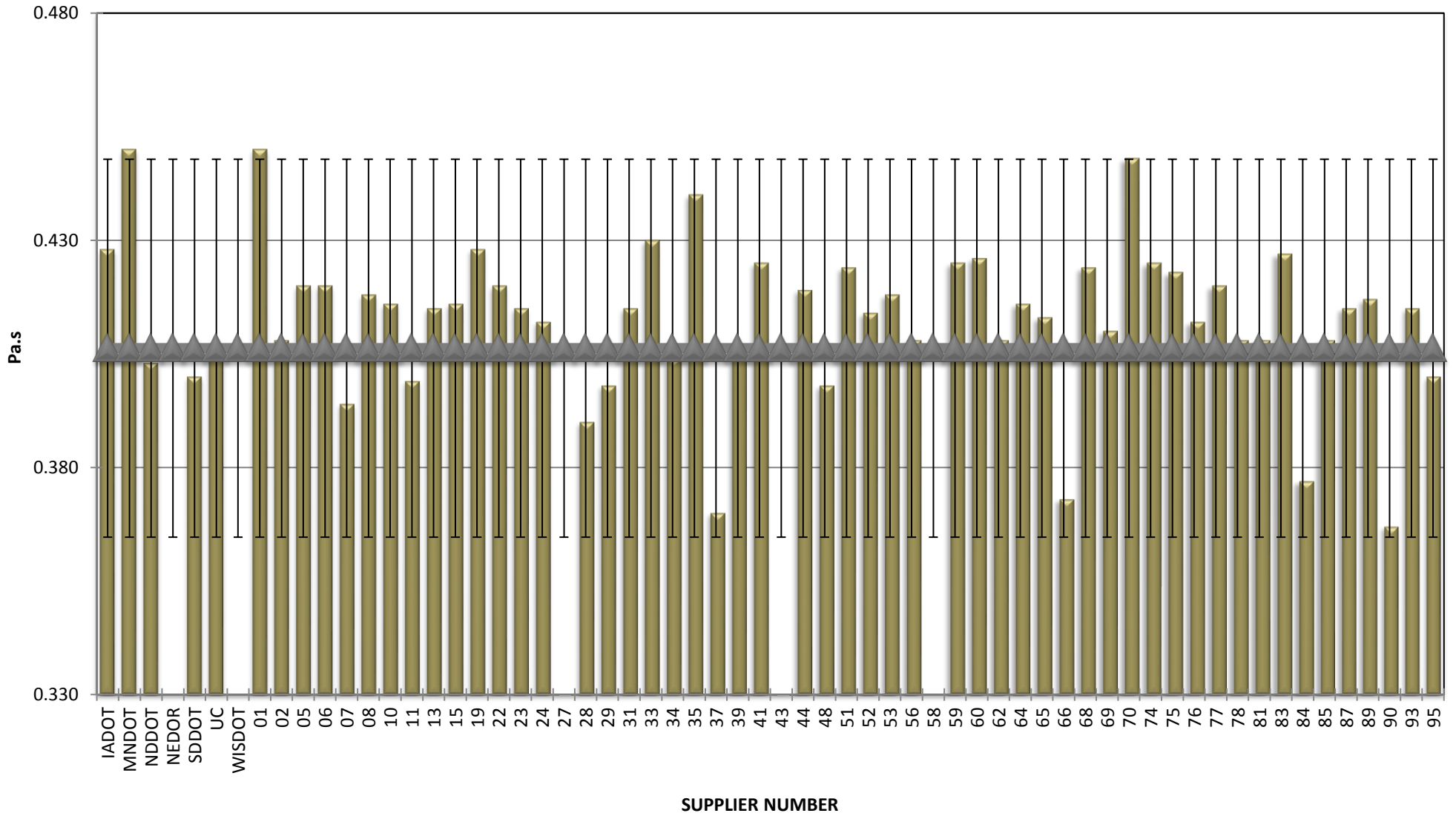


COMBINED STATE BINDER GROUP ROUND ROBIN SUMMARY A 2018-2

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	0.428	1.38		3,590	0.250	227	0.339	2.960	3.38	3.150	1.02
MNDOT	0.450	1.43		3,683	0.100	182	0.369	3.700	1.58	3.950	0.37
NDDOT	0.403	1.49		4,190	0.296	235	0.337	2.412	3.20	2.582	1.00
NEDOR		1.40		3,685	0.291	238	0.330	2.600	7.31	2.980	1.22
SDDOT	0.400	1.40		3,590	0.200	211	0.345	2.810	2.06	3.122	1.00
UC	0.406	1.35		3,821	0.236	223	0.345	2.920	4.20	3.322	1.00
WISDOT		1.41			0.232			2.823	2.34	3.038	0.09
01	0.450	1.37		3,840	0.252	225	0.339	2.800	3.00	3.100	0.90
02	0.408	1.50		4,154	0.213	240	0.336	2.650	2.94	2.850	0.99
05	0.420	1.44		4,013	0.271	227	0.334	2.629	2.62	2.915	0.23
06	0.420	1.35		4,490	0.306	216	0.339	3.060	1.31	3.280	0.05
07	0.394	1.31		4,737	0.287	231	0.337	2.723	2.20	3.012	0.00
08	0.418	1.40		4,057	0.278	227	0.339	2.658	2.46	2.921	0.66
10	0.416	1.46		4,438	0.274	226	0.333	2.682	2.01	2.971	0.27
11	0.399	1.47		4,170	0.196	237	0.331	2.610	2.92	2.810	1.01
13	0.415	1.33		4,260	0.312	232	0.341	2.578	3.34	2.880	0.41
15	0.416	1.42		3,660	0.279	190	0.350	2.642	2.17	2.830	0.22
19	0.428	1.45		4,509	0.285		0.347	1.073	8.10	1.158	3.80
22	0.420	1.44		4,440	0.265	227	0.336	2.623	2.40	2.888	0.06
23	0.415	1.42		4,270	0.240	224	0.350	2.640	3.01	2.820	1.04
24	0.412	1.35		4,290	0.240	228	0.342	2.757	1.95	2.942	0.12
27	0.243	1.37		3,340	0.215	200	0.374	2.680	2.44	2.899	0.26
28	0.390	1.37		3,914	0.236	239	0.335	2.690	3.77	2.930	1.06
29	0.398	1.33		3,576	0.200	229	0.348	2.820	3.61	3.080	1.02
31	0.415	1.40		4,045	0.279	228	0.336	2.721	2.19	3.011	0.13
33	0.430	1.42		4,300	0.210	215	0.339	2.624	3.05	2.849	0.40
34	0.404	1.46		4,216	0.208	220	0.330	2.797	1.73	2.966	1.01
35	0.440	1.47		4,080	0.238	206	0.339				
37	0.370	1.41		4,380	0.260	225	0.343	2.900	4.60	3.200	0.90
39	0.407	1.41		3,390	0.261	227	0.335	2.726	3.21	2.967	0.30
41	0.425	1.43		4,003	0.275	239	0.337	2.575	2.41	2.859	0.38
43	0.163	1.47		4,140	0.260	232	0.343	2.675	2.58	2.890	0.28
44	0.419	1.42		4,487	0.264	229	0.333	2.588	2.51	2.852	0.50
48	0.398	1.46		4,196	0.221	229	0.337	2.901	1.94	3.082	0.90
