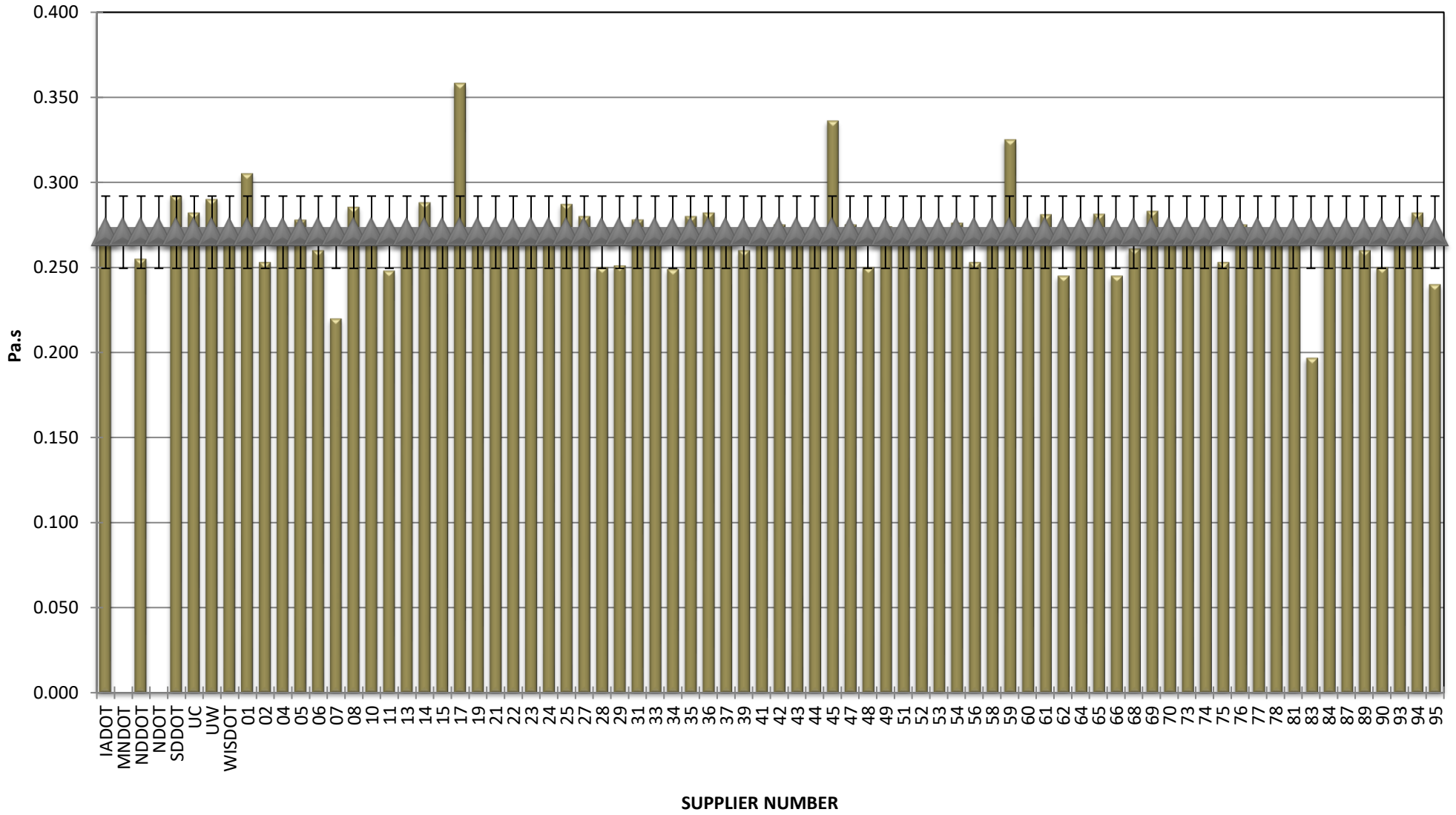


**COMBINED STATE BINDER GROUP ROUND ROBIN SUMMARY A 2021-2
PG 58S-28**

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	0.273	1.24		4,730	0.680	231	0.320	2.679	4.21	2.865	1.25
MNDOT		1.24		4,320	0.880	229	0.321	2.509	3.03	2.730	0.39
NDDOT	0.255	1.24		4,587	0.705	241	0.331	2.689	3.18	2.922	0.78
NDOT		1.20		4,077	0.498	217	0.325	2.796	3.40	3.142	0.80
SDDOT	0.292	1.22		6,860	0.525	224	0.324	2.970	2.07	3.302	0.00
UC	0.282	1.19		4,286	0.610	228	0.326	2.790	3.80	3.140	0.90
UW	0.290	1.19		4,807	0.394	238	0.321	2.641	2.74	2.982	0.00
WISDOT	0.273	1.24		4,520	0.600	236	0.314	2.731	2.82	2.976	0.27
01	0.305	1.17		3,330	0.666	235	0.321	2.720	3.70	2.960	1.04
02	0.253	1.19		4,583	0.640	240	0.321	2.380	3.30	2.610	0.40
04	0.272	1.18		3,490	0.665	236	0.332	3.060	2.35	3.330	0.07
05	0.278	1.27		4,190	0.753	220	0.324	2.356	3.05	2.621	0.58
06	0.260	1.20		4,040	0.765	209	0.336	2.995	2.27	3.258	-0.01
07	0.220	1.25		4,037	0.722	240	0.331	2.595	3.50	2.768	0.10
08	0.285	1.26		4,185	0.719	218	0.328	2.364	3.22	2.647	0.40
10	0.270	1.25		4,125	0.733	225	0.324	2.343	3.30	2.631	0.38
11	0.248	1.21		4,611	0.635	250	0.326	2.680	3.03	2.940	0.10
13	0.273	1.18		4,170	0.688	236	0.332	2.456	3.73	2.689	0.66
14	0.288	1.27		4,240	0.737	227	0.326	2.396	3.43	2.684	0.43
15	0.270	1.22		3,889	0.659	245	0.330	2.720	3.98	2.990	0.00
17	0.358	1.20		3,180	0.637	225	0.317	2.630	3.88	2.890	1.05
19	0.272	1.23		4,428	0.613	235	0.325	2.572	4.40	2.835	1.30
21	0.270	1.23		4,601	0.686	226	0.333	2.631	3.91	2.880	0.81
22	0.272	1.28		4,444	0.740	229	0.323	2.397	3.42	2.677	0.44
23	0.272	1.20		4,511	0.678	236	0.332	2.650	3.77	3.140	1.08
24	0.273	1.19		4,180	0.737	220	0.330	2.392	3.79	2.617	0.75
25	0.287	1.18		4,846	0.595	201	0.315	2.487	2.80	2.717	0.16
27	0.280	1.22		4,978	0.757	236	0.322	2.508	3.32	2.850	0.00
28	0.250	1.22		4,258	0.604	221	0.323	2.750	2.51	3.000	0.04
29	0.251	1.22		3,823	0.704	221	0.322	2.600	3.78	2.840	1.16
31	0.278	1.25		3,930	0.745	218	0.329	2.384	3.30	2.659	0.40
33	0.273	1.22		1,318	0.550	239	0.325	2.646	2.77	2.967	0.00
34	0.249	1.26		4,552	0.635	256	0.317	2.400	4.96	2.640	1.32
35	0.280	1.24		4,160	0.726	210	0.337				
36	0.282	1.24		4,297	0.742	212	0.323	2.466	2.95	2.733	0.41
37	0.270	1.25		4,610	0.763	216	0.332	2.530	3.35	2.740	1.09
39	0.260	1.17		3,545	0.635	246	0.329	2.800	2.60	3.050	0.00
41	0.272	1.28		4,213	0.737	218	0.328	2.339	3.76	2.636	0.47
