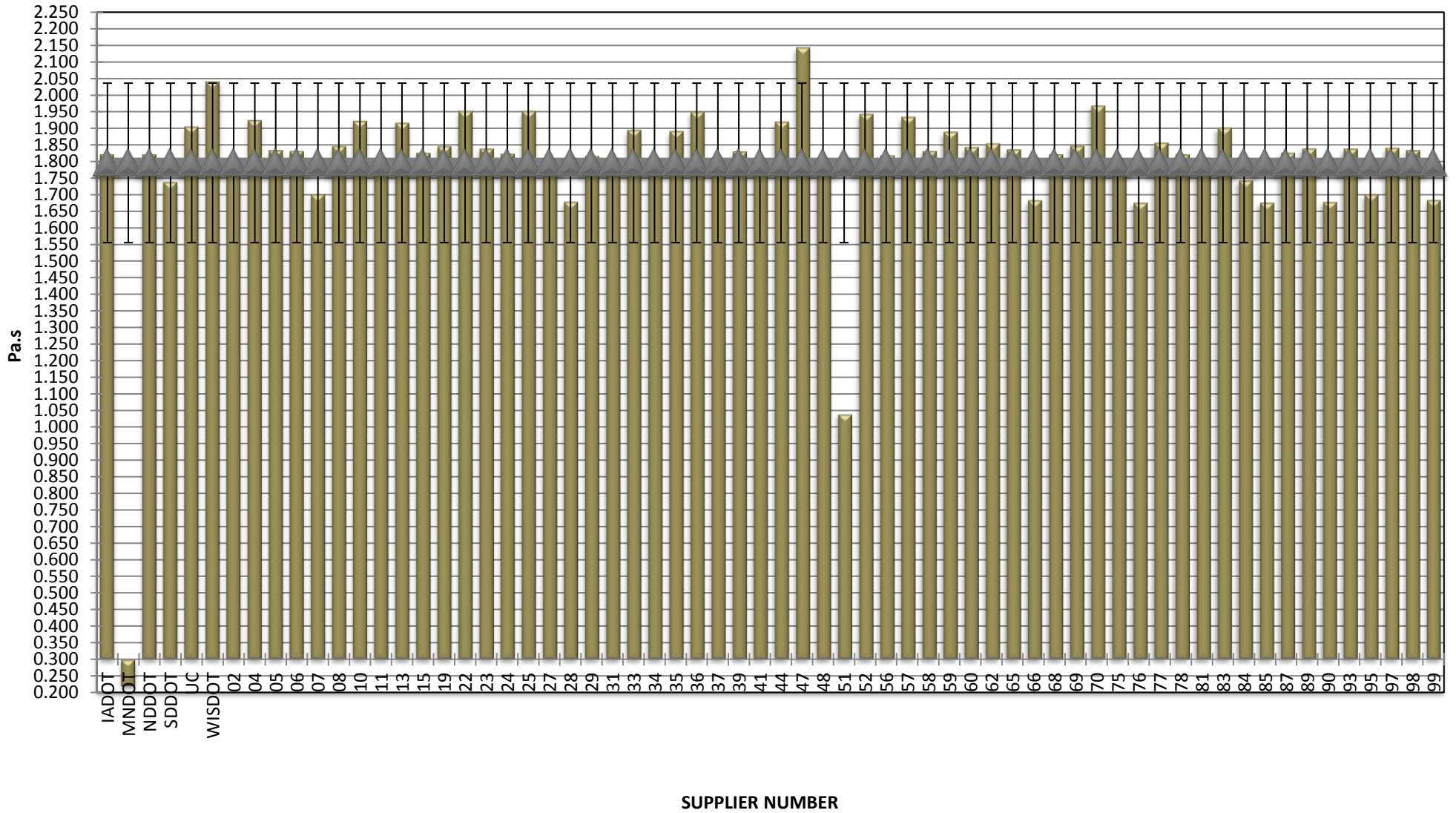


COMBINED STATE BINDER GROUP ROUND ROBIN SUMMARY A 2018-4

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	1.820	5.89		2,600	0.595	263	0.321	0.007	98.35	0.012	97.02
MNDOT	0.219	5.93		2,720	0.627	218	0.322	0.005	98.90	0.011	97.54
NDDOT	1.820	6.16		2,807	0.647	253	0.331	0.011	97.20	0.011	97.30
SDDOT	1.737	5.91		1,750	0.444	100	0.387	0.006	98.60	0.012	97.10
UC	1.904	6.11		2,546	0.528	265	0.324	-0.011	100.00	-0.041	100.00
WISDOT	2.040	6.06		2,443	0.527	258	0.332	0.005	98.67	0.011	97.23
02	1.772	6.02		3,051	0.600	265	0.327	0.005	98.50	0.011	97.06
04	1.923	5.93		2,496	0.512	258	0.330				
05	1.833	5.61		1,800	0.767	212	0.457	0.064	98.55	0.014	96.83
06	1.830	6.03		2,620	0.581	253	0.330	0.005	98.74	0.016	97.36
07	1.700	6.01		2,494	0.522	245	0.337	-0.042	100.00	-0.026	100.00
08	1.845	5.93		1,770	0.774	212	0.352	0.059	98.63	0.013	97.00
10	1.921	5.86		2,662	0.665	244	0.323	-0.047	100.00	-0.019	100.00
11	1.782	6.18		2,963	0.599	262	0.332	0.005	98.55	0.011	96.99
13	1.915	5.92		2,940	0.462	232	0.330	0.005	98.65	0.011	97.27
15	1.825	5.90		2,320	0.610	228	0.332	0.006	98.42	0.011	97.05
19	1.845	5.82		2,201	0.667	242	0.340	0.006	98.50	0.012	97.00
22	1.950	5.88		2,614	0.603	247	0.328	-0.022	100.00	-0.020	100.00
23	1.837	5.80		2,608	0.571	243	0.339	0.005	98.81	0.011	97.28
24	1.822	6.10		2,870	0.528	235	0.336	0.005	98.61	0.011	97.01
25	1.950	6.32		1,951	0.720	106	0.383	4.400	98.30	8.100	97.00
27	1.778	6.21		3,370	0.659	258	0.341	0.006	98.65	0.012	97.30
28	1.678	6.02		2,626	0.457	225	0.338	0.006	98.64	0.012	97.16
29	1.815	5.85		3,414	0.535	258	0.334	0.001	99.78	0.011	97.34
31	1.795	5.65		1,950	0.769	221	0.352	0.051	98.63	0.011	97.19
33	1.894	5.91		2,760	0.550	248	0.330	0.005	98.64	0.011	97.28
34	1.792	6.03		3,015	0.538	260	0.331	0.002	99.58	0.012	97.15
35	1.890	6.04		2,650	0.530	253	0.328				
36	1.948	5.92		2,606	0.646	245	0.331	-0.043	100.00	-0.030	100.00
37	1.773	5.95		2,570	0.426	242	0.325	0.005	98.70	0.012	97.20
39	1.829	5.90		2,310	0.607	229	0.330	0.006	98.38	0.012	96.98
41	1.798	5.48		1,720	0.766	218	0.342	0.057	98.52	0.012	96.85