51	0.424	1.43		4,070	0.293		0.345	1.154	5.90	1.213	3.50
52	0.414	1.45		4,336	0.275	223	0.338	2.666	2.75	2.950	0.53
53	0.418	1.42		3,929	0.281	218	0.337	2.960	1.52	3.260	
56	0.408	1.42		4,670	0.222	235	0.339	2.570	3.28	2.760	1.05
58		1.38		3,900	0.198	222	0.342	2.880	2.57	3.137	0.06
59	0.425	1.43		3,538	0.353	215	0.353	2.050	4.87	2.230	1.55
60	0.426	1.47		4,870	0.265	225	0.330	2.759	2.42	2.984	0.08
62	0.408	1.41		4,340	0.216	231	0.336	2.740	2.64	2.930	0.96
64	0.416	1.43		4,055	0.278	231	0.342	2.990	1.40	3.280	
65	0.413	1.40		3,942	0.274	231	0.342	2.692	2.24	2.983	0.34
66	0.373	1.39		4,003	0.274	230	0.335	2.740	3.08	2.970	0.92
68	0.424	1.48		4,887	0.264	233	0.339	2.735	4.15	2.913	1.24
69	0.410	1.35		3,821	0.229	228	0.344	2.823	3.60	3.174	1.00
70	0.448	1.51		3,888	0.278	208	0.339	2.464	5.09	2.718	1.19
74	0.425	1.43		3,920	0.246	218	0.346	2.690	2.28	2.910	0.15
75	0.423	1.46		4,409	0.274	233	0.338	2.637	2.74	2.909	0.13
76	0.412	1.46		4,170	0.234	220	0.341	2.805	2.10	3.017	0.11
77	0.420	1.54		4,880	0.265	235	0.329	2.340	2.94	2.523	0.54
78	0.408	1.40		4,090	0.198	219	0.341	2.666	2.46	2.853	0.29
81	0.408	1.42		3,900	0.198	228	0.342	2.833	2.28	3.052	0.15
83	0.427	1.38		4,120	0.121	200	0.332	2.650	3.13	2.870	1.06
84	0.377	1.38		4,151	0.244	228	0.343	2.960	2.16	3.190	1.00
85	0.408	1.44		4,180	0.236	215	0.346	2.983	1.69	3.190	0.04
87	0.415	1.40		4,300	0.148	222	0.334	2.582	2.65	2.785	0.42
89	0.417	1.38		3,560	0.255	201	0.345	2.833	1.85	3.031	0.07
90	0.367	1.38		4,149	0.247	242	0.337	2.830	3.56	3.030	0.88
93	0.415	1.46		4,102	0.247	222	0.351	2.980	2.62	3.190	0.84
95	0.400	1.42		4,558	0.258	226	0.337	2.655	2.40	2.794	0.40
97	0.426	1.42		4,408	0.271		0.345	2.803	3.40	3.025	1.00
98	0.424	1.36		4,539	0.243		0.345	2.922	3.40	3.164	1.00
99	0.388	1.40		3,919	0.239	229	0.339	2.830	2.38	3.060	0.89
Average	0.406	1.42		4,118	0.247	224	0.341	2.692	2.94	2.925	0.71
Std. Dev.	0.042	0.05		352	0.042	12	0.008	0.352	1.24	0.384	0.68
Coef. of Var.	10.240	3.22		9	16.987	5	2.286	13.090	42.05	13.138	95.95

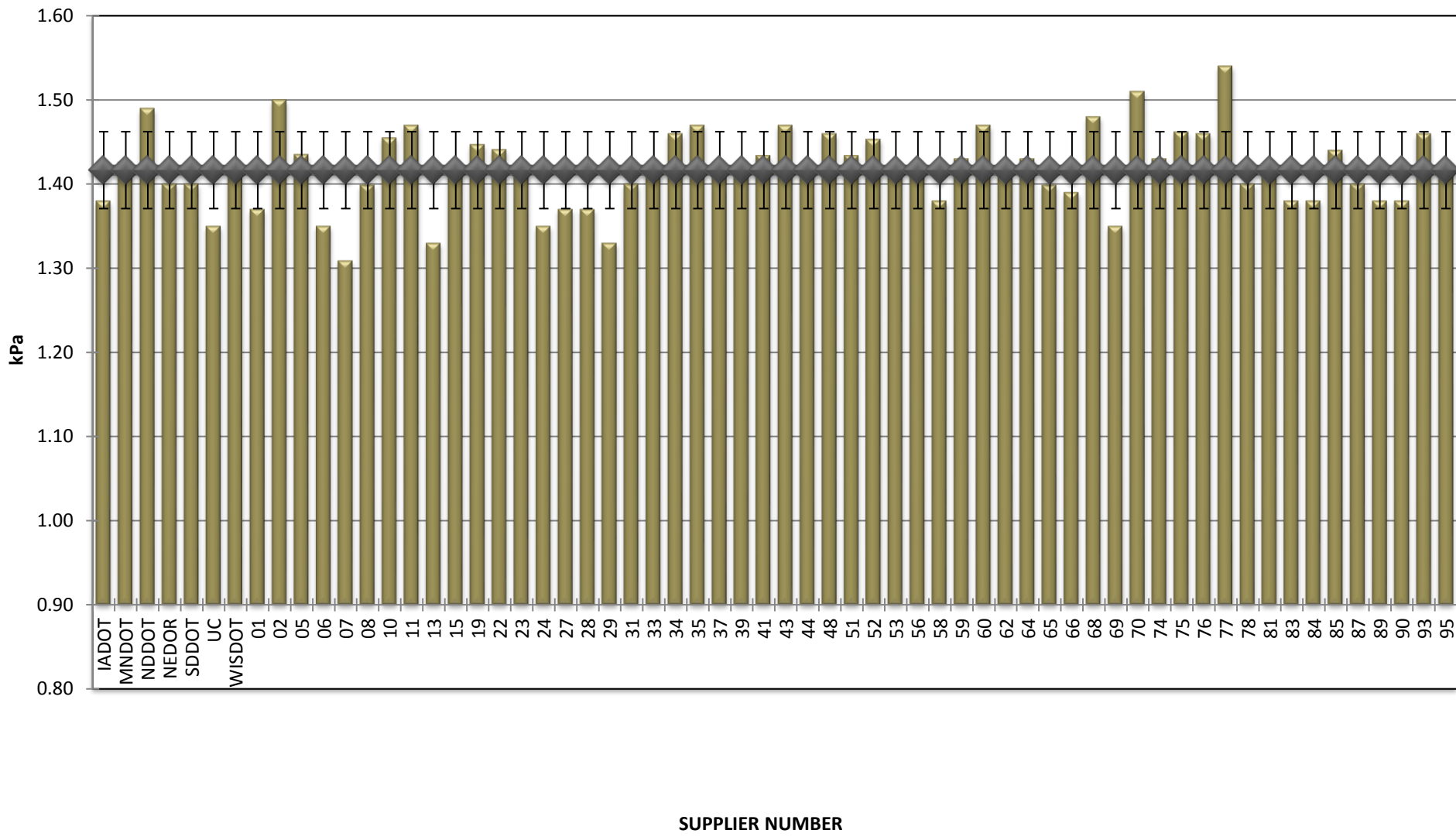
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