42	0.275	1.27		3,720	0.664	230	0.330	2.570	3.11	2.800	0.53
43	0.272	1.24		4,270	0.640	234	0.324	2.680	2.87	2.910	0.35
44	0.273	1.24		3,767	0.729	226	0.324	2.403	3.43	2.689	0.52
45	0.336	1.22		3,540	0.653	253	0.314	2.660	3.62	2.920	1.05
47	0.275	1.14		3,730	0.661	236	0.329	2.990	2.41	3.250	0.11
48	0.250	1.25		4,753	0.638	243	0.314	2.610	3.87	2.840	1.17
49	0.274	1.25		4,520	0.643	242	0.316	2.650	2.98	2.900	0.40
51	0.270	1.28		4,668	0.756	234	0.329	2.376	3.70	2.564	1.40
52	0.273	1.22		4,030	0.736	220	0.325	2.455	3.50	2.765	0.33
53	0.269	1.22		3,956	0.728	231	0.329	2.790	2.68	3.055	9.53
54	0.276	1.33		4,263	0.632	240	0.326	2.537	4.90	2.783	1.30
56	0.253	1.24		4,660	0.728	255	0.312	2.440	4.05	2.680	1.25
58	0.271	1.18		4,973	0.801	236	0.328	2.590	3.24	2.850	0.30
59	0.325	1.25		4,380	0.857	245	0.326	2.250	7.05	2.580	1.65
60	0.270	1.25		4,810	0.749	248	0.319	2.446	3.17	2.660	0.36
61	0.281	1.23		4,312	0.744	221	0.329	2.391	3.50	2.691	0.48
62	0.245	1.23		4,880	0.649	252	0.316	2.330	3.09	2.520	1.30
64	0.269	1.23		3,933	0.700	228	0.328	2.735	3.05	3.015	-0.09
65	0.281	1.25		3,957	0.727	231	0.326	2.315	3.91	2.617	0.56
66	0.245	1.22		4,650	0.636	253	0.320	2.690	3.48	2.920	1.07
68	0.261	1.22		2,883	0.694	256	0.315	2.570	6.07	2.843	1.48
69	0.283	1.20		4,280	0.599	240	0.327	2.790	4.00	3.150	1.00
70	0.273	1.26		4,410	0.564	237	0.320	2.640	4.42	2.910	1.07
73	0.269	1.20		4,326	0.732	238	0.328	2.640	3.51	2.860	1.13
74	0.272	1.23		4,244	0.659	228	0.332	2.400	3.05	2.615	0.25
75	0.253	1.23		4,649	0.679	248	0.314	2.220	3.56	2.430	0.55
76	0.275	1.28		4,209	0.733	279	0.314	2.455	2.99	2.677	0.20
77	0.270	1.28		4,521	0.600	238	0.328	2.890	2.27	3.140	0.00
78	0.269	1.17		4,870	0.815	241	0.323	2.490	3.28	2.730	0.51
81	0.269	1.21		4,760	0.817	242	0.322	2.506	3.35	2.740	0.47
83	0.197	1.14		4,520	0.651	233	0.315	2.730	3.43	2.980	1.10
84	0.269	1.22		4,720	0.713	223	0.326	2.390	3.59	2.610	0.55
87	0.271	1.27		4,476	0.758	227	0.328	2.432	3.28	2.738	0.51
89	0.260	1.17		3,505	0.648	234	0.330	2.810	3.73	3.090	0.00
90	0.250	1.23		4,014	0.656	246	0.319	2.270	5.54	2.520	1.46
93	0.271	1.22		4,173	0.748	227	0.330	2.770	3.14	3.000	1.05
94	0.282	1.25		3,856	0.753	222	0.325	2.540	3.84	2.780	1.14
95	0.240	1.23		4,085	0.726	232	0.330	2.616	3.00	2.804	-0.10
97	0.270	1.30		4,605	0.784	225	0.324	2.286	5.30	2.514	1.60

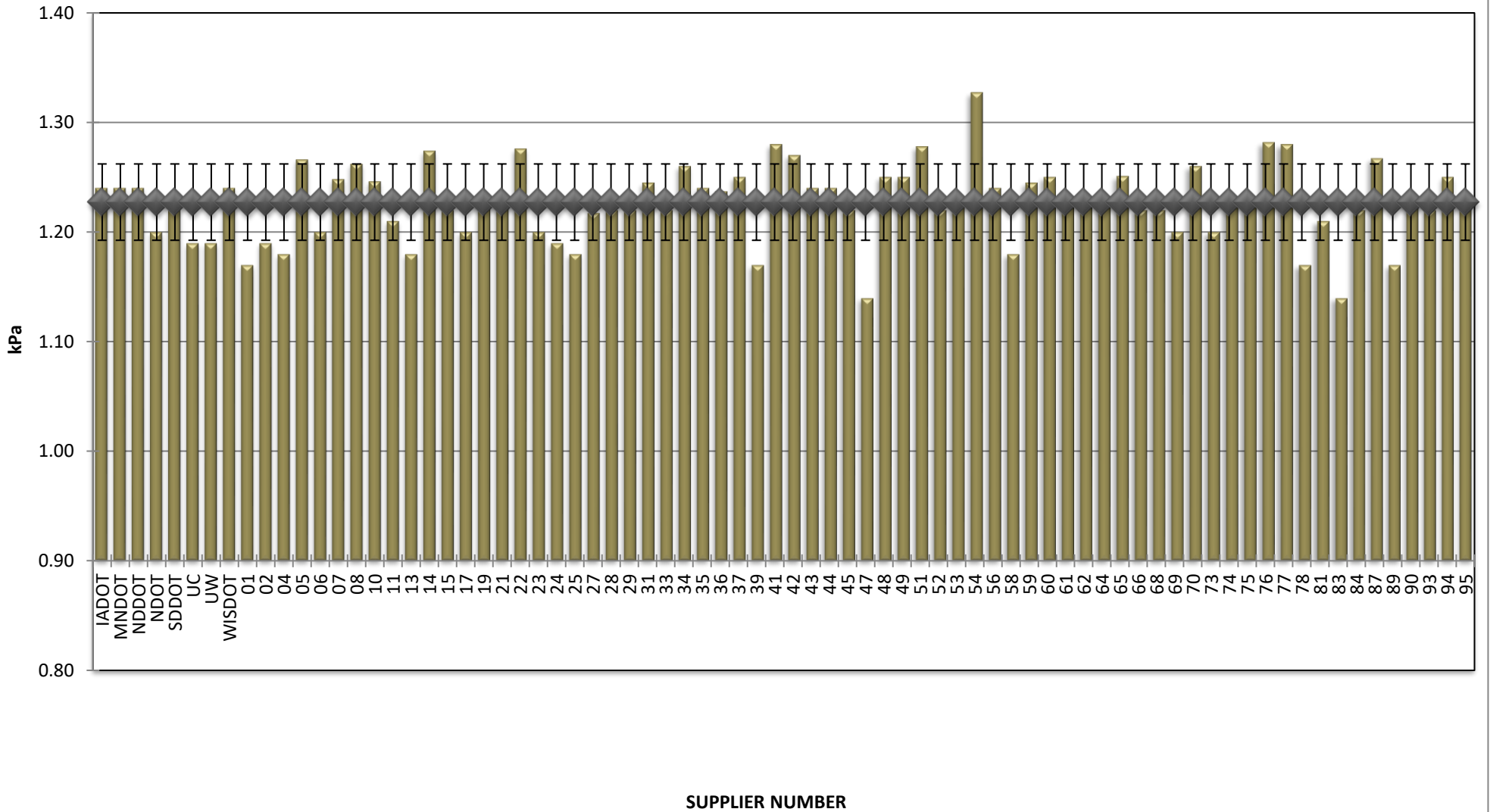
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
PG 58S-28**