44	1.919	6.02		2,712	0.578	244	0.323	-0.041	100.00	-0.024	100.00
47	2.142	6.06		2,214	0.429	255	0.332				
48	1.798	5.94		3,000	0.586	263	0.329	0.004	98.73	0.011	97.16
51	1.038	5.66		2,340	0.566	244	0.341	0.006	98.70	0.012	97.40
52	1.942	5.86		2,727	0.669	251	0.327	-0.023	100.00	-0.030	100.00
56	1.817	5.88		3,130	0.581	261	0.331	0.004	98.96	0.011	97.07
57	1.933	6.05		2,386	0.525	273	0.328				
58	1.830	5.87		2,680	0.599	260	0.328	0.005	98.81	0.010	97.42
59	1.888	6.04		2,953	0.571	231	0.323	0.020	96.50	0.010	96.90
60	1.842	6.09		3,220	0.648	231	0.324	0.005	98.87	0.010	97.53
62	1.853	5.95		2,670	0.708	268	0.323	0.005	98.67	0.010	97.36
65	1.835	5.63		2,010	0.765	207	0.353	0.058	98.73	0.015	96.81
66	1.682	5.85		2,502	0.513	226	0.333	0.006	98.46	0.013	96.97
68	1.820	5.39		2,910	0.585	241	0.340	0.011	97.44	0.012	97.19
69	1.846	6.19		2,566	0.494	264	0.322	-0.016	100.00	-0.042	100.00
70	1.967	6.27		3,099	0.471	252	0.313	0.005	98.69	0.010	97.32
75	1.795	5.99		3,090	0.597	272	0.332	0.005	98.53	0.010	97.09
76	1.675	5.80		2,830	0.534	254	0.333	0.006	98.56	0.012	97.08
77	1.855	6.03		2,810	0.586	229	0.346	0.007	97.93	0.011	96.94
78	1.820	5.89		2,810	0.610	262	0.326	0.006	98.66	0.011	97.22
81	1.810	5.88		2,850	0.607	256	0.330	0.006	98.63	0.001	97.26
83	1.900	6.21		3,990	0.685	282	0.318	0.004	98.86	0.009	97.34
84	1.742	6.02		2,838	0.570	247	0.330	0.007	98.29	0.011	97.19
85	1.675	5.85		2,830	0.542	244	0.331	0.006	98.49	0.011	97.18
87	1.825	5.82		2,650	0.550	253	0.326	0.016	96.22	0.011	97.40
89	1.838	5.83		2,560	0.566	216	0.335	0.005	98.64	0.011	97.22
90	1.677	5.92		2,783	0.475	228	0.334	0.006	98.66	0.014	97.16
93	1.837	5.88		2,450	0.614	258	0.338	0.005	98.69	0.012	97.26
95	1.700	6.05		2,561	0.591	250	0.335	-0.030	100.00	-0.015	100.00
97	1.840	5.61		2,423	0.579	227	0.344	0.006	98.70	0.012	97.30
98	1.833	5.72		2,304	0.604	238	0.343	0.006	98.50	0.012	96.90
99	1.683	5.84		2,516	0.497	225	0.329	0.006	98.48	0.013	96.98
Average	1.796	5.93		2,635	0.586	241	0.336	0.078	98.73	0.014	97.59
Std. Dev.	0.240	0.18		411	0.084	30	0.020	0.568	0.76	1.045	1.04
Coef. of Var.	13.380	2.98		16	14.268	12	5.858	726.903	0.77	744.615	1.06