ROTATIONAL VISCOSITY



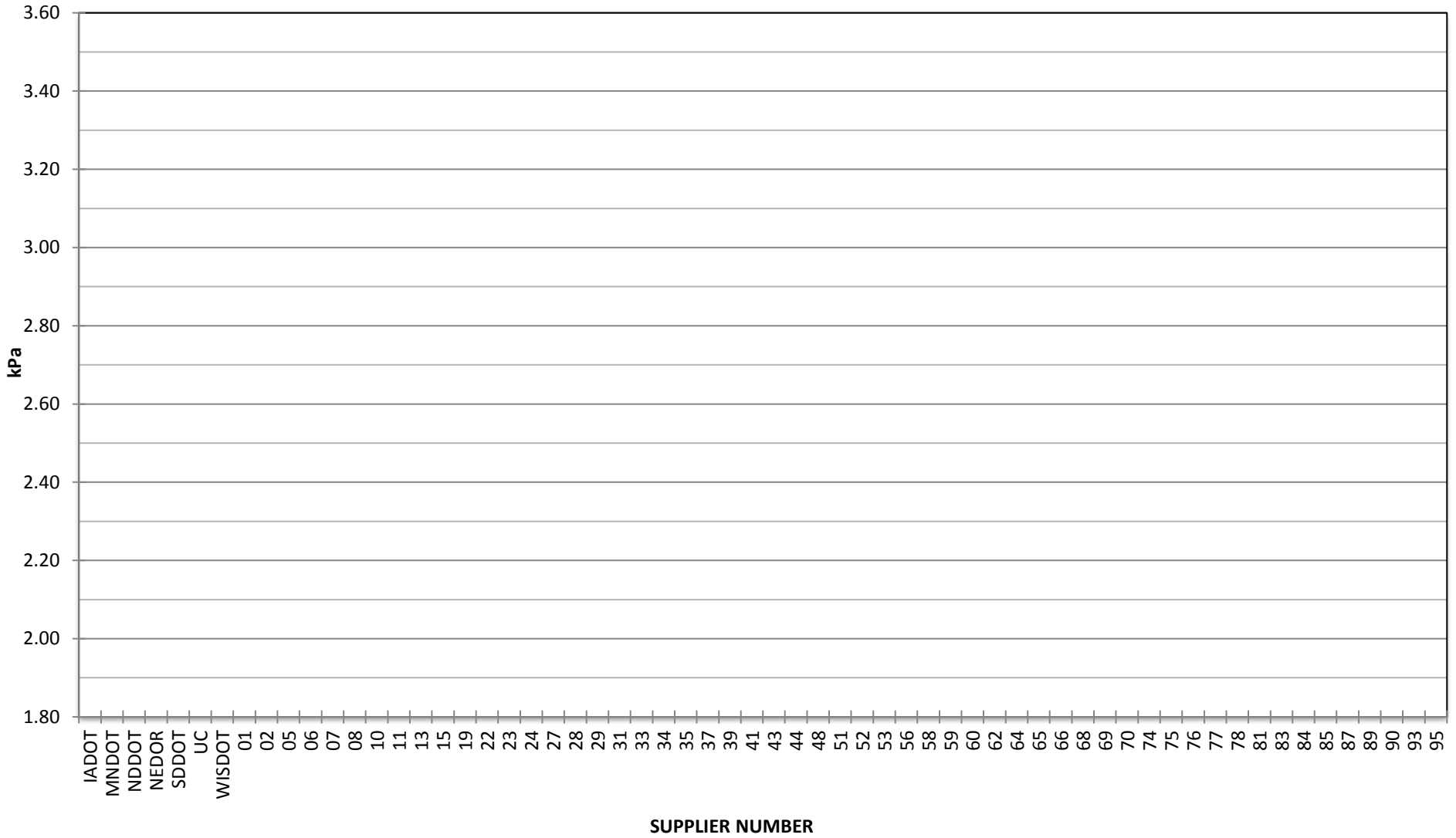
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