ROTATIONAL VISCOSITY



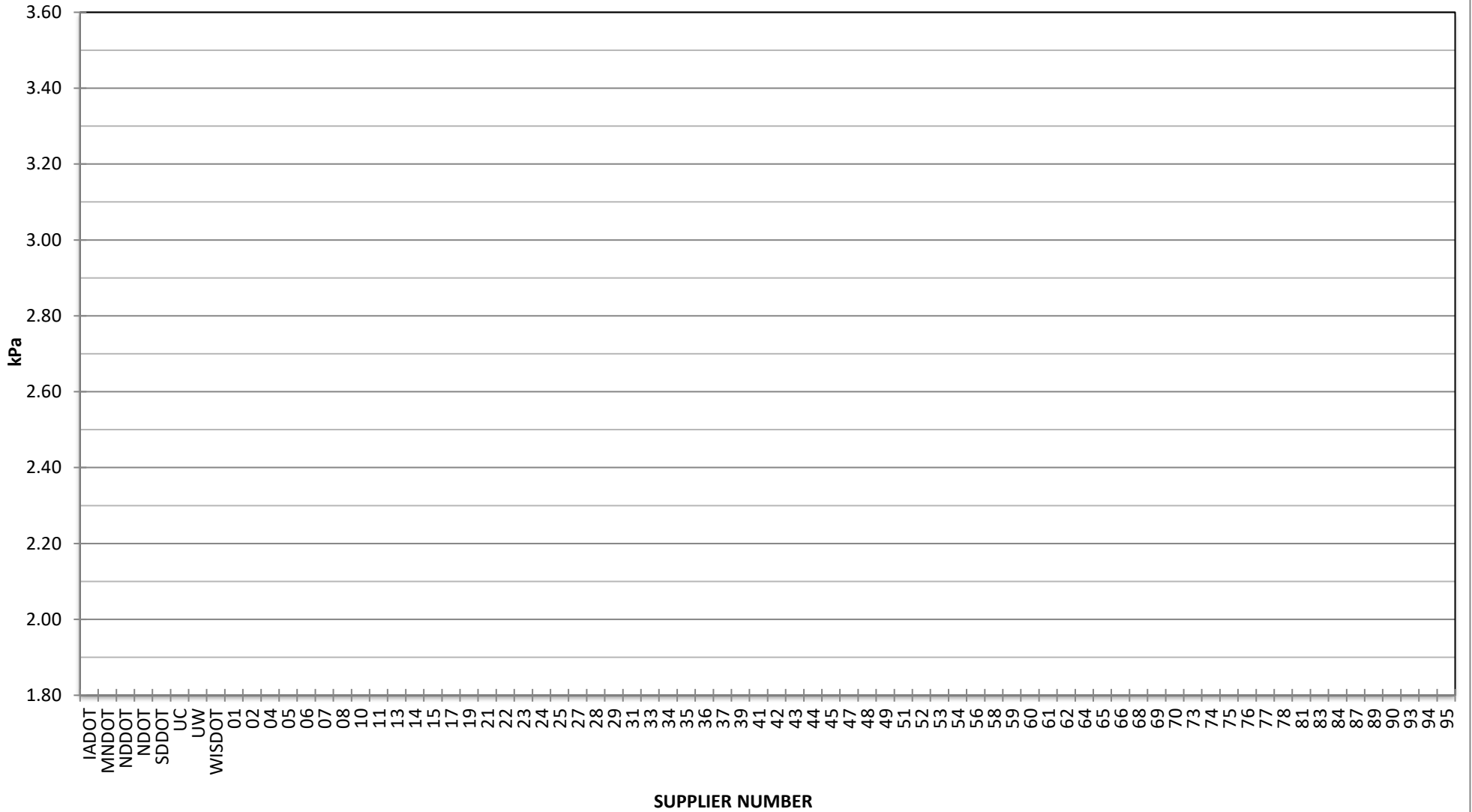
**COMBINED STATE BINDER GROUP ROUND ROBIN
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DSR - ORIGINAL