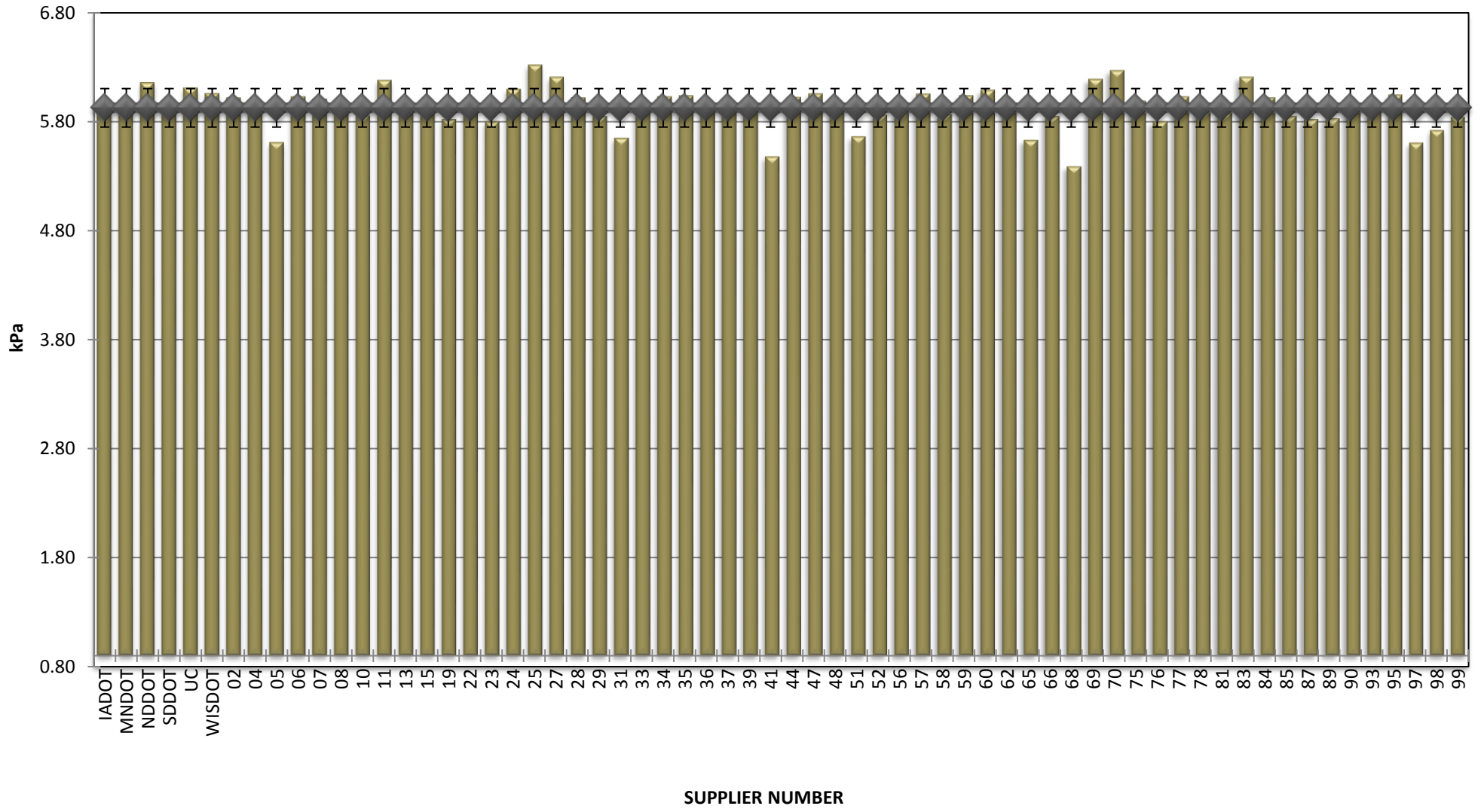
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