DSR - ORIGINAL



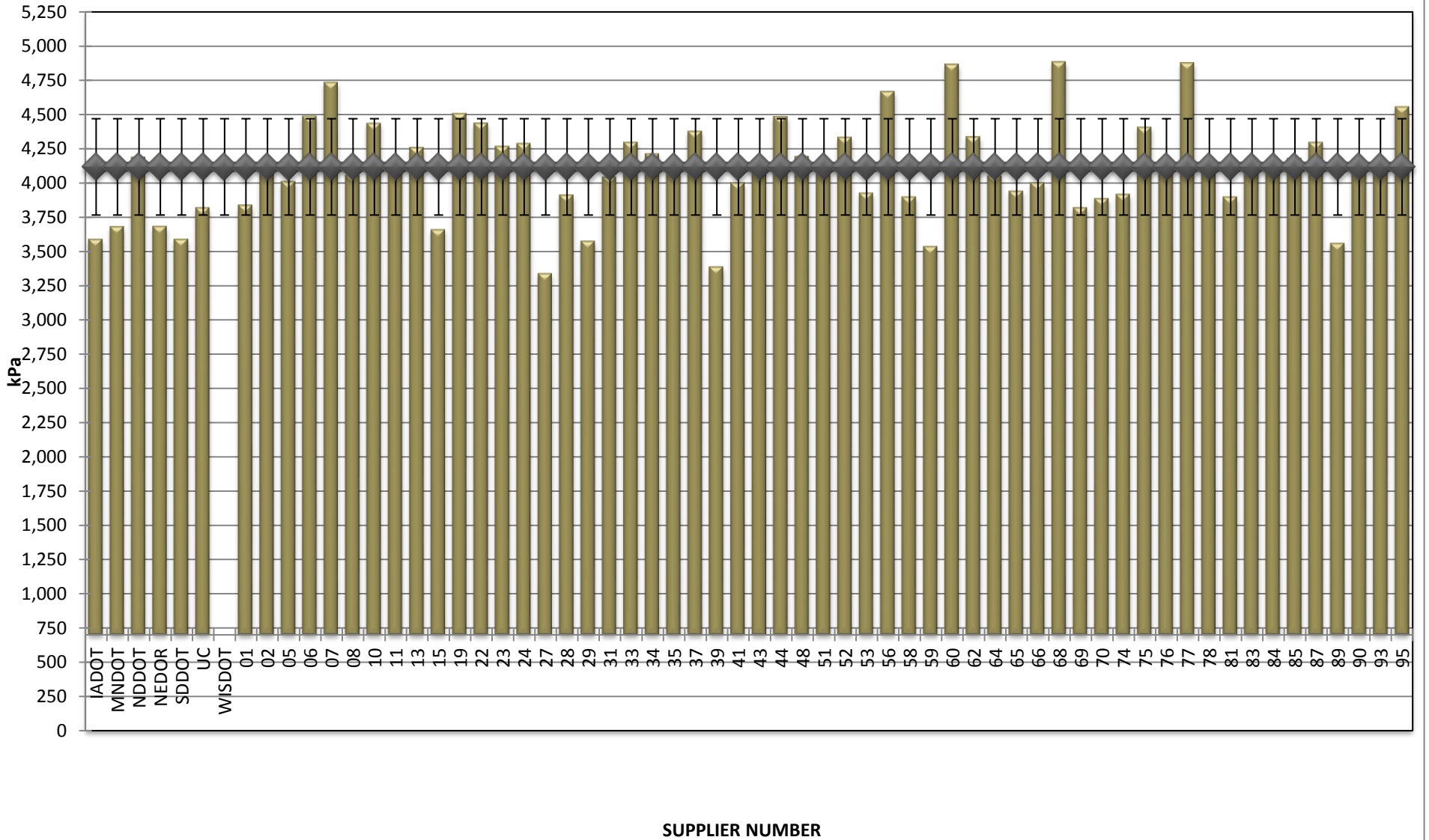
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2

DSR - RTFO



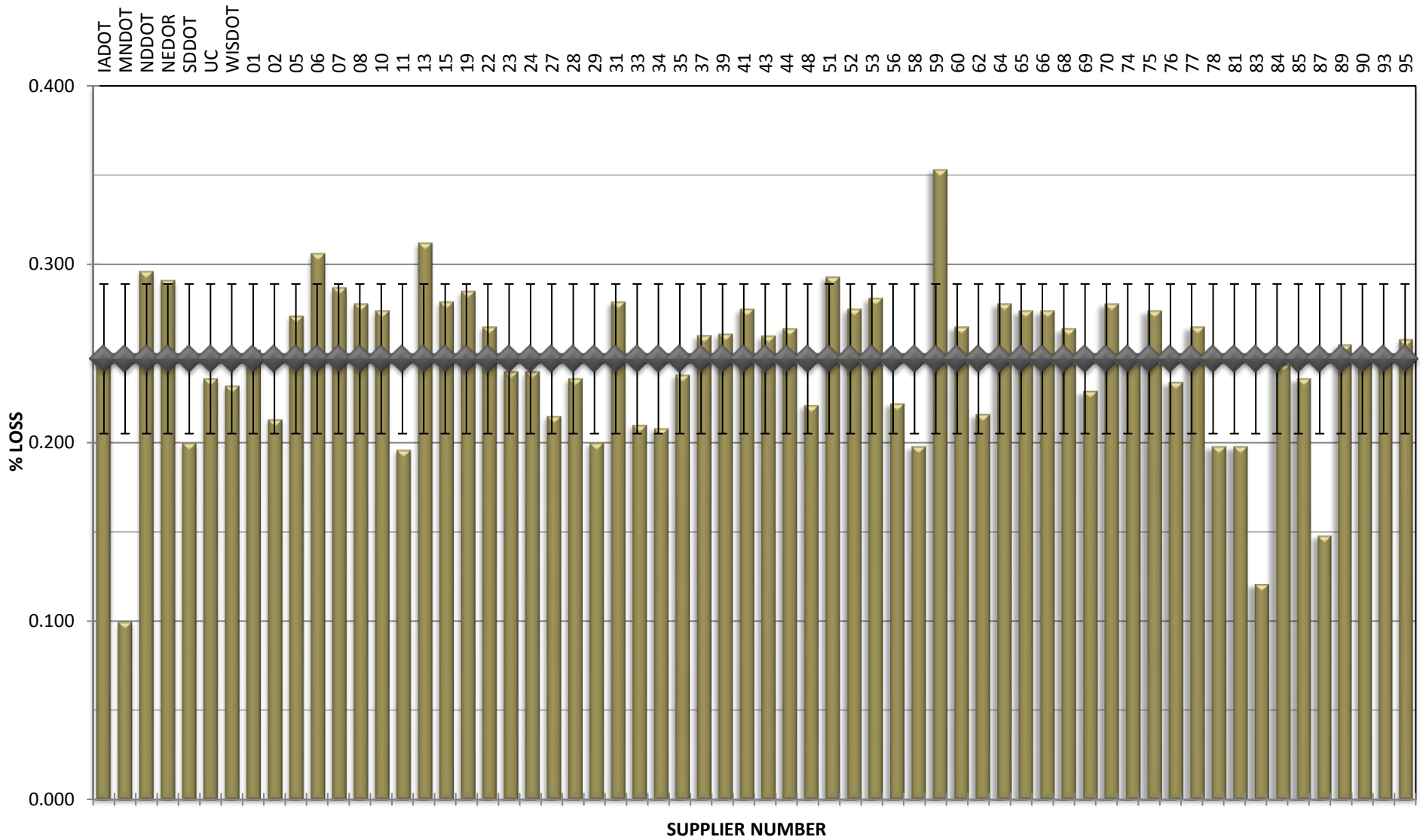
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