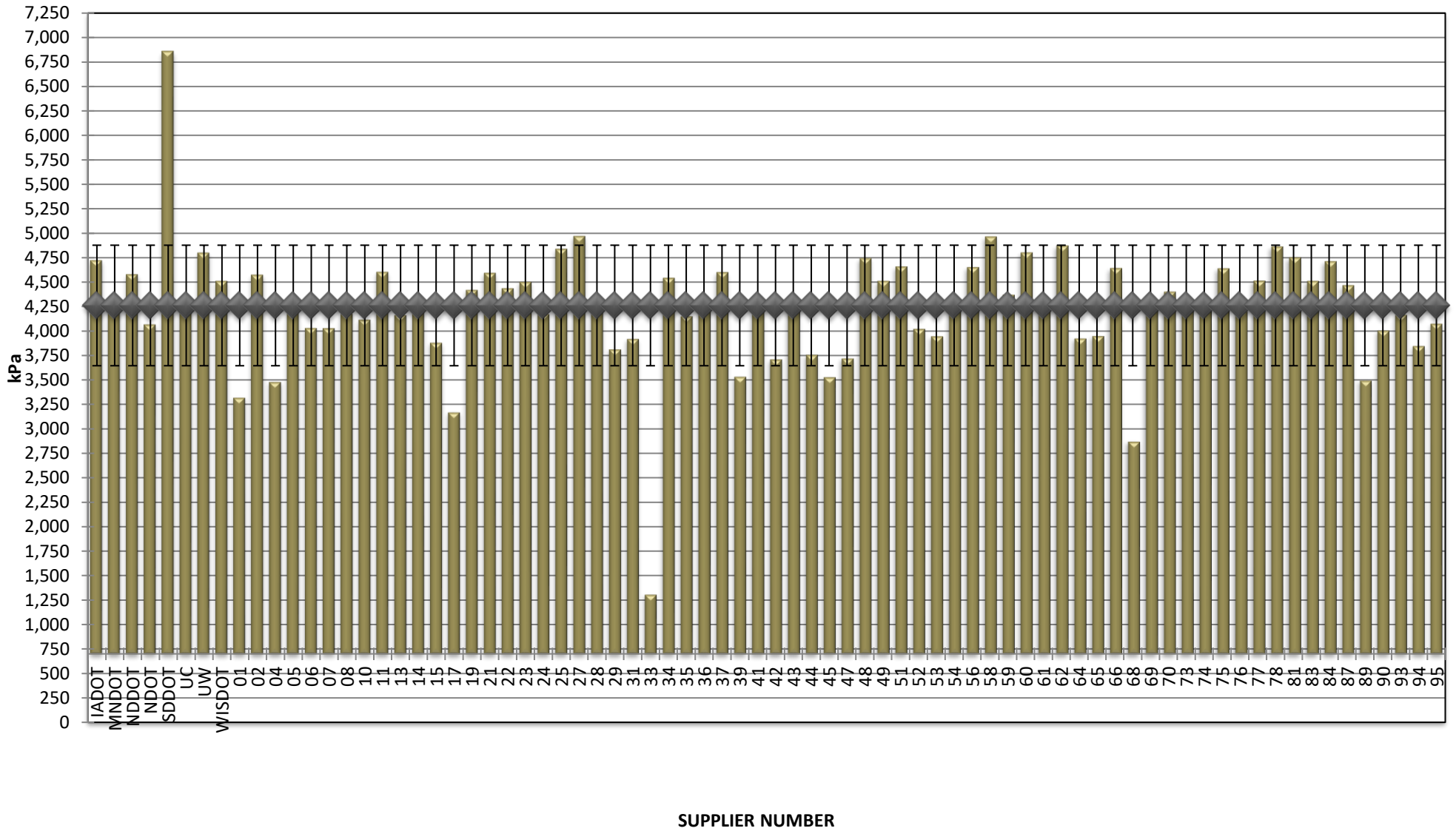
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
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DSR - RTFO



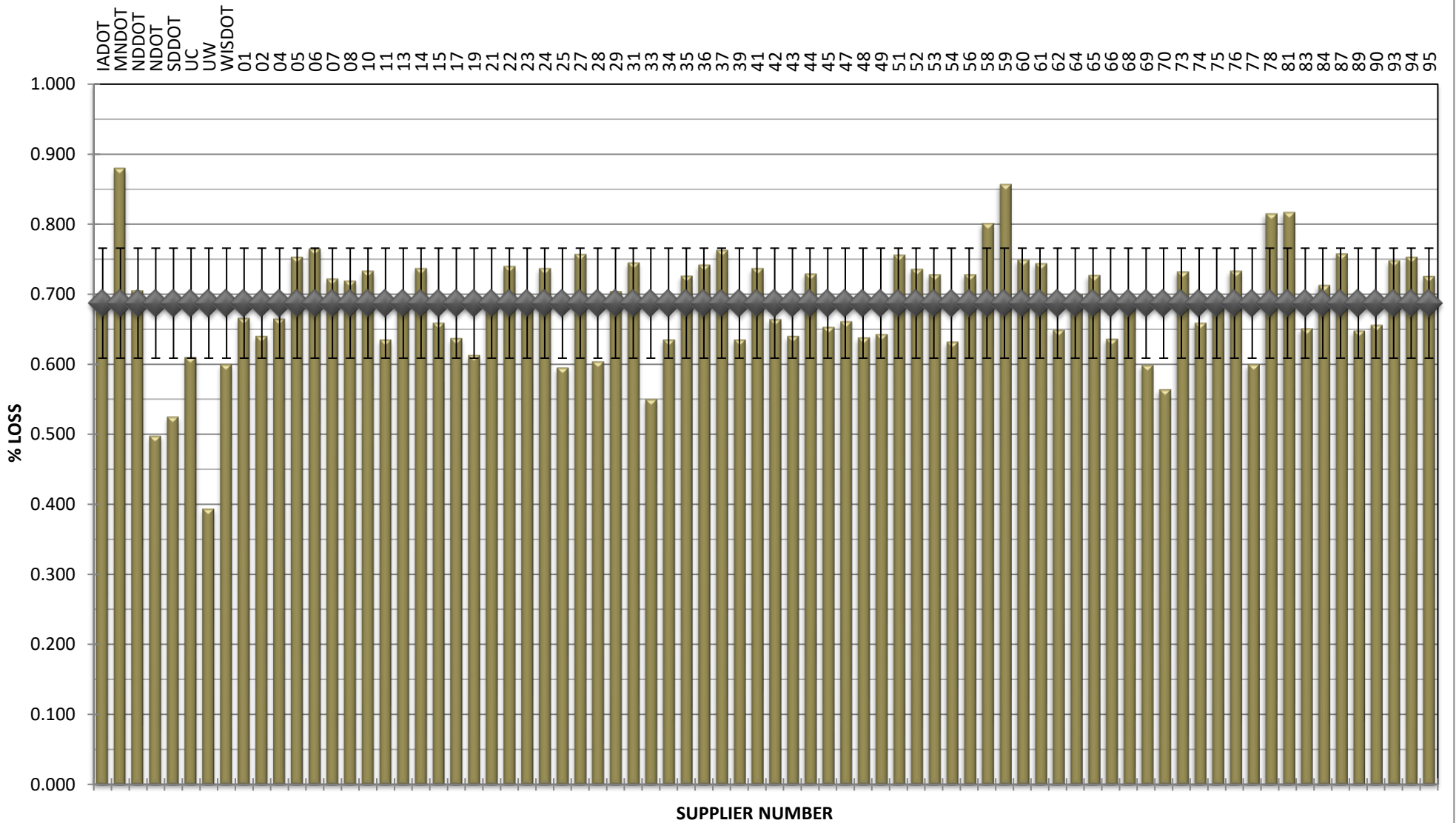
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
PG 58S-28**