ROTATIONAL VISCOSITY



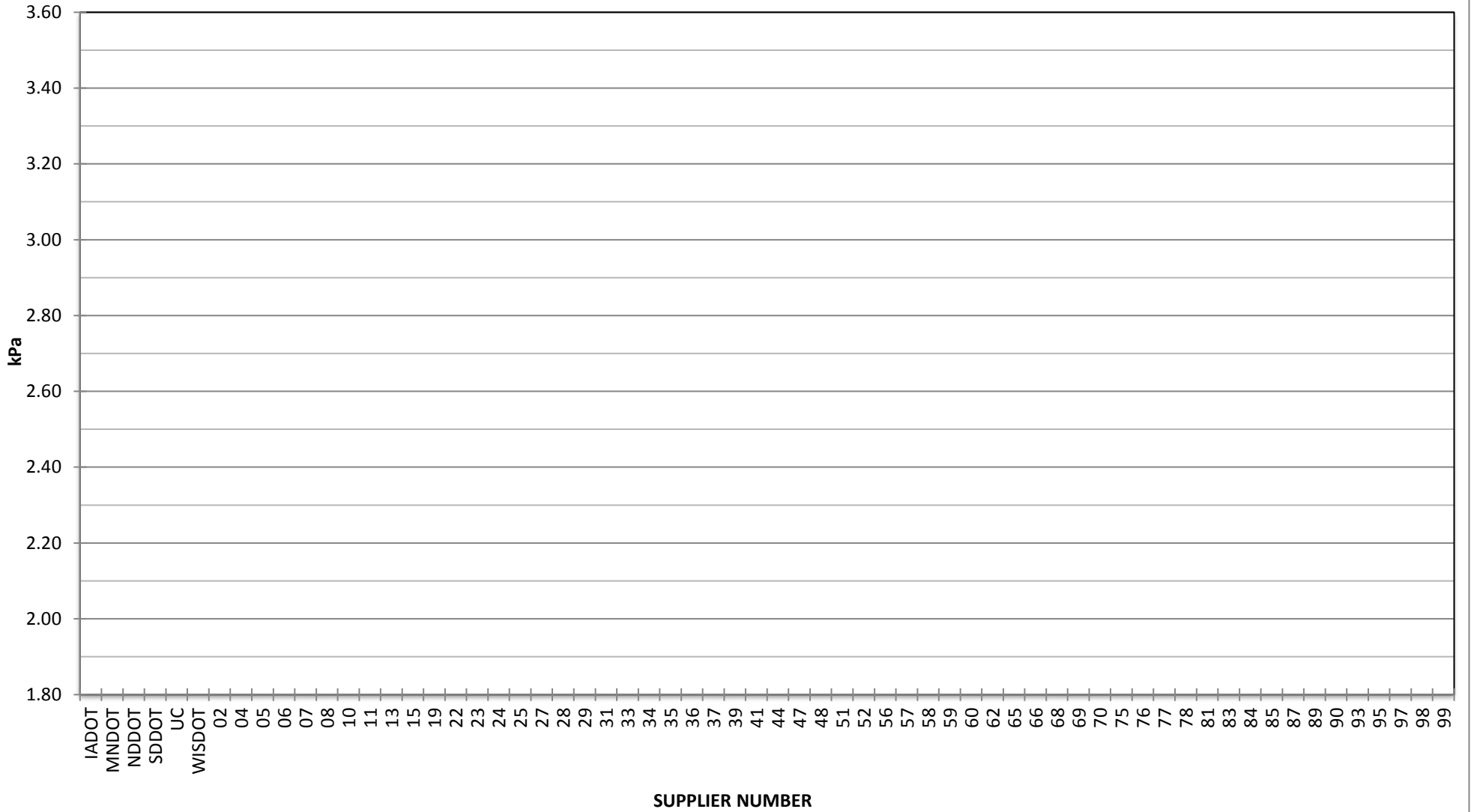
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