DSR - PAV



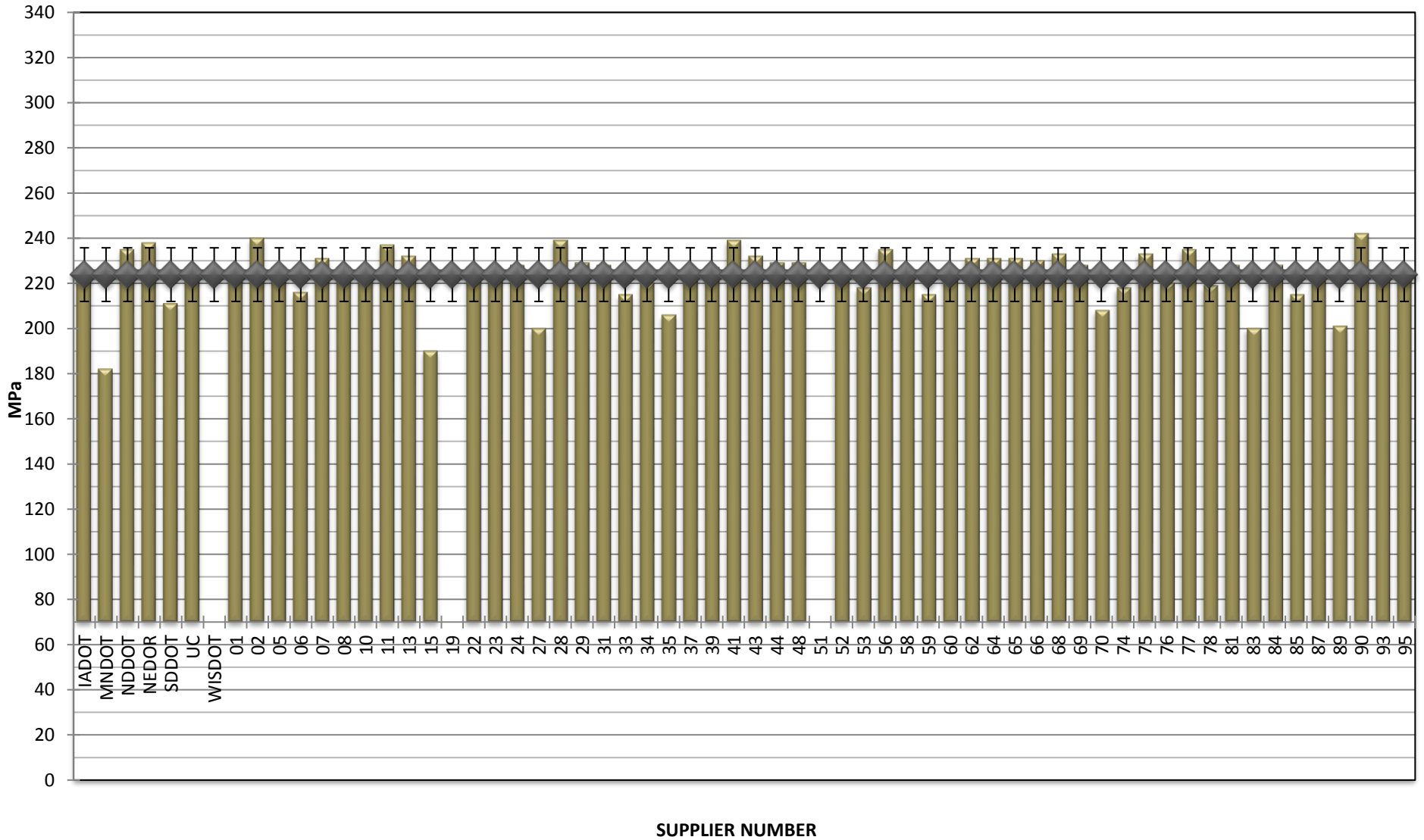
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

RTFO MASS LOSS



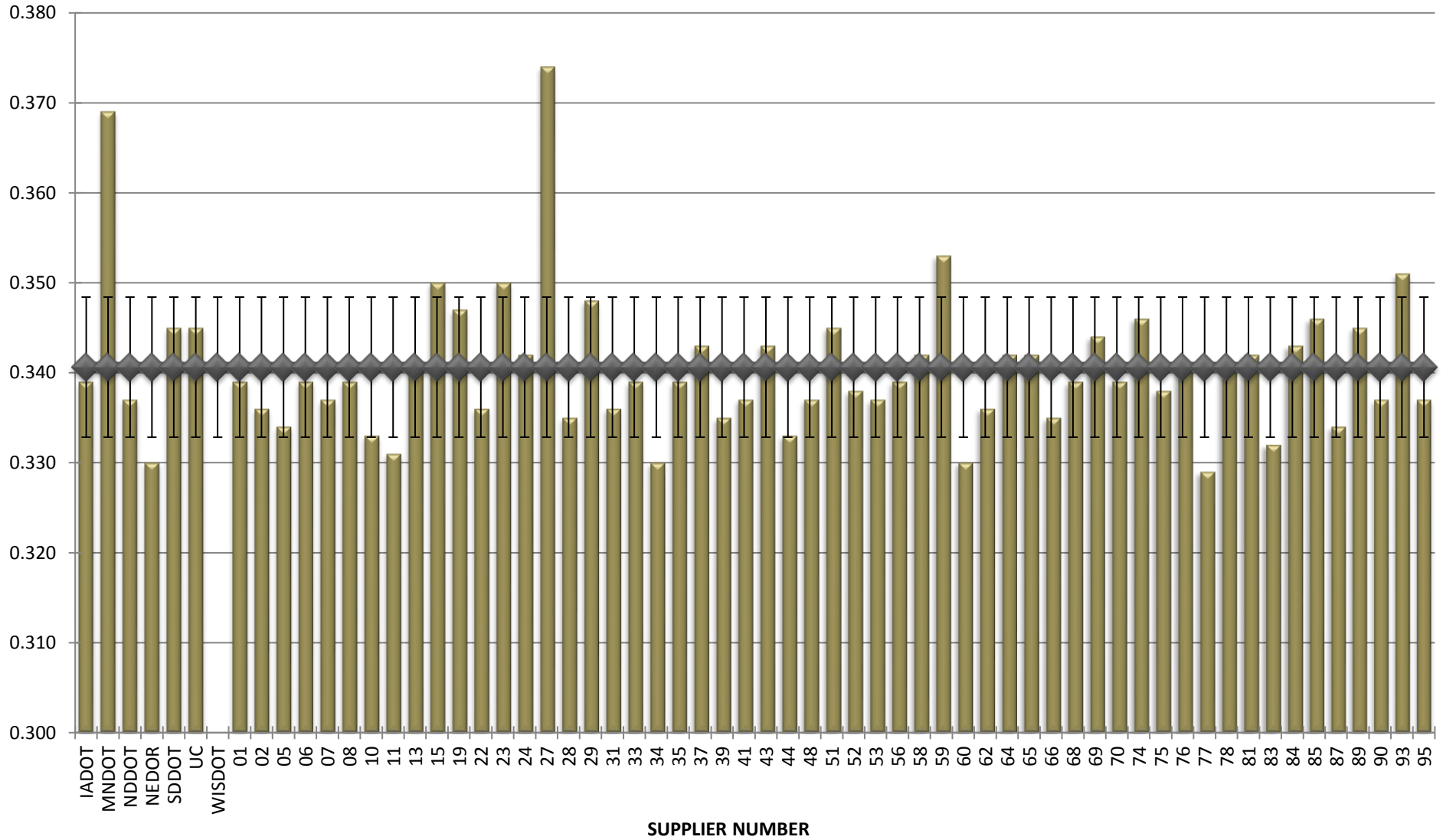
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