DSR - PAV



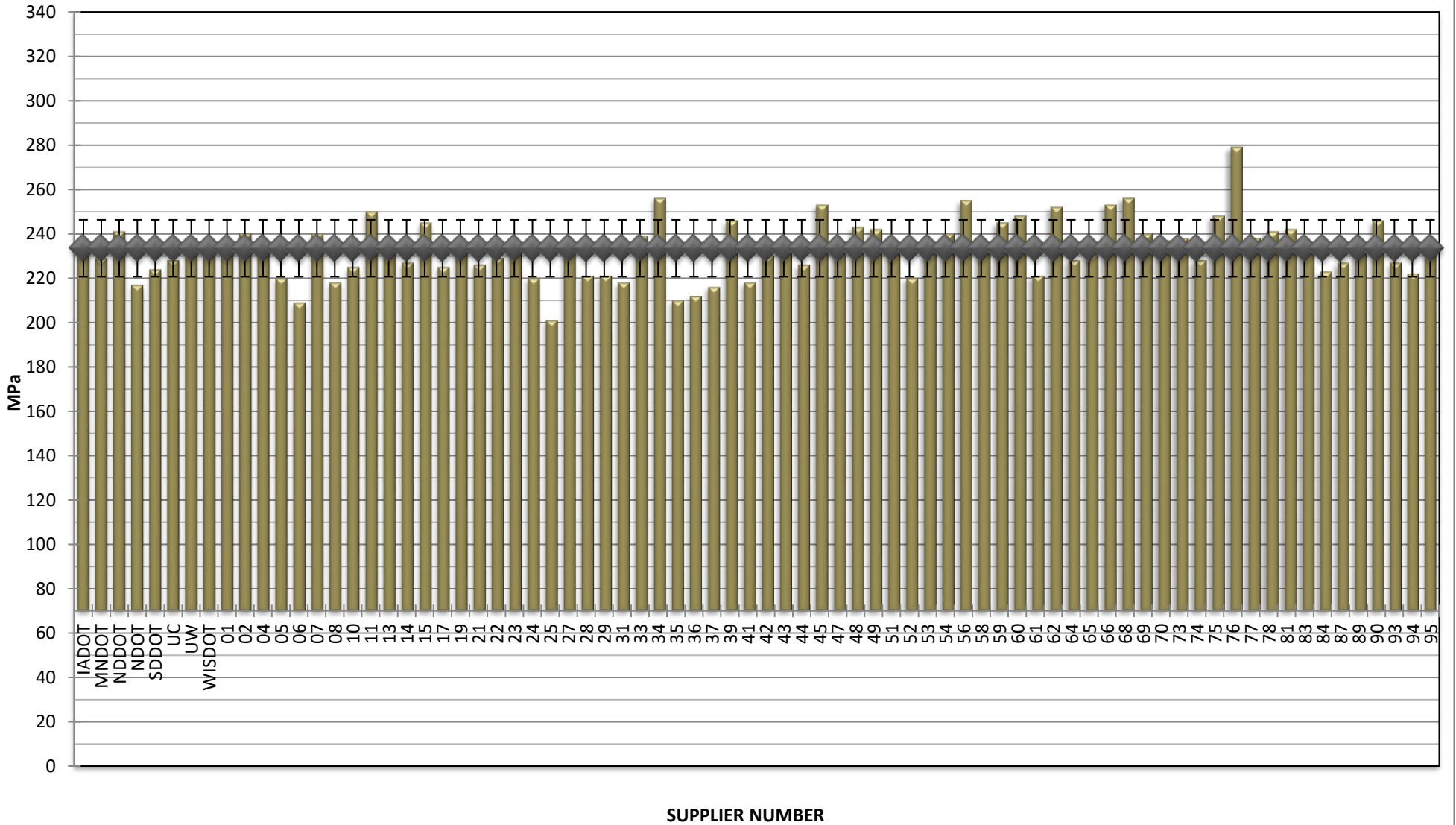
**COMBINED STATE BINDER GROUP ROUND ROBIN
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RTFO MASS LOSS



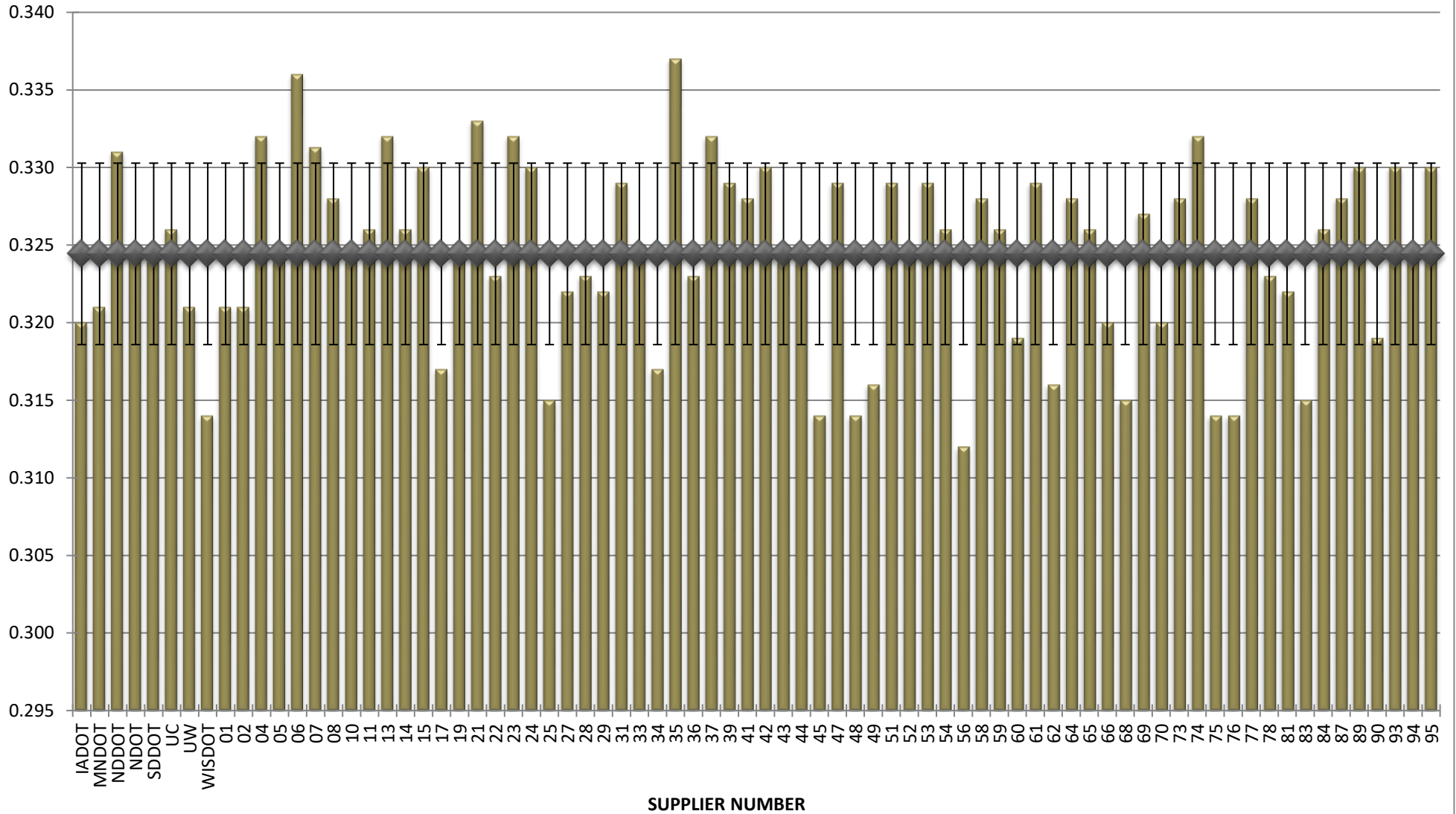
**COMBINED STATE BINDER GROUP ROUND ROBIN
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BBR STIFFNESS



