60.70
WISDOT	0.424	1.87	4.100	3,870	0.576	224	0.324	0.384	74.47	0.634	61.00
01	0.428	1.62	4.350	3,090	0.619	218	0.318	0.330	75.40	0.510	64.10
02	0.434	1.73	4.500	2,854	0.512	260	0.317	0.326	75.90	0.506	64.86
04	0.333	1.66	3.850	2,060	0.333	219	0.330				
05	0.416	1.72	4.320	2,820	0.614	245	0.327	0.393	73.18	0.642	59.36
06	0.413	1.67	4.010	2,880	0.770	221	0.314	0.400	74.06	0.653	60.68
08	0.414	1.62	4.510	2,730	0.609	241	0.325	0.370	73.70	0.607	60.10
10	0.426	1.70	4.236	2,727	0.654	241	0.316	0.309	77.51	0.564	63.14
11	0.412	1.69	4.290	2,918	0.524	264	0.318	0.347	75.71	0.555	63.55
13	0.424	1.65	4.400	3,010	0.583	249	0.314	0.343	75.10	0.540	63.48
15	0.413	1.67	4.360	2,430	0.641	202	0.320	0.362	74.15	0.575	61.58
17	0.458	1.67	4.050	3,540	0.582	216	0.314	0.400	73.30	0.640	60.90
19	0.424	1.67	4.431	2,594	0.606	240	0.320	0.357	74.70	0.550	63.20
22	0.419	1.69	4.279	2,702	0.667	241	0.312	0.329	76.65	0.604	61.92
23	0.425	1.61	4.020	2,839	0.458	242	0.321	0.371	75.02	0.589	62.78
24	0.428	1.61	4.180	2,880	0.558	254	0.314	0.373	74.45	0.594	61.76
25	0.450	1.58	3.939	3,229	0.610	235	0.332	0.379	72.93	0.592	60.32
27	0.408	1.69	4.110	2,740	0.570	252	0.324	0.374	74.84	0.610	61.77
28	0.393	1.67	3.950	2,835	0.538	270	0.298	0.420	72.95	0.652	61.61
29	0.398	1.68	4.440	2,701	0.643	246	0.317	0.337	75.63	0.538	63.49
31	0.414	1.73	4.580	3,030	0.607	218	0.320	0.331	75.55	0.524	63.80
33	0.416	1.70	4.300	2,900	0.569	254	0.318	0.347	75.43	0.548	63.52
34	0.408	1.72	4.280	2,800	0.591	259	0.305	0.355	75.14	0.549	63.66
35	0.420	1.87	4.140	2,630	0.561	222	0.308				
37	0.443	1.68	3.880	2,970	0.466	249	0.321	0.400	74.90	0.660	61.90
39	0.400	1.68	4.270	1,610	0.647	194	0.325	0.368	74.35	0.589	61.54
41	0.417	1.69	4.310	2,690	0.603	201	0.321	0.369	74.51	0.599	61.52
43	0.456	1.67	4.220	2,840	0.583	235	0.318	0.480	68.48	0.633	68.61
44	0.419	1.70	4.240	2,857	0.638	244	0.313	0.323	76.68	0.557	63.42
45	0.393	1.64	3.780	3,380	0.536	216	0.311	0.460	71.90	0.720	59.60
47	0.375	1.66	4.143	2,358	0.529	228	0.323				
48	0.410	1.75	4.270	2,890	0.597	261	0.313	0.353	74.92	0.541	63.72
51	0.424	1.68	4.330	2,488	0.604	246	0.323	0.363	74.80	0.561	63.20
52	0.422	1.70	4.292	2,645	0.678	242	0.313	0.310	77.26	0.569	62.63
53	0.427	1.64	3.920	1,752	0.667	264	0.314	0.426	73.01	0.831	51.08
56	0.418	1.68	4.000	2,820	0.583	261	0.317	0.376	75.30	0.607	62.67
57	0.340	1.68	3.817	1,765	0.350	222	0.332	0.317	79.10	0.699	60.20
58	0.417	1.67	4.080	2,840	0.678	250	0.323	0.368	74.38	0.588	62.01
59	0.462	1.77	4.350	1,697	0.528	237	0.324	0.418	69.70	0.551	62.50
60	0.426	1.78	4.440	2,830	0.591	247	0.314	0.339	75.21	0.538	63.04
62	0.432	1.73	4.070	2,968	0.638	266	0.312	0.369	75.47	0.597	62.88
64	0.428	1.68	3.870	1,711	0.654	250	0.323	0.427	73.25	0.829	51.70
65	0.417	1.66	4.520	2,950	0.606	231	0.325	0.359	74.29	0.585	61.49
66	0.407	1.71	4.200	2,827	0.545	258	0.300	0.378	74.18	0.601	62.10
68	0.431	1.58	4.010	3,016	0.657	239	0.322	0.489	69.04	0.646	61.06
69	0.414	1.53	3.710	2,781	0.562	244	0.310	0.411	73.60	0.684	61.40
70	0.425	1.69	4.060	2,475	0.545	219	0.328	0.455	70.12	0.582	63.90
75	0.421	1.69	4.342	2,651	0.682	244	0.313	0.316	76.98	0.564	62.90
76	0.398	1.64	4.060	3,050	0.594	237	0.323	0.478	68.66	0.632	61.01
77	0.400	1.69	4.590	3,090	0.657	226	0.324	0.339	74.54	0.534	62.35
78	0.422	1.69	4.000	2,850	0.702	251	0.318	0.386	74.40	0.626	61.30
81	0.400	1.68	4.270	1,610	0.647	194	0.325	0.368	74.35	0.589	61.54
83	0.431	1.67	4.380	2,610	0.606	240	0.314	0.351	75.92	0.551	64.62
84	0.415	1.63	4.170	2,342	0.620	245	0.312	0.378	74.50	0.608	61.72
85	0.399	1.65	4.110	2,920	0.601	248	0.322	0.467	68.98	0.614	61.51
87	0.413	1.66	4.160	2,220	0.601	224	0.318	0.453	69.47	0.591	62.42
89	0.400	1.65	4.230	1,500	0.662	203	0.322	0.374	74.14	0.600	61.22
90	0.391	1.67	3.960	2,913	0.612	266	0.309	0.407	73.91	0.648	61.57
93	0.415	1.60	4.000	2,827	0.540	245	0.319	0.380	75.17	0.603	62.84
95	0.449	1.73	4.150	2,680	0.570	241	0.316	0.486	68.11	0.648	60.16
97	0.422	1.68	4.491	2,689	0.651	231	0.317	0.357	74.50	0.546	63.20
98	0.422	1.67	4.367	2,453	0.626	239	0.327	0.356	75.00	0.555	63.20
99	0.407	1.64	4.100	2,995	0.540	266	0.303	0.387	72.95	0.588	61.40
Average	0.416	1.66	4.171	2,695	0.593	239	0.318	0.387	73.69	0.606	61.84
Std. Dev.	0.021	0.13	0.221	447	0.076	18	0.007	0.056	2.69	0.071	2.48
Coef. of Var.	5.072	7.80	5.305	17	12.812	8	2.261	14.541	3.66	11.690	4.02