BBR STIFFNESS



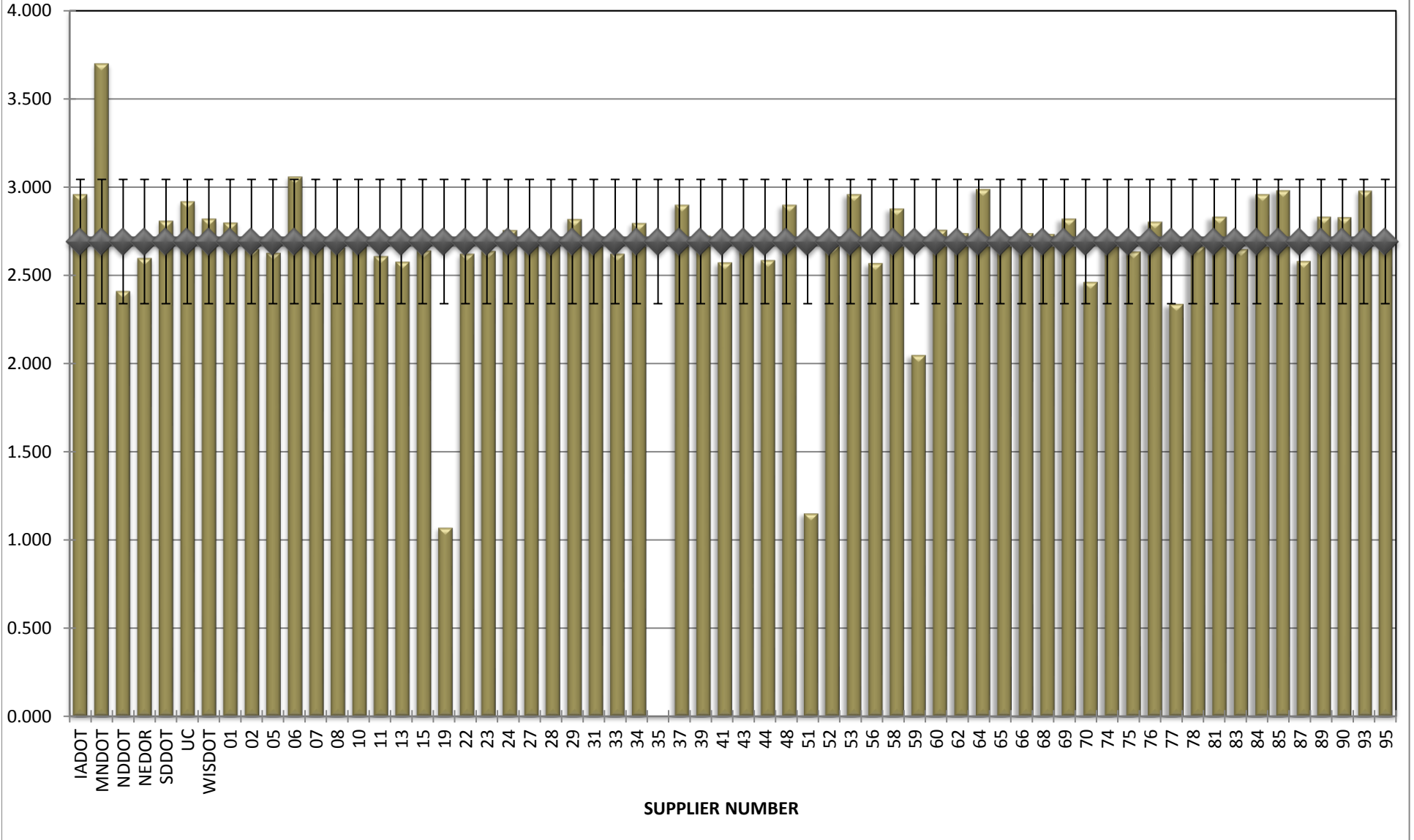
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

BBR m-VALUE



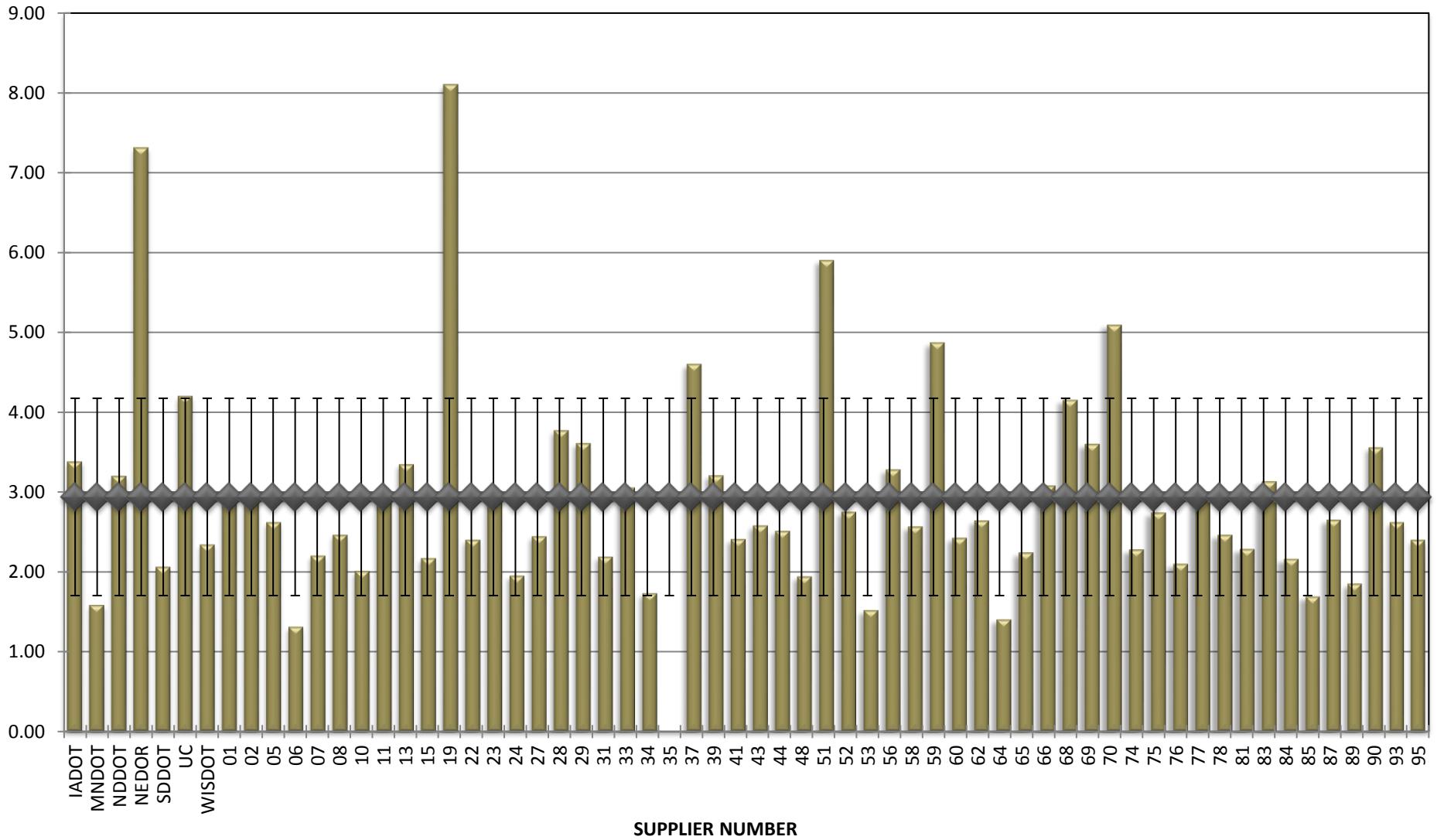
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