DSR - ORIGINAL



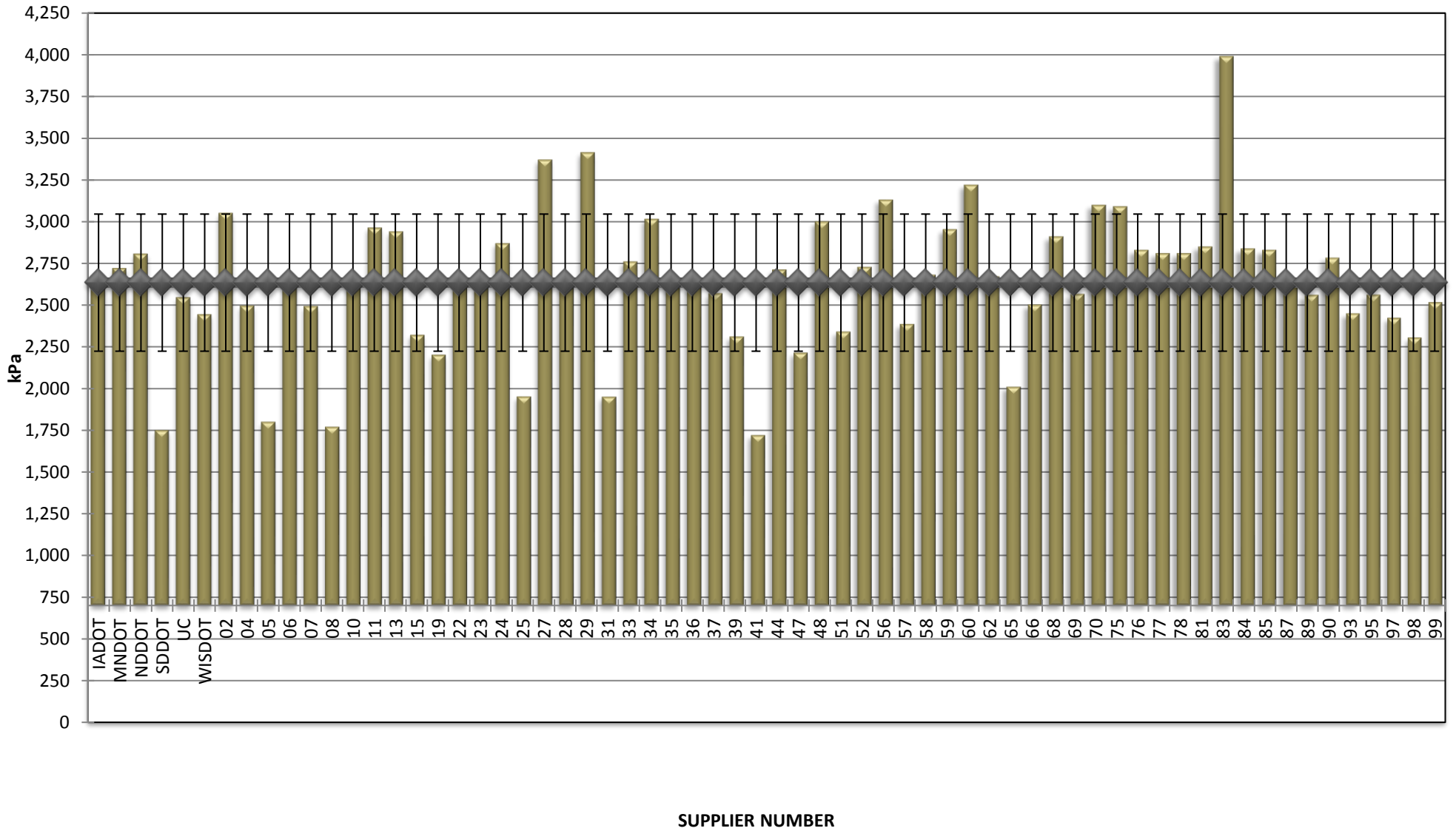
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4