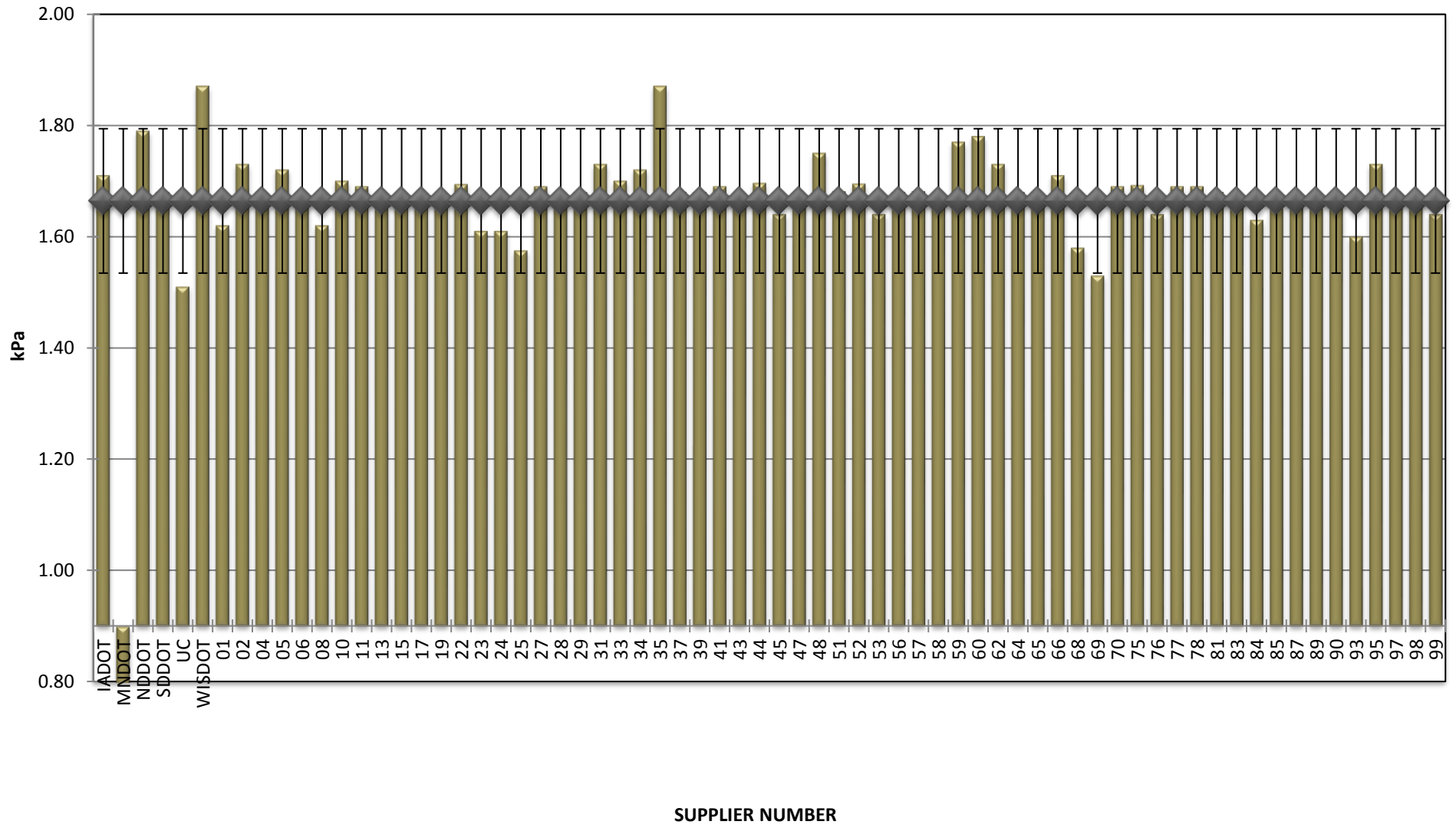
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