Jnr @ 100 Pa



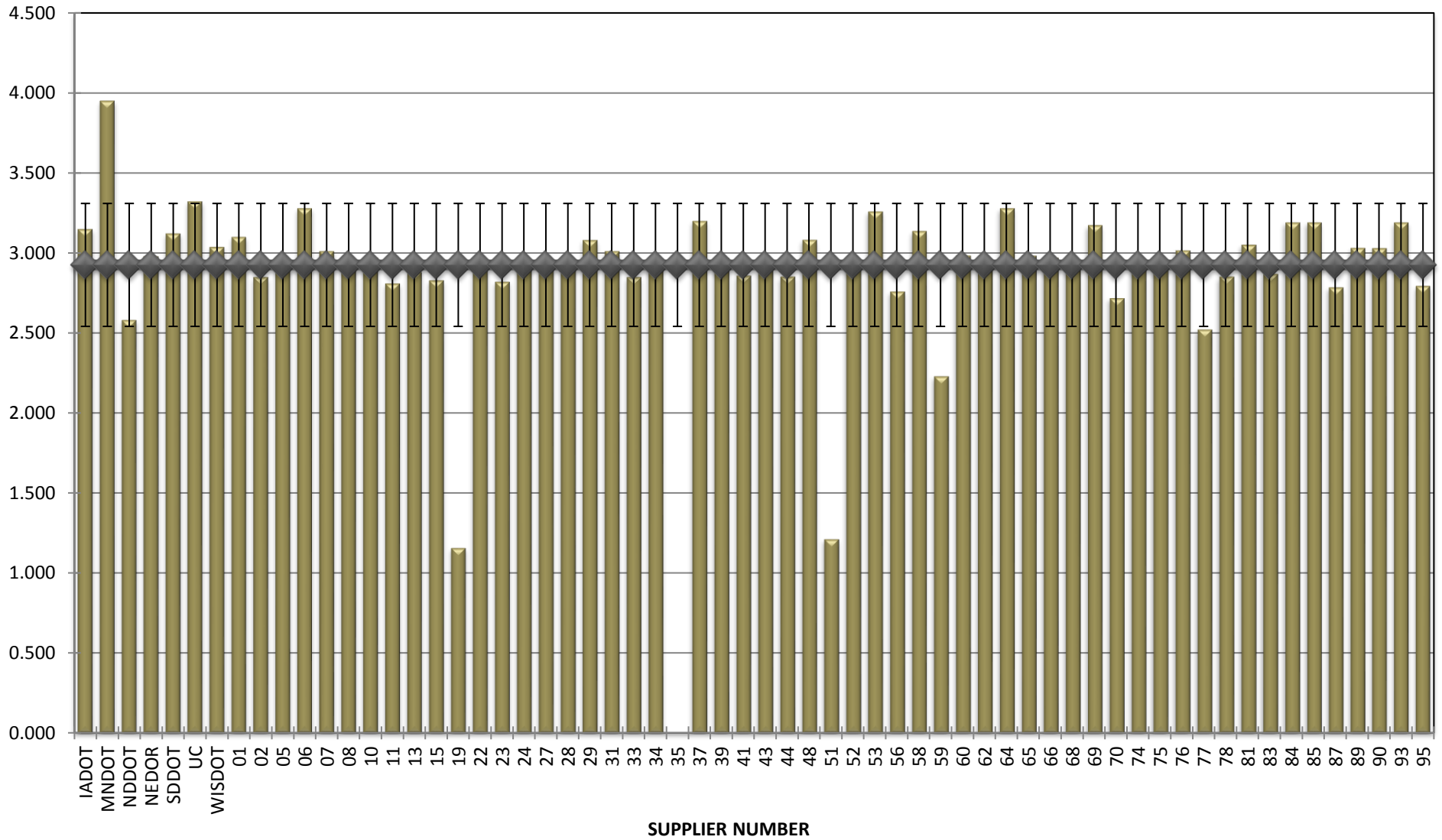
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