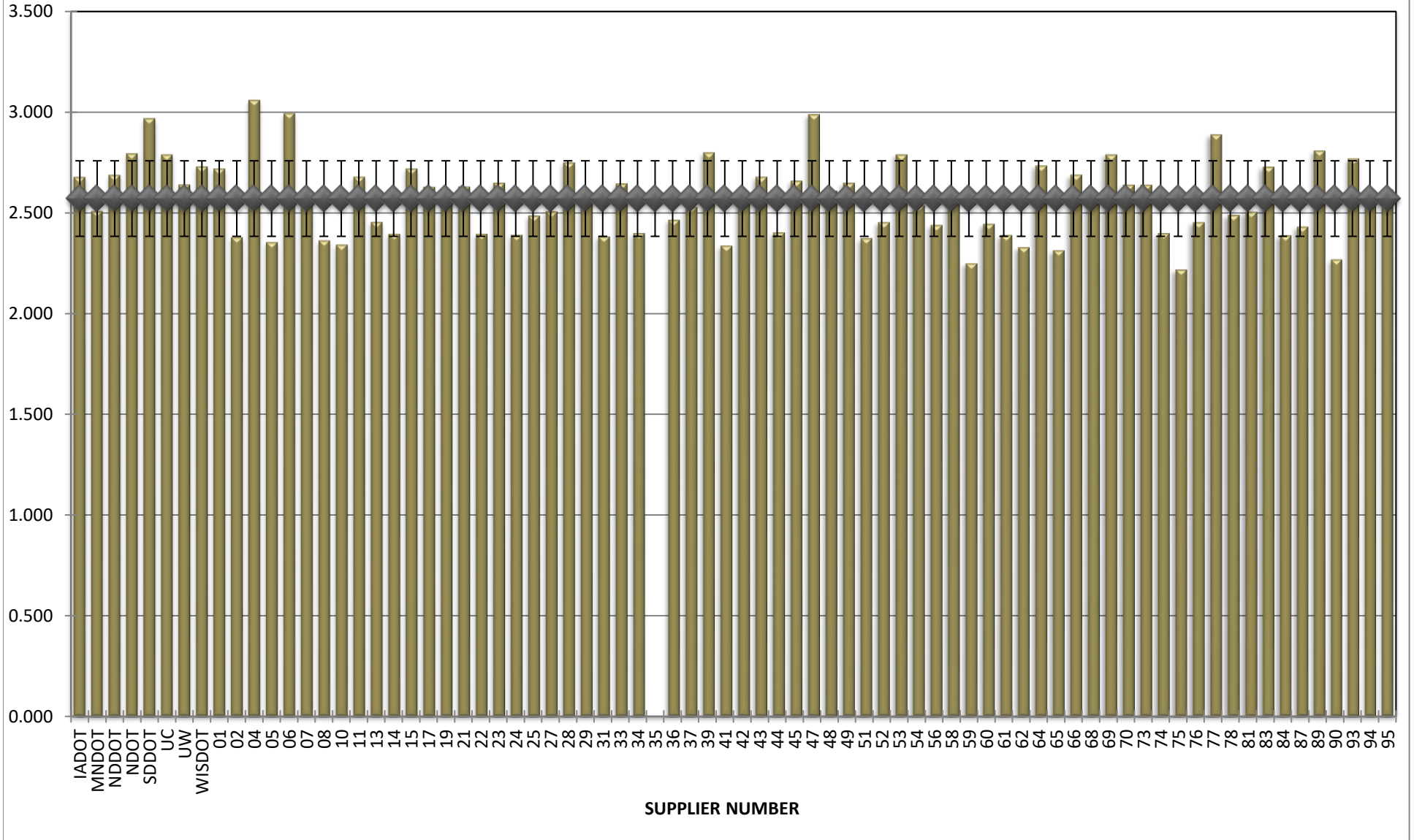
**COMBINED STATE BINDER GROUP ROUND ROBIN
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BBR m-VALUE



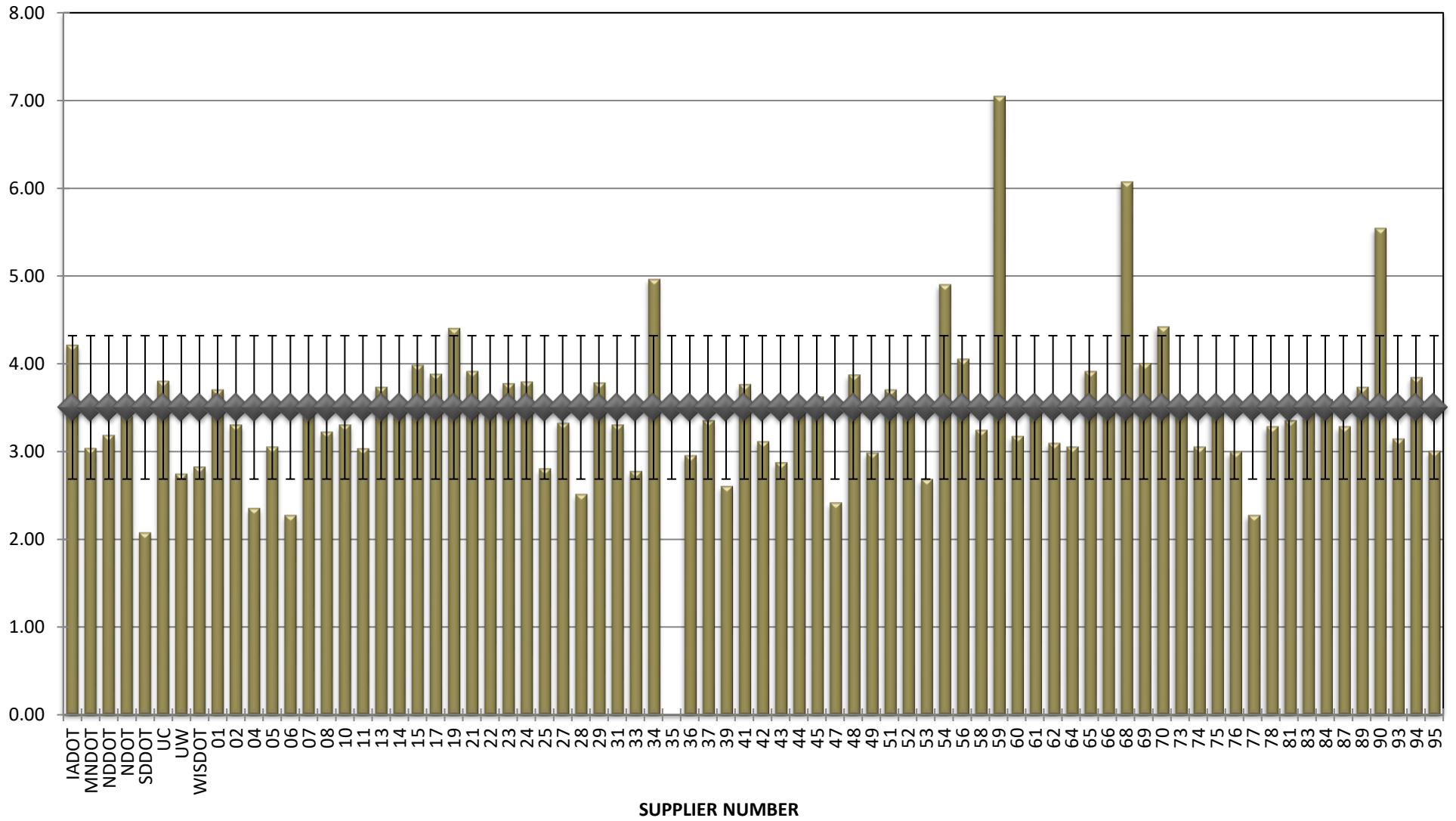
**COMBINED STATE BINDER GROUP ROUND ROBIN
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Jnr @ 100 Pa