ROTATIONAL VISCOSITY



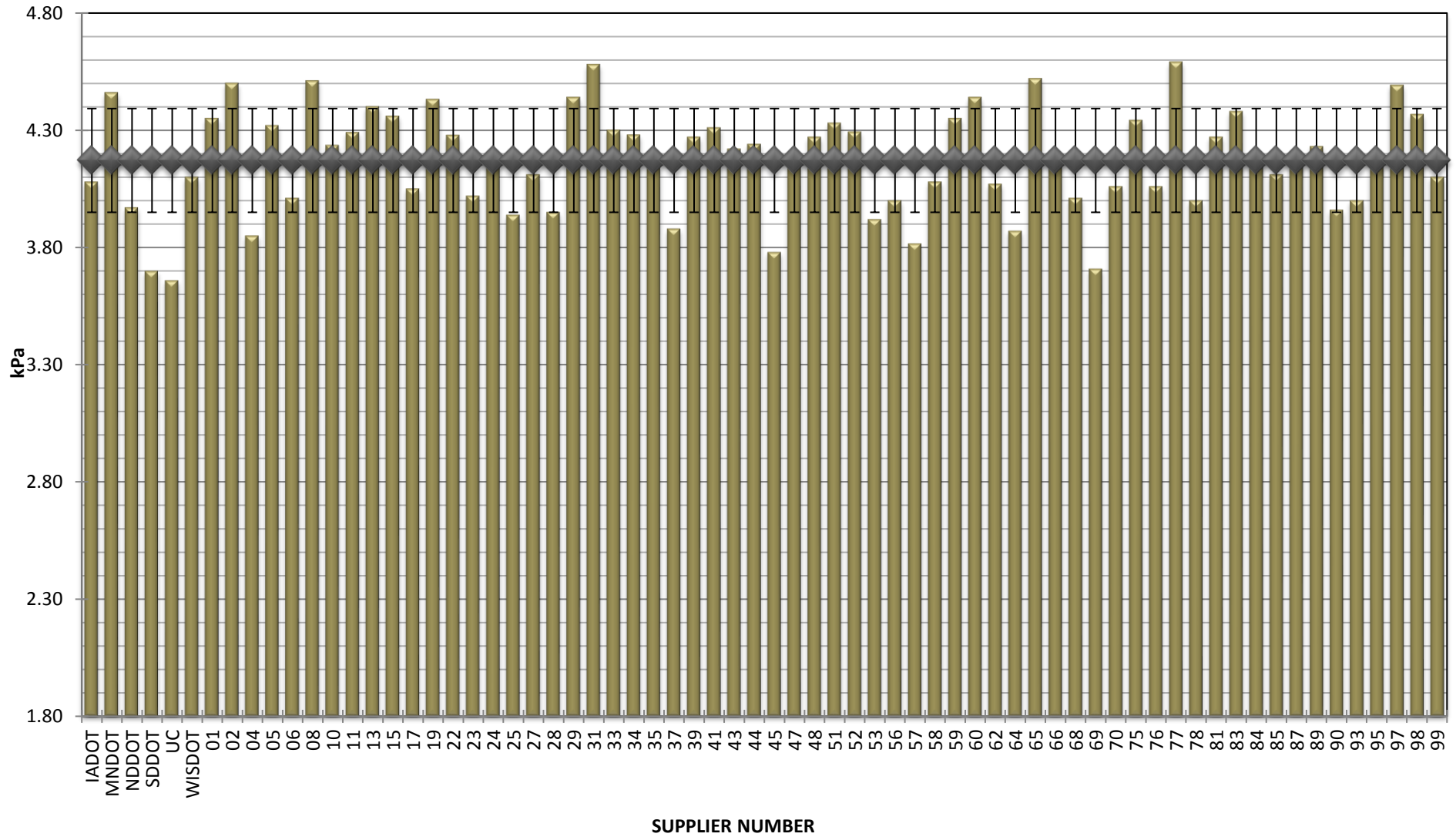
**COMBINED STATE BINDER GROUP ROUND ROBIN
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DSR - ORIGINAL



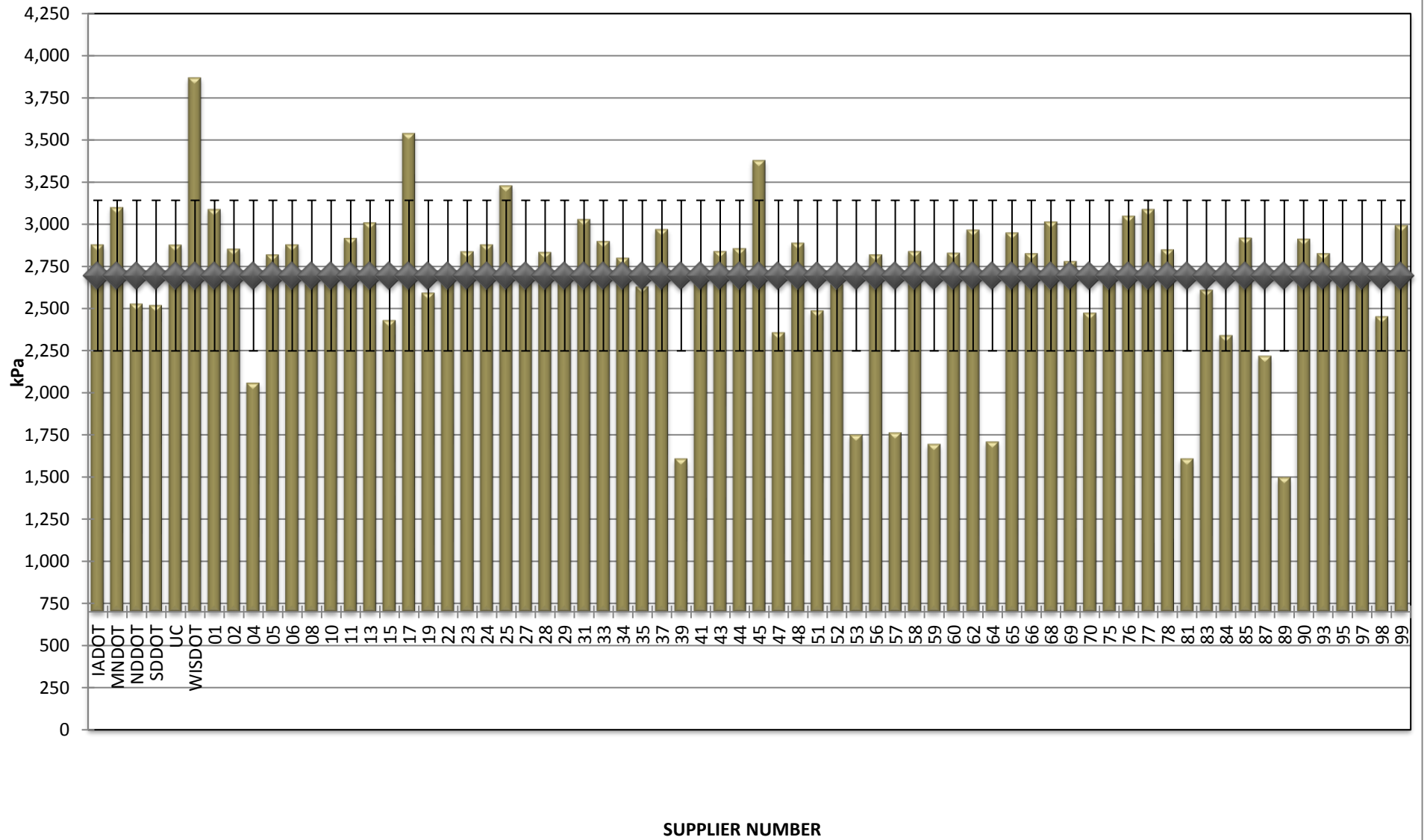
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DSR - RTFO