DSR - RTFO



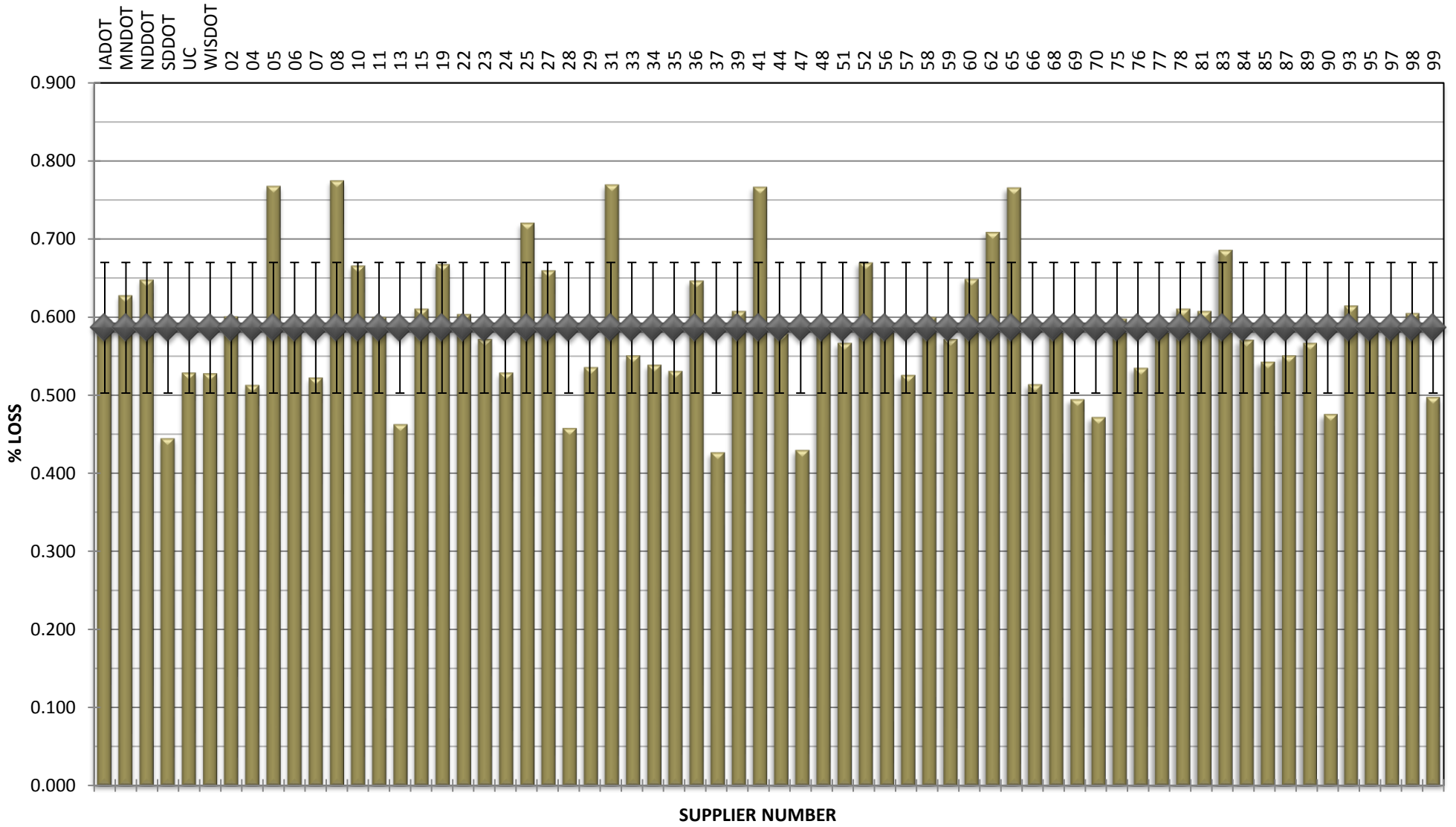
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

DSR - PAV



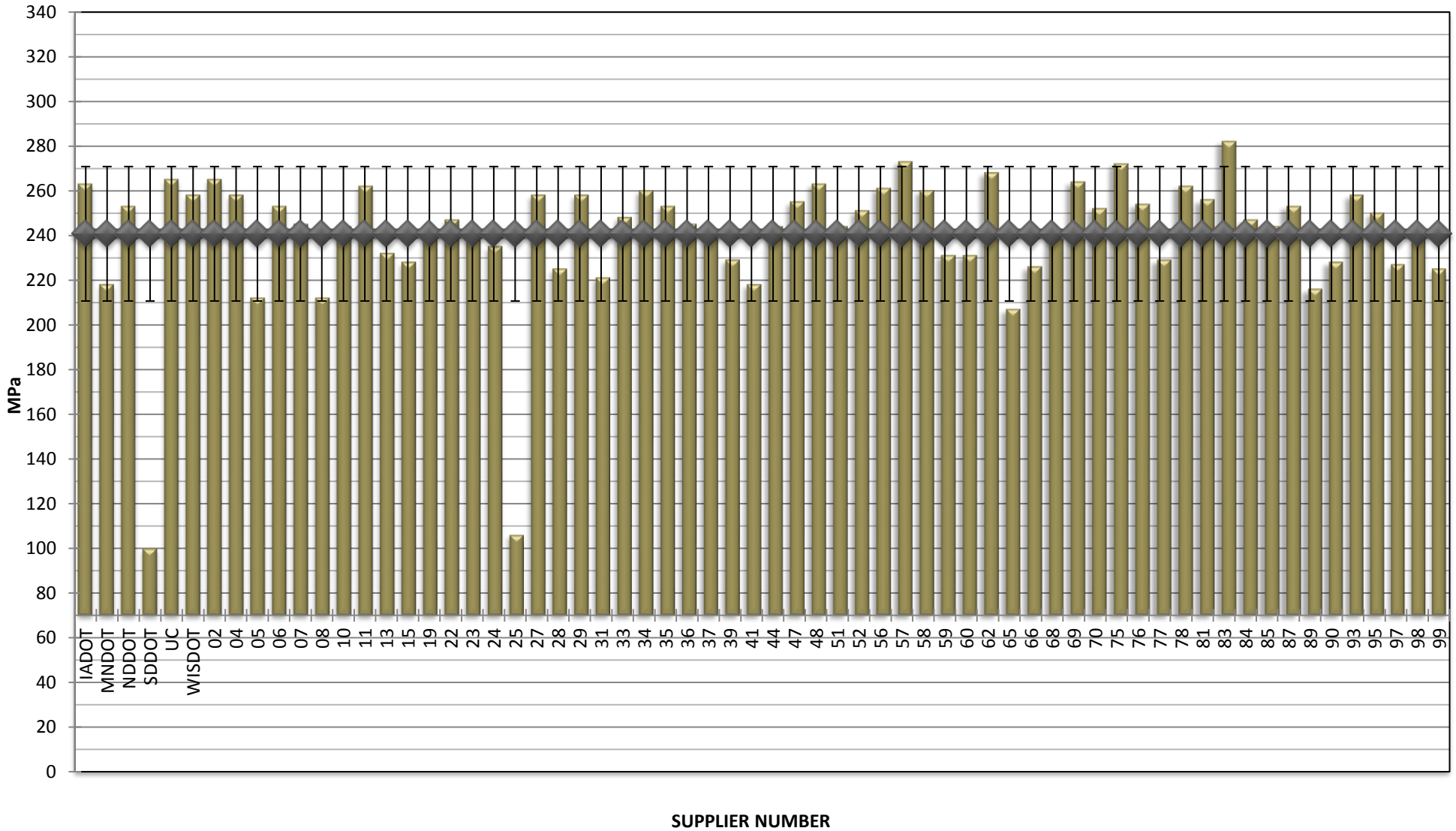
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