% Recovery @ 100 Pa



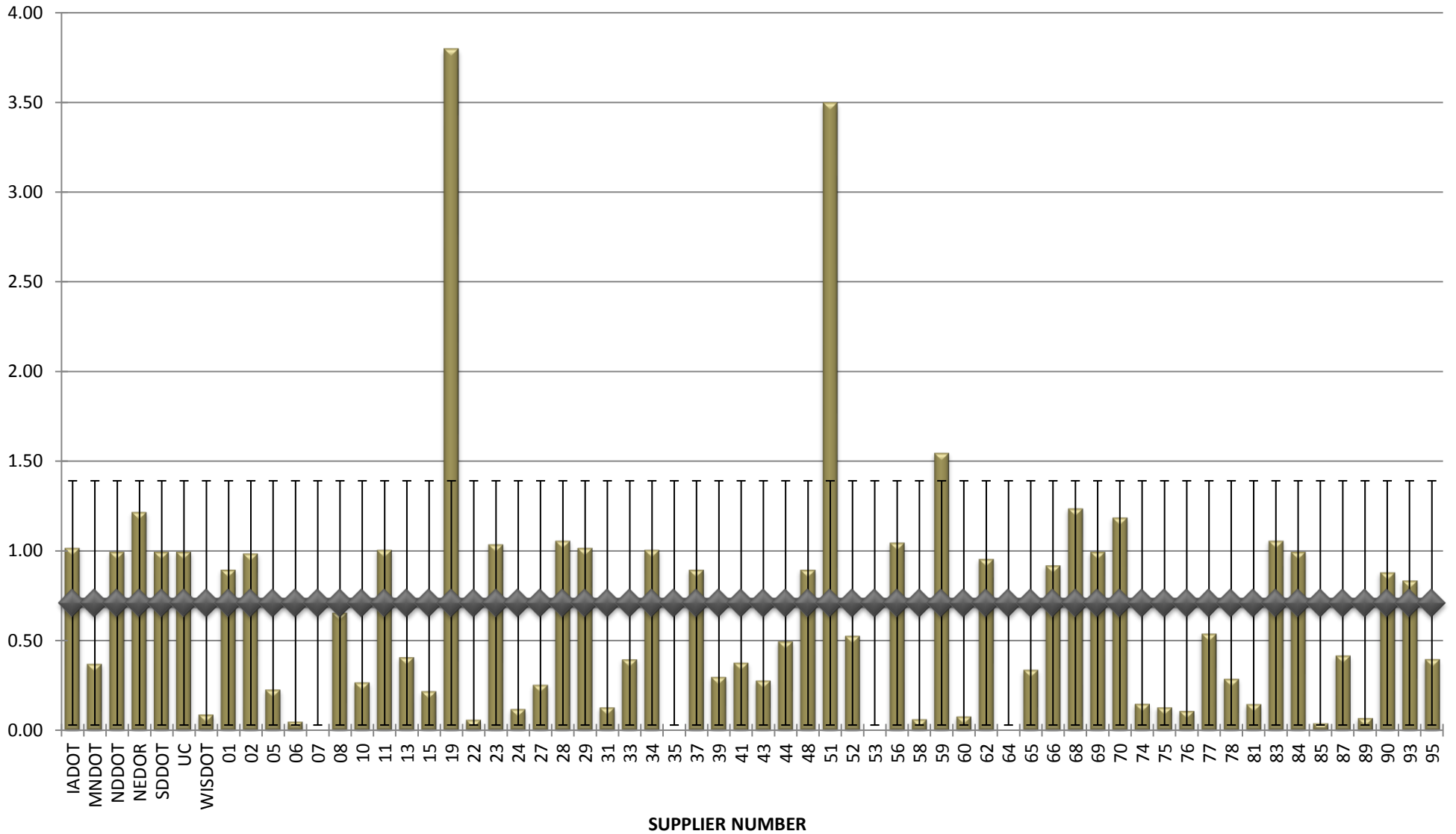
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

Jnr @ 3200 Pa



**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-2**

% Recovery @ 3200 Pa



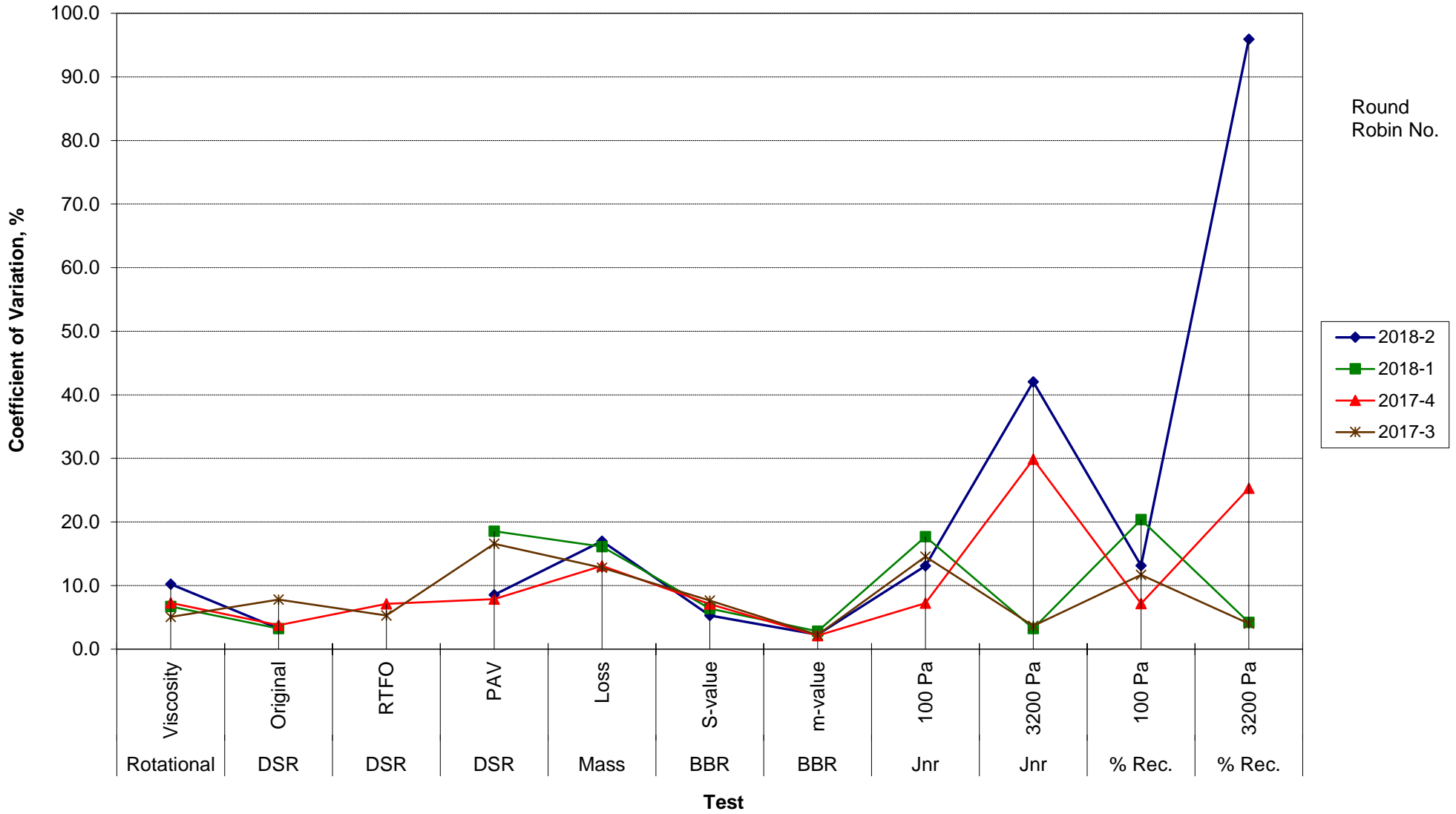
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

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
2018-2	65	10.240	3.225		8.545	16.987	5.303	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
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

**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	0.413	1.42		4,118	0.247	225	0.340	2.743	2.79	2.981	0.61
Std. Dev.	0.0169	0.0461		353.48	0.0353	10.69	0.0055	0.2130	0.9710	0.2279	0.4312
Coef. of Var.	4.103	3.253		8.584	14.280	4.760	1.631	7.765	34.863	7.644	70.503

**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	5.302906	2.285746	13.08987	42.04845	13.138	95.94854	25.74922