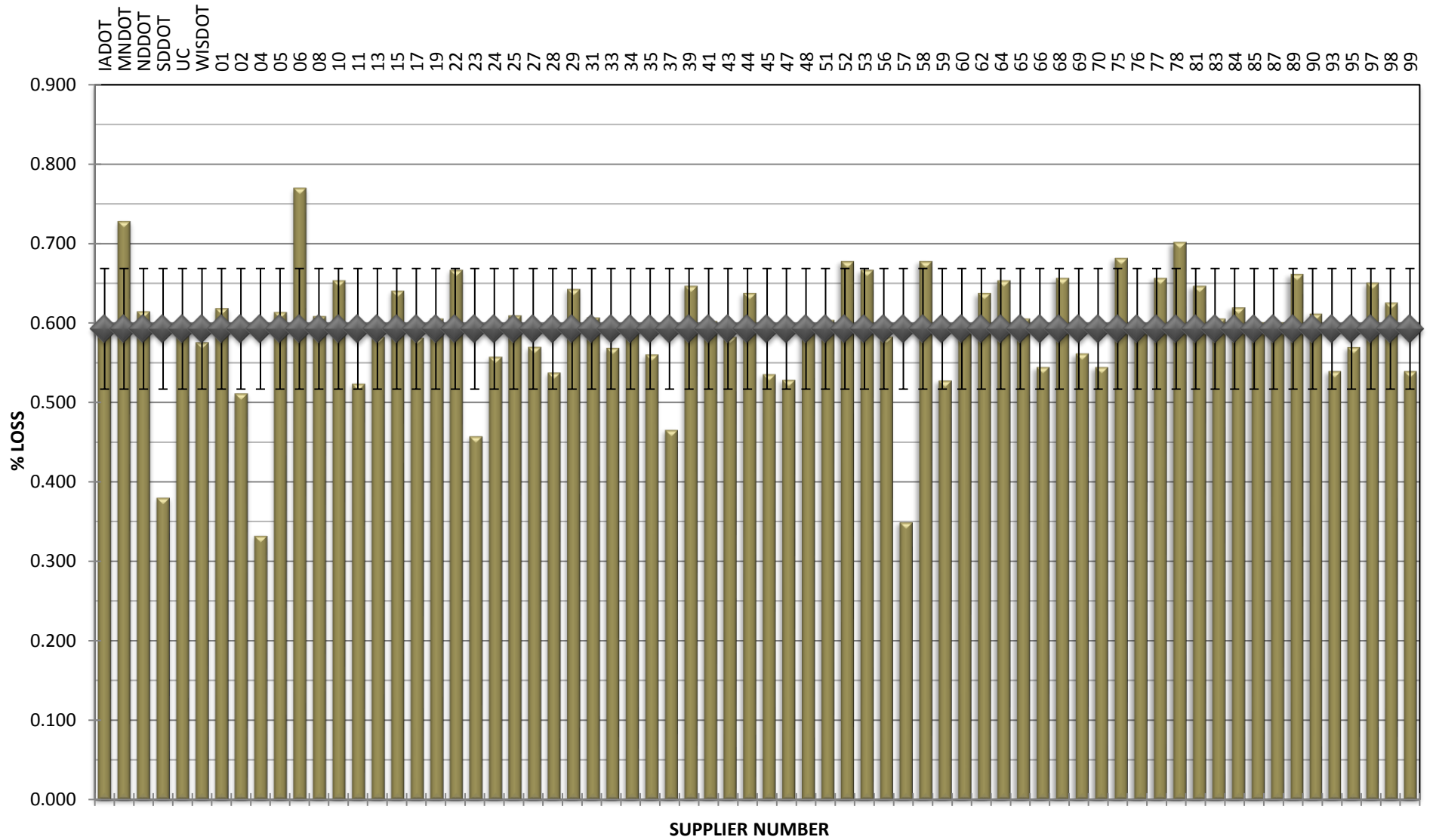
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

DSR - PAV



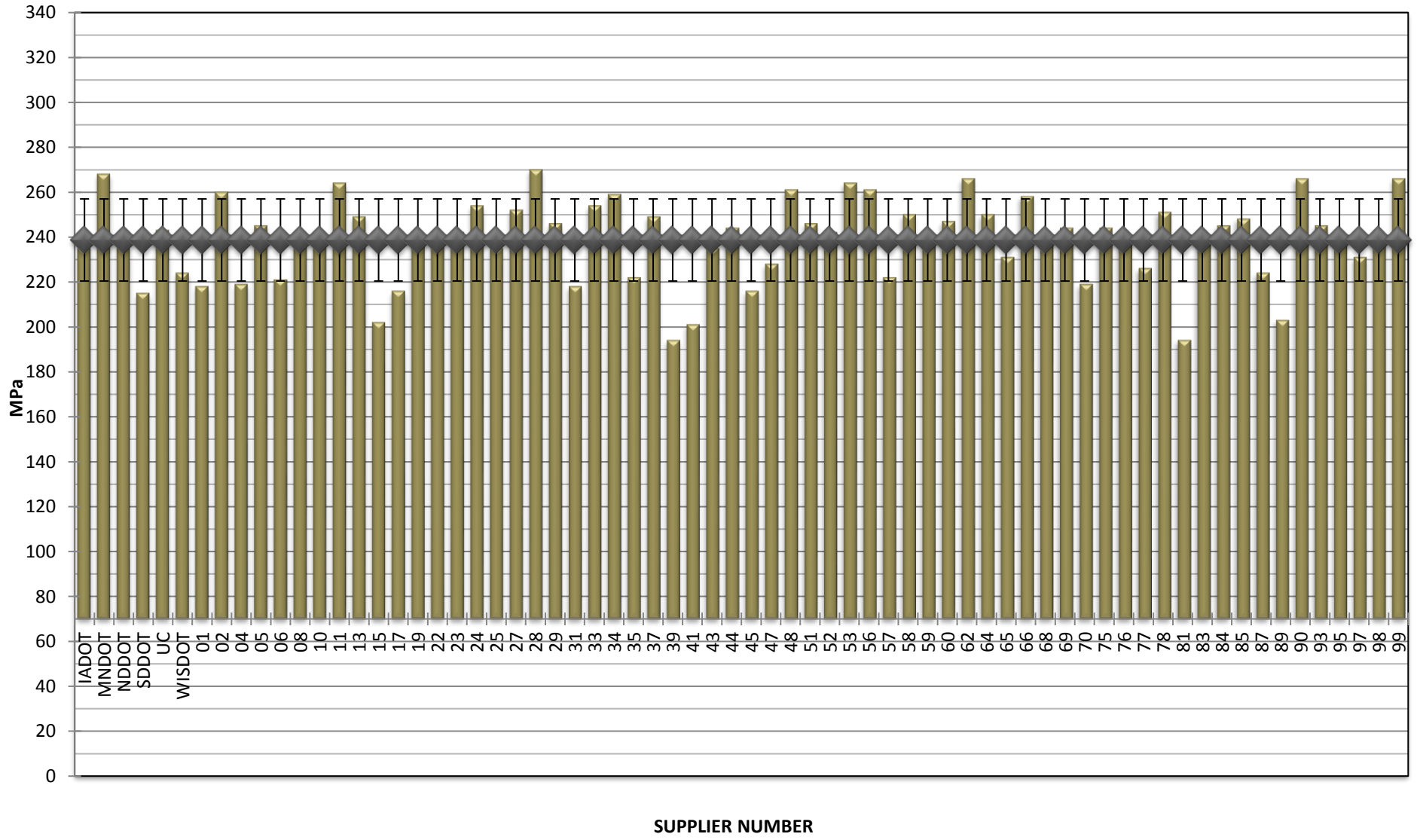
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