RTFO MASS LOSS



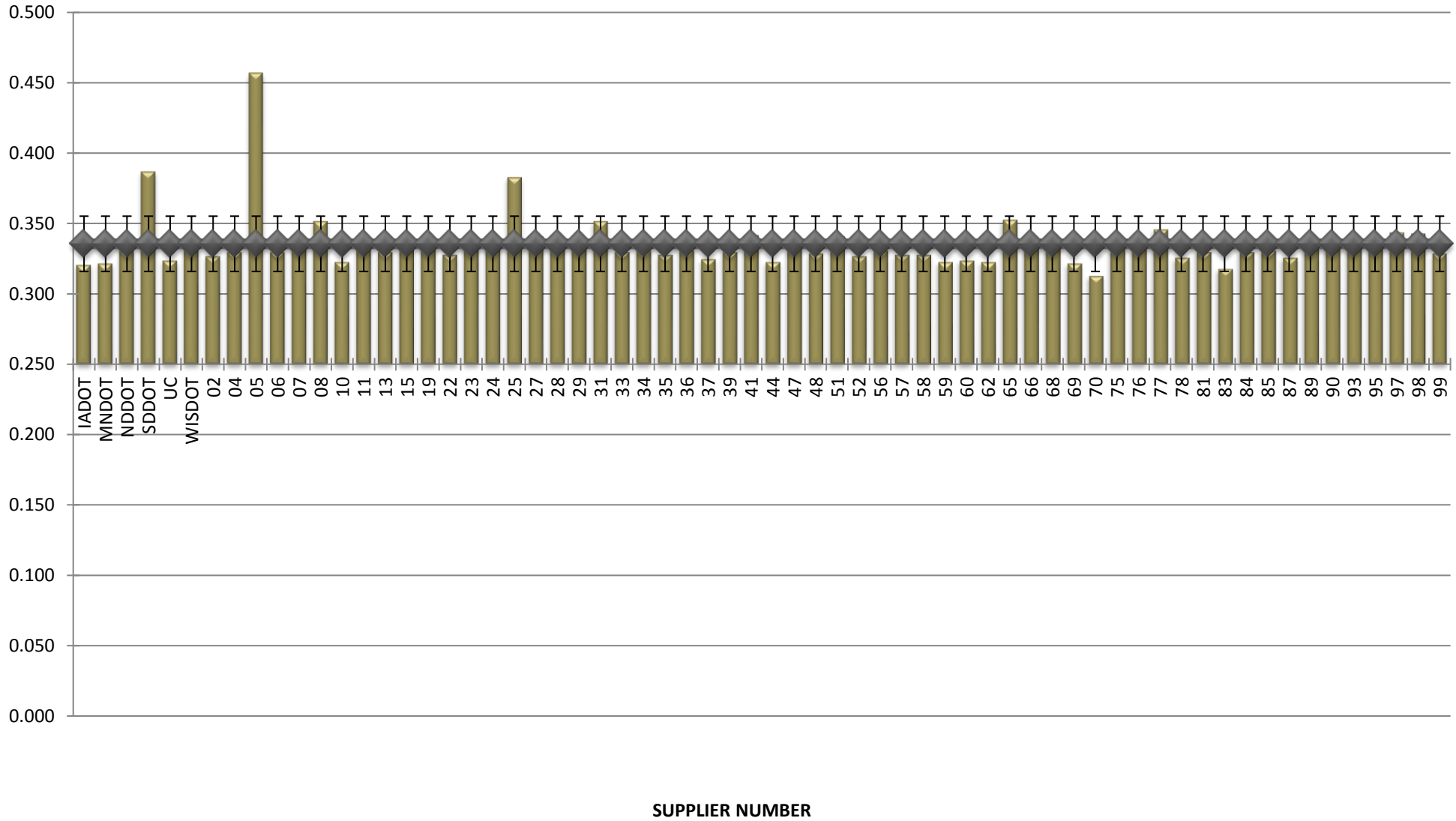
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