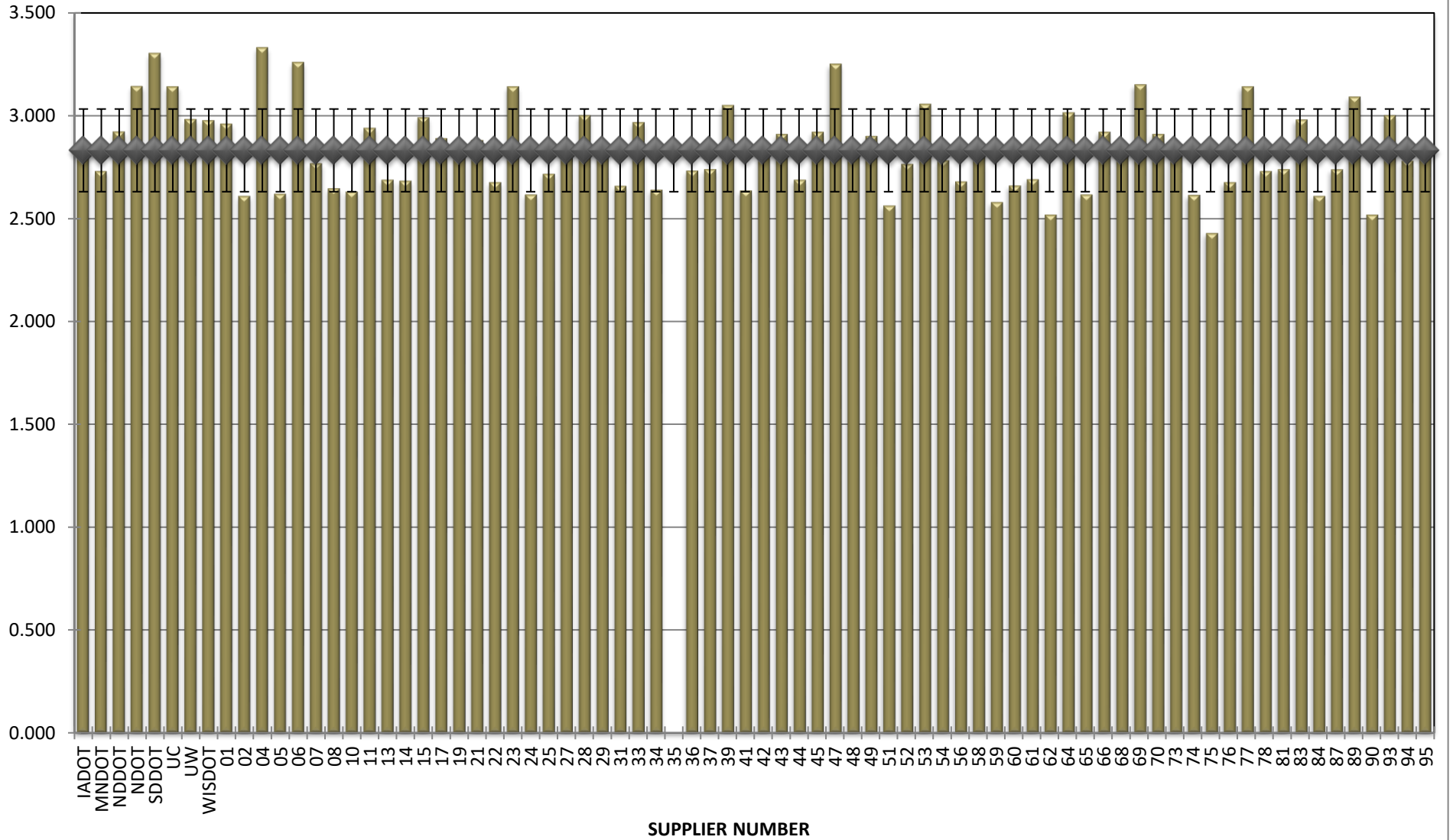
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
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% Recovery @ 100 Pa



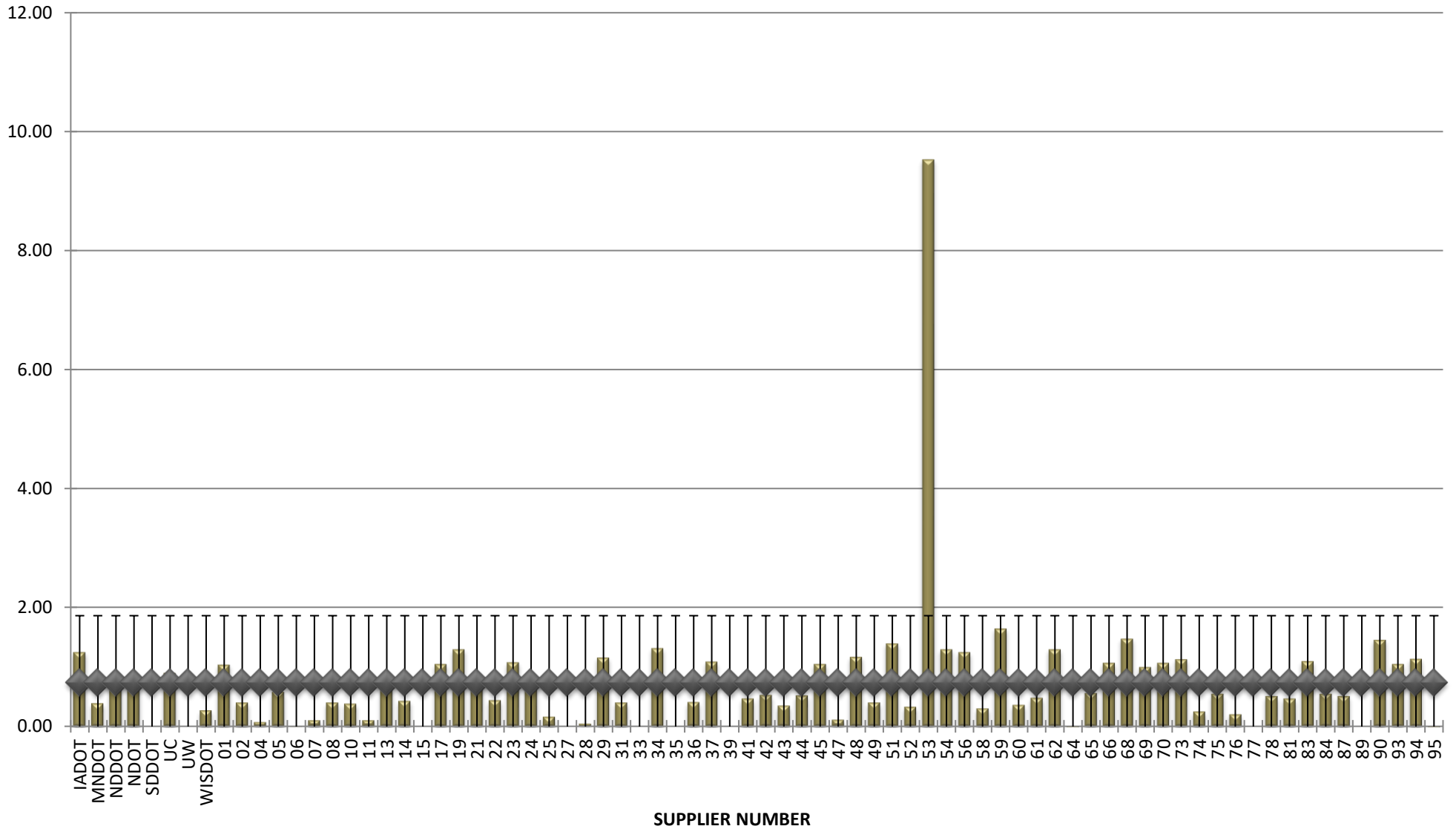
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
PG 58S-28**