RTFO MASS LOSS



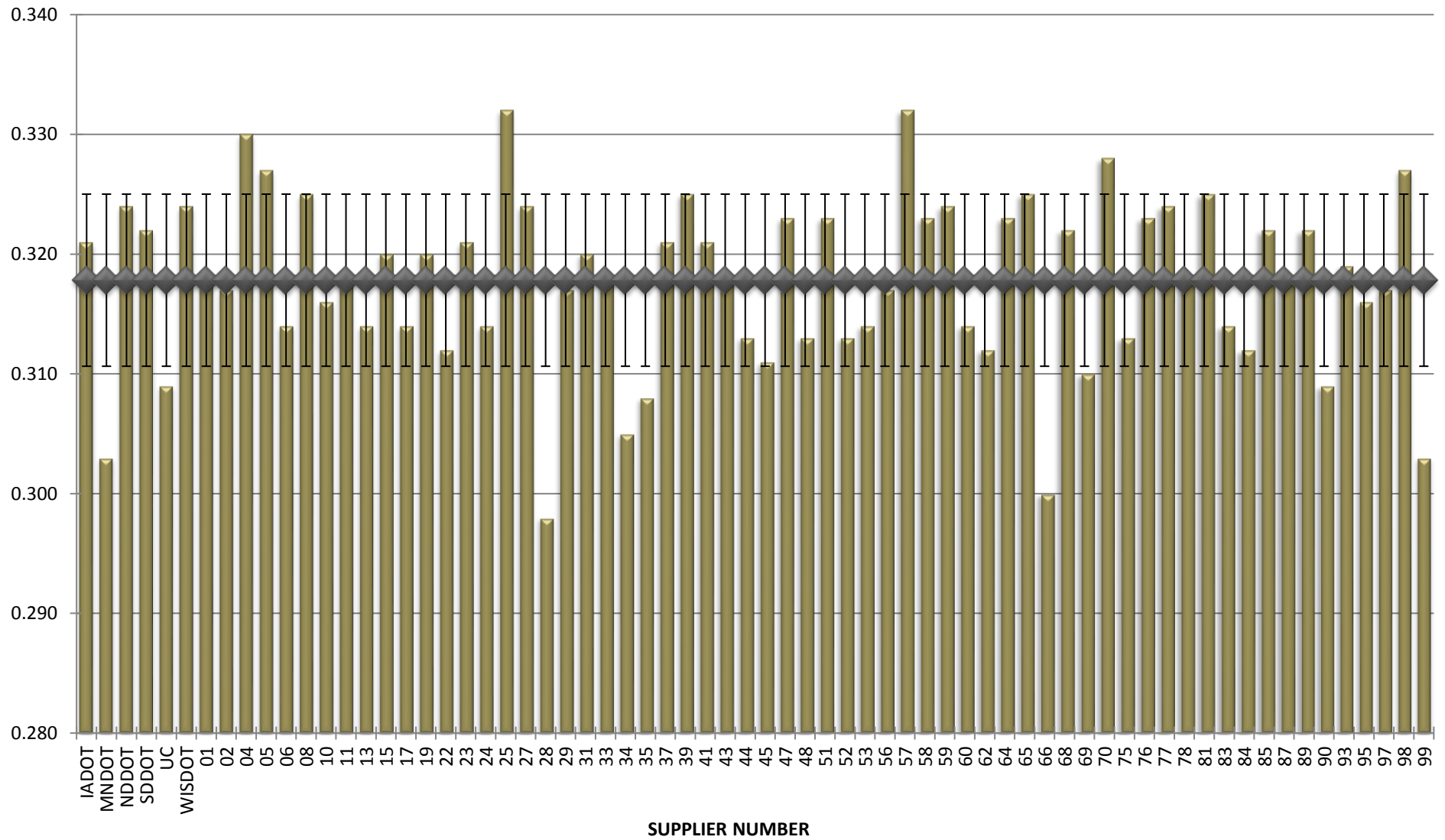
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SUMMARY A 2017-3**