BBR STIFFNESS



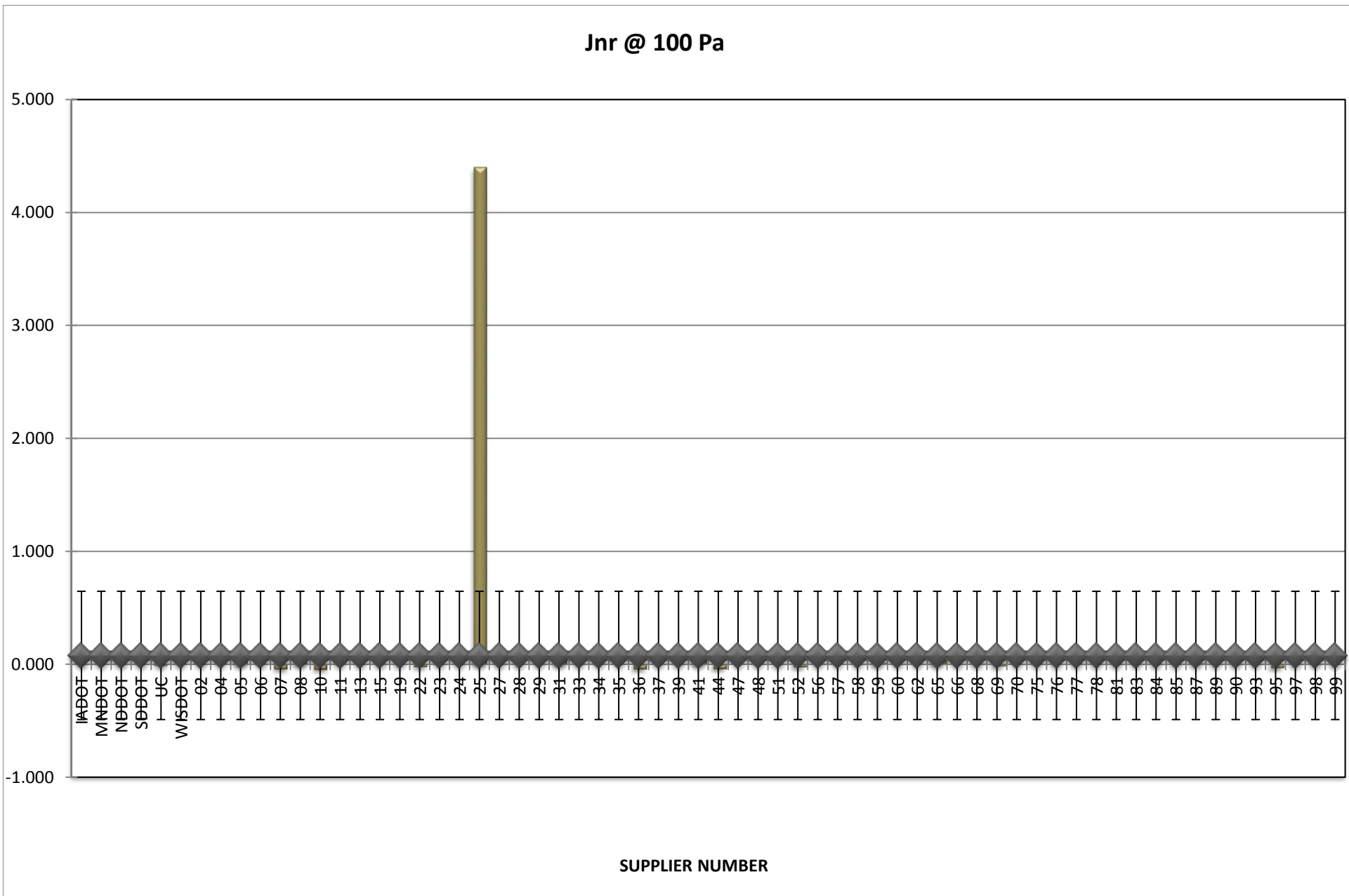
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

BBR m-VALUE