Jnr @ 3200 Pa



**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2021-2
PG 58S-28**

% Recovery @ 3200 Pa



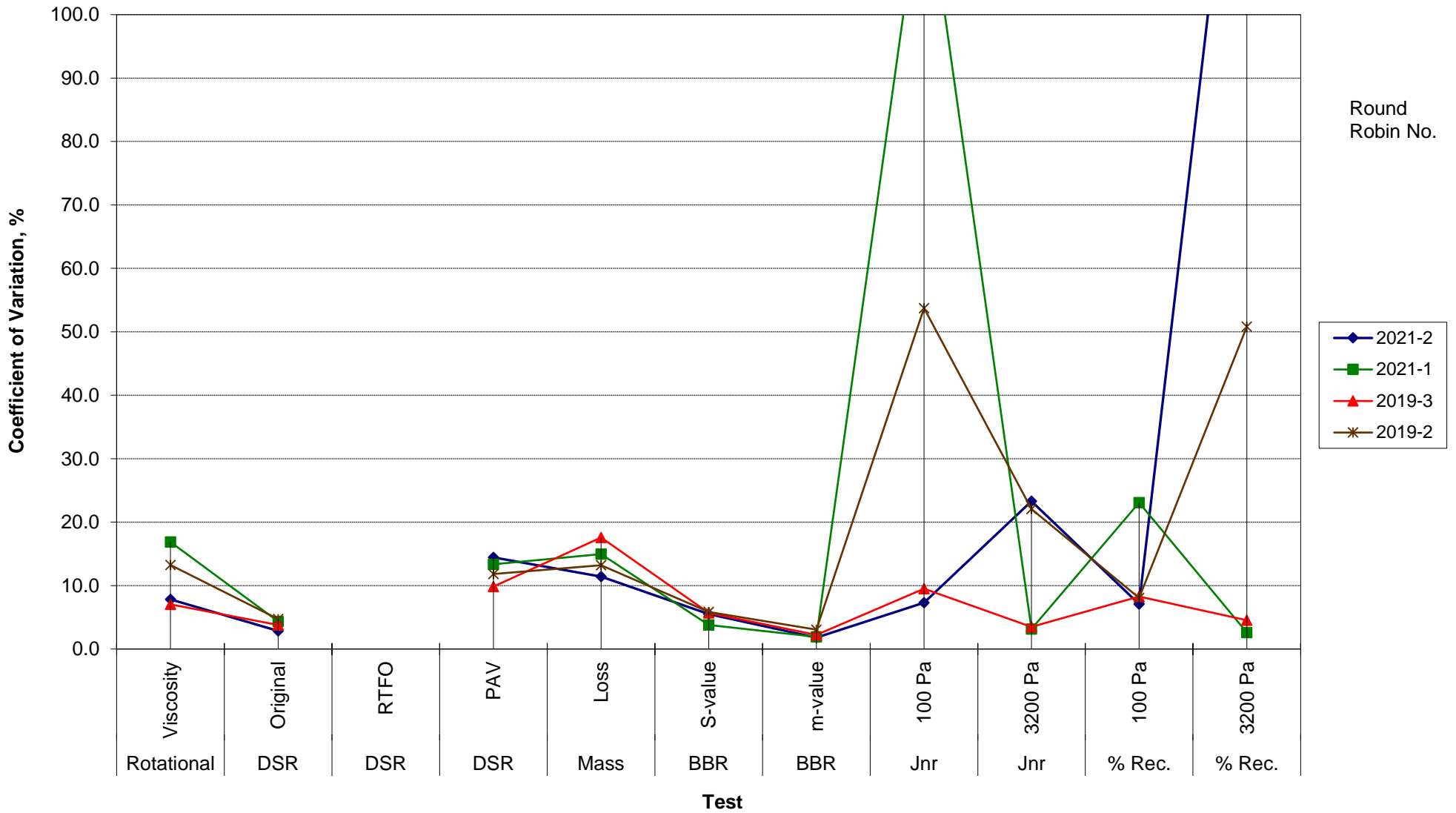
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

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
2021-2	78	7.842	2.838		14.457	11.431	5.502	1.802	7.294	23.319	7.098	152.558	74.259
2021-1	72	16.870	4.360		13.354	14.981	3.785	1.923	123.328	3.154	23.097	2.608	29.516
2019-3	66	7.028	3.779		9.848	17.580	5.691	2.231	9.519	3.499	8.284	4.540	33.516
2019-2	74	13.258	4.708		11.840	13.213	5.855	3.057	53.743	22.057	8.044	50.807	20.079

**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	0.270	1.23		4,266	0.687	233	0.324	2.571	3.42	2.832	0.62
Std. Dev.	0.0151	0.0343		431.64	0.0714	11.82	0.0059	0.1871	0.6182	0.2003	0.4774
Coef. of Var.	5.608	2.798		10.118	10.393	5.077	1.807	7.277	18.065	7.071	76.872

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

COEFFICIENT OF VARIATION

R R No.	Number of Participants	Coefficient of Variation, %											DTT Strain
		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	
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
2018-4	64	13.3804	2.9787		15.593	14.267542	12.49947	5.858218	372.6974	30.4146	328.5556	26.97164	54.58176
2019-1	75	7.0211	2.9324		10.403	13.729654	5.989426	2.318013	7.221429	21.89445	7.063977	65.53669	37.34238
2019-2	74	13.2579	4.7082		11.84	13.212726	5.854851	3.05673	53.74261	22.0569	8.043793	50.80675	20.07887
2019-3	66	7.0285	3.7792		9.8478	17.580086	5.690624	2.23106	9.518568	3.498796	8.283841	4.539972	33.51614
2021-1	72	16.8701	4.3597		13.354	14.980827	3.784658	1.923067	123.3285	3.154241	23.09658	2.608384	29.51648
2021-2	78	7.84153	2.8382		14.457	11.431002	5.502305	1.802378	7.294076	23.31866	7.097866	152.5584	74.25903

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