BBR STIFFNESS



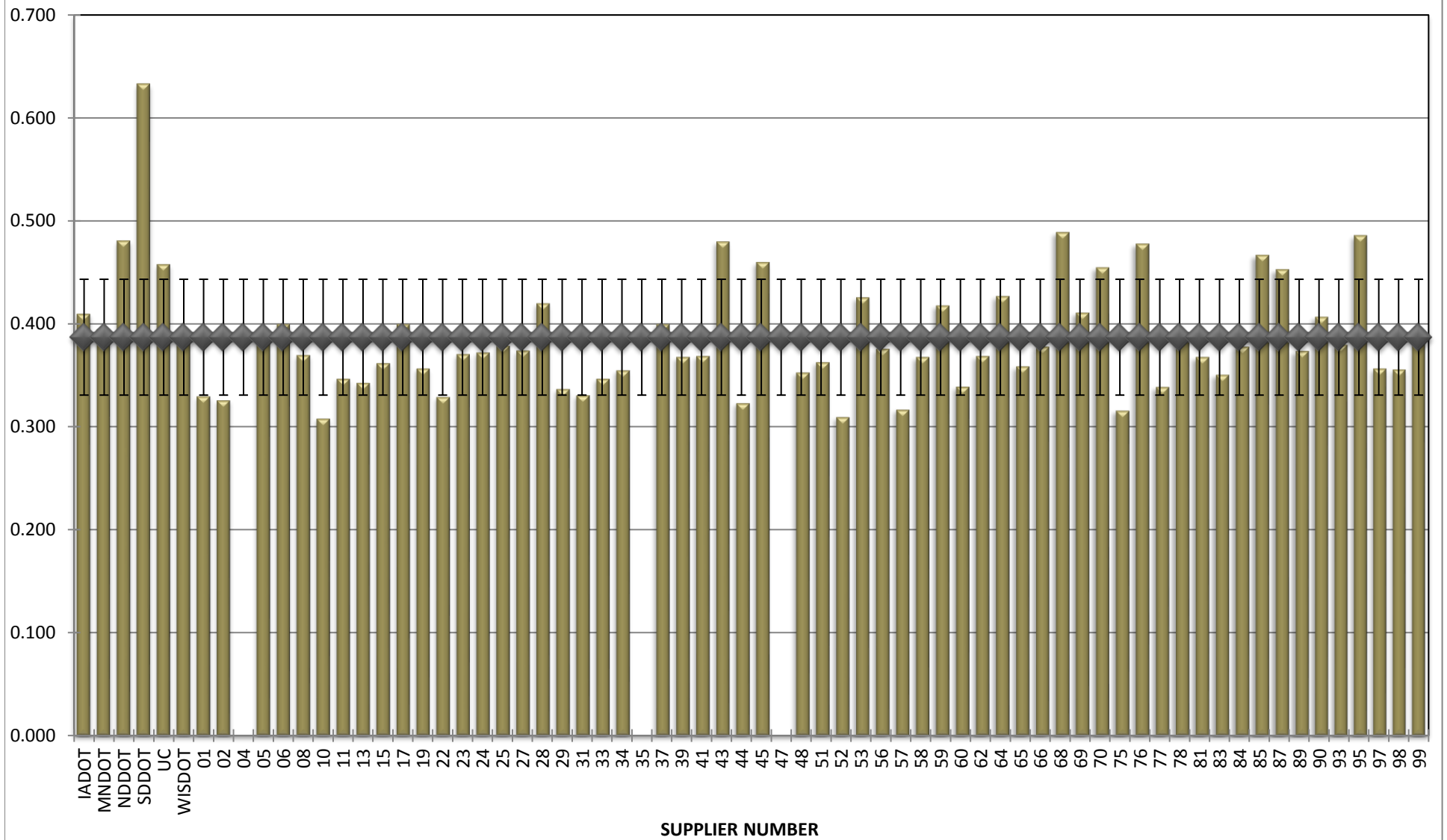
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BBR m-VALUE



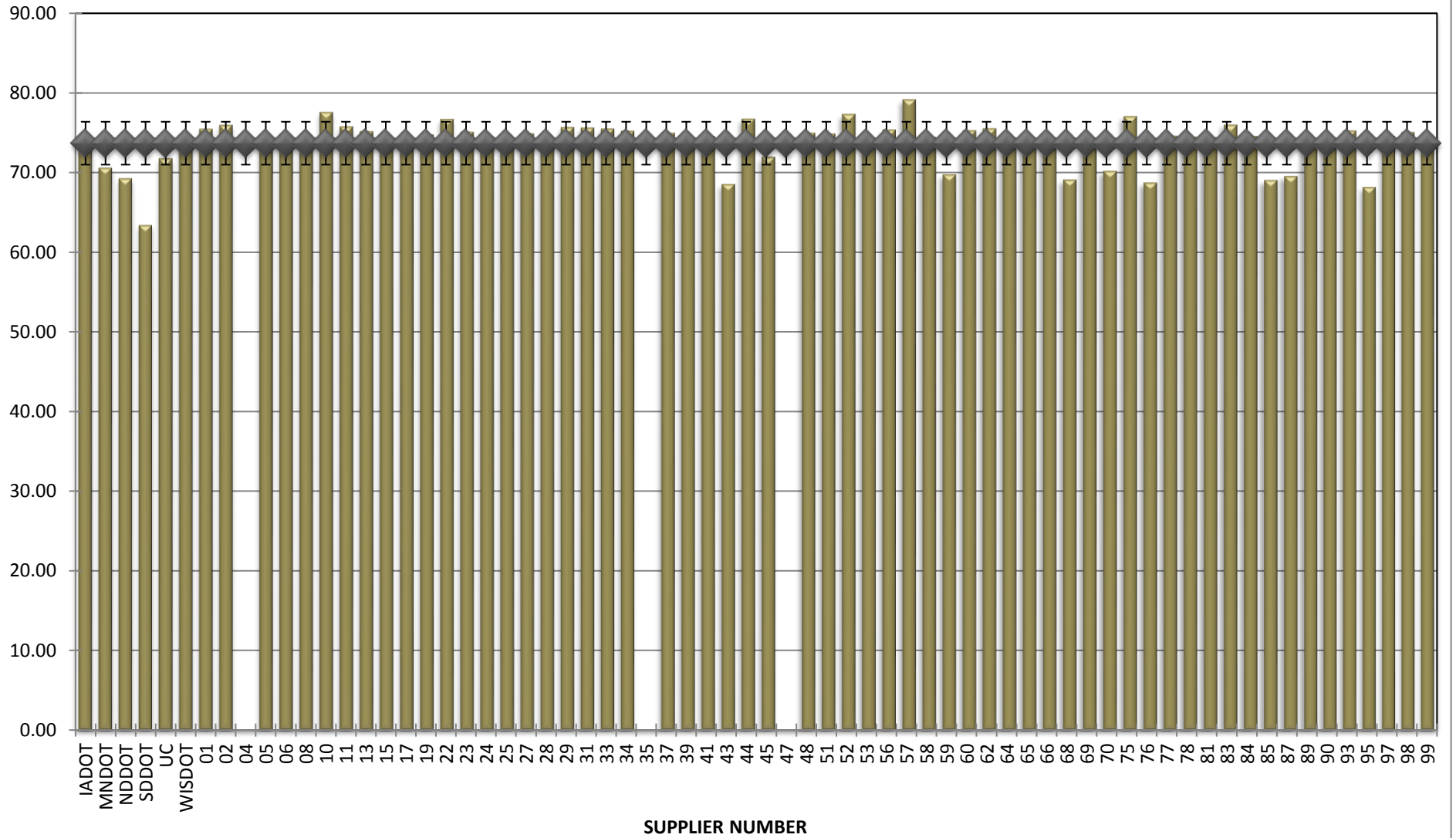
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

Jnr @ 100 Pa



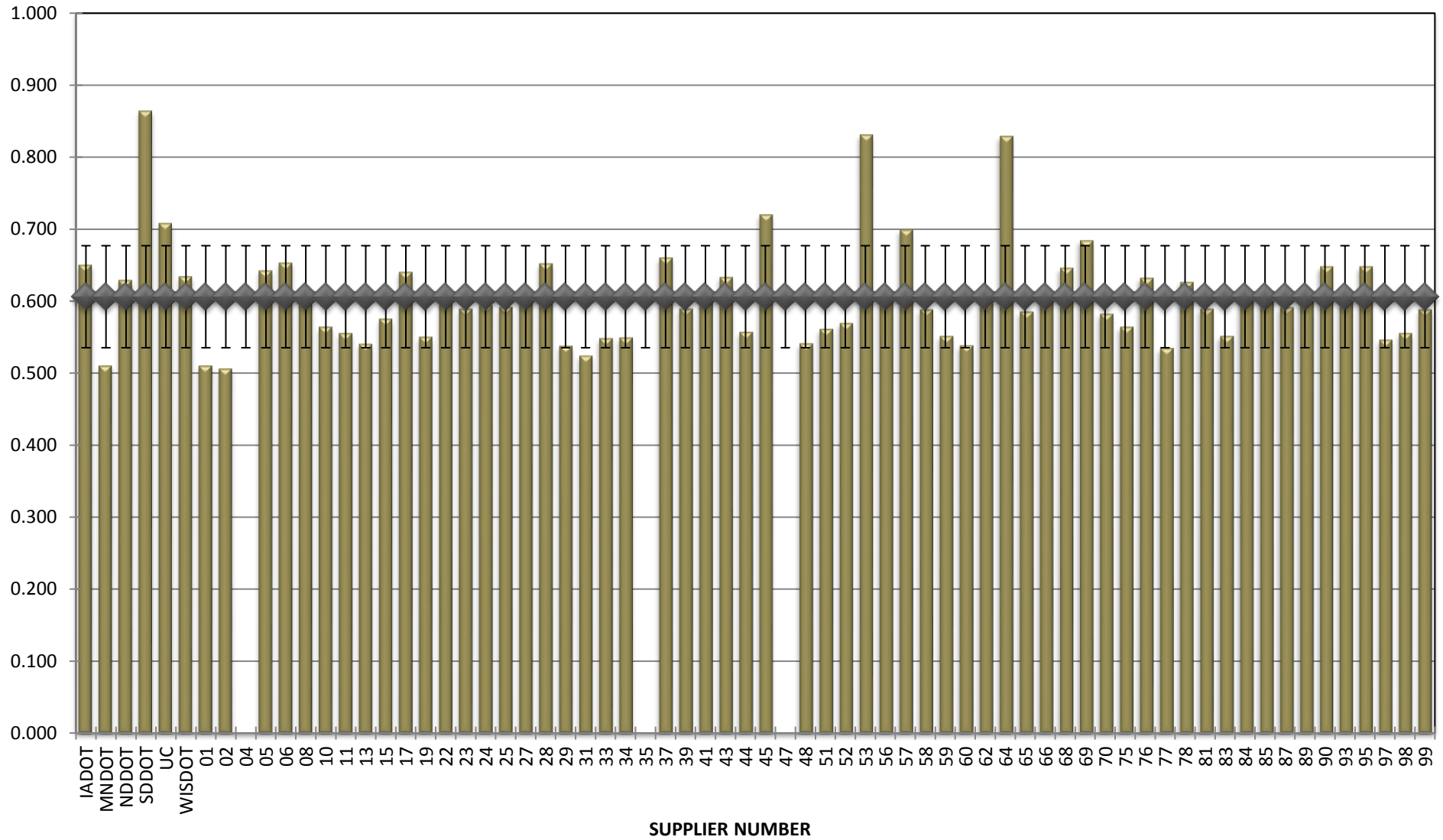
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

% Recovery @ 100 Pa



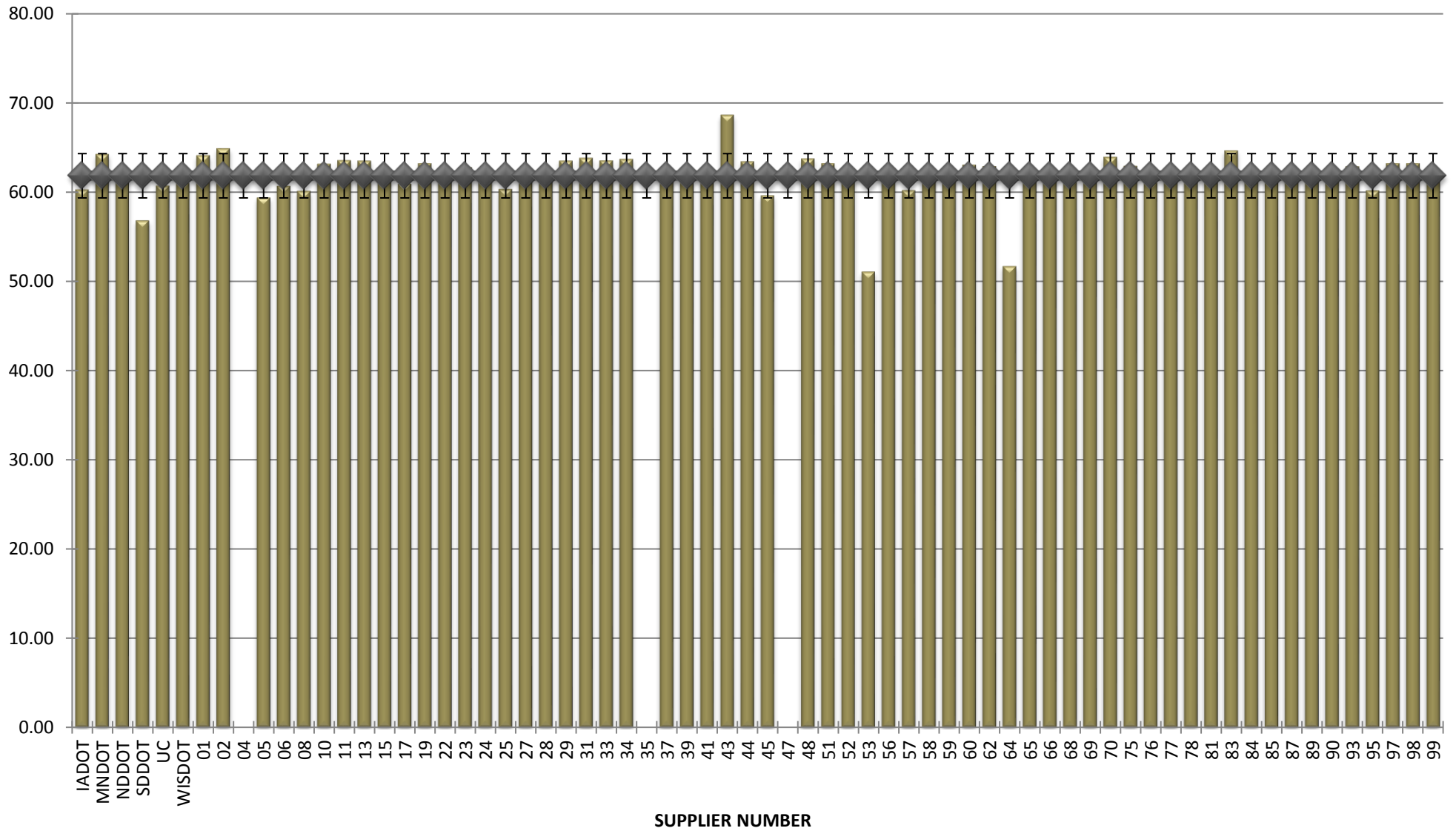
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

Jnr @ 3200 Pa



**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2017-3**

% Recovery @ 3200 Pa



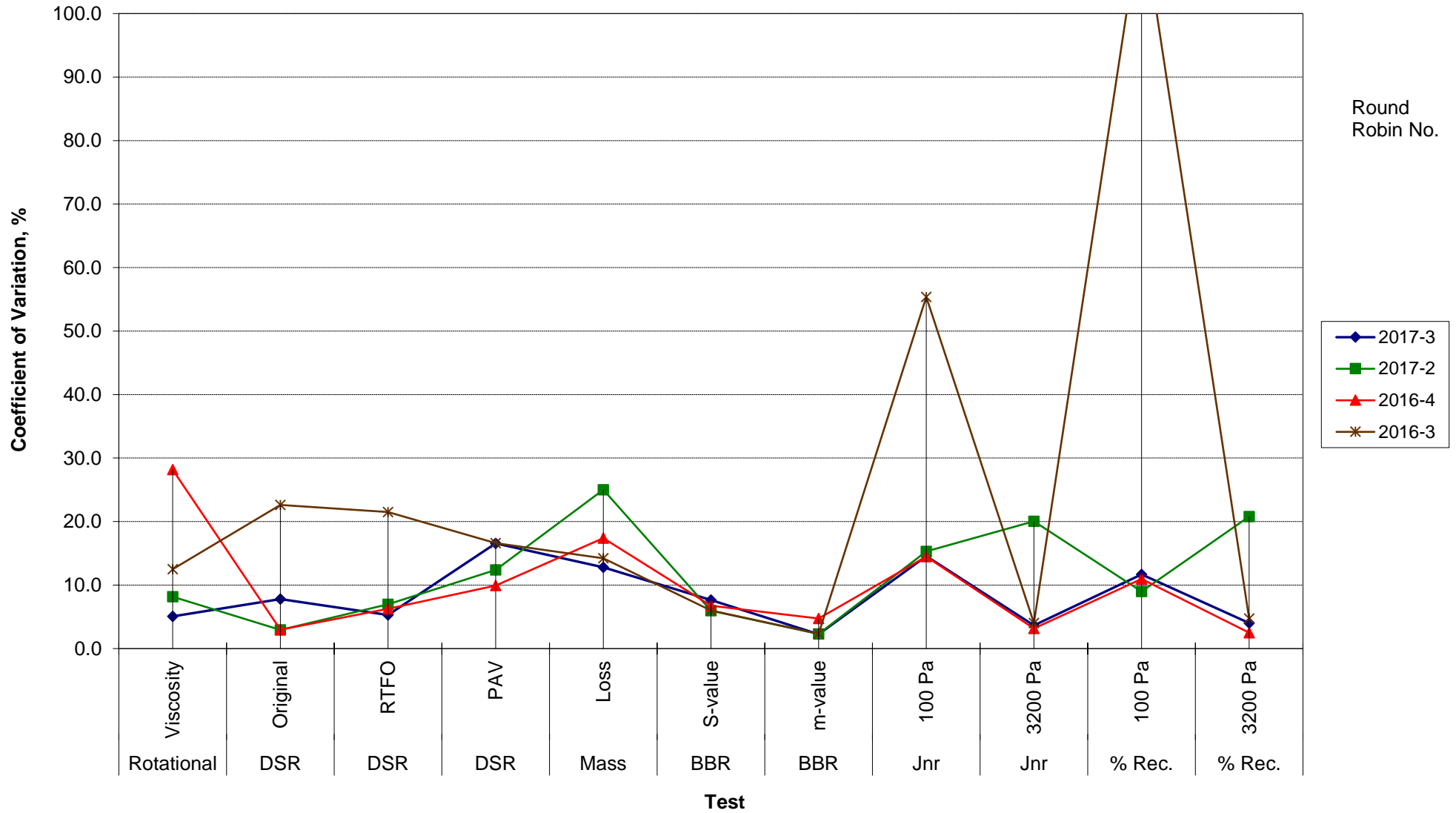
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

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
2017-3	68	5.072	7.804	5.305	16.576	12.812	7.658	2.261	14.541	3.656	11.690	4.017	32.224
2017-2	72	8.189	2.942	6.977	12.404	25.015	5.960	2.306	15.323	20.048	9.000	20.782	38.912
2016-4	72	28.172	2.989	6.269	9.911	17.390	6.765	4.719	14.487	3.161	10.957	2.508	15.867
2016-3	64	12.516	22.641	21.497	16.608	14.221	5.999	2.339	55.384	4.044	115.654	4.750	41.519

**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	0.418	1.68	4.17	2,695	0.593	239	0.318	0.383	73.85	0.595	62.18
Std. Dev.	0.0161	0.0596	0.2213	446.76	0.0628	18.28	0.0072	0.0473	2.3771	0.0490	1.6526
Coef. of Var.	3.854	3.553	5.305	16.576	10.592	7.658	2.261	12.357	3.219	8.244	2.658

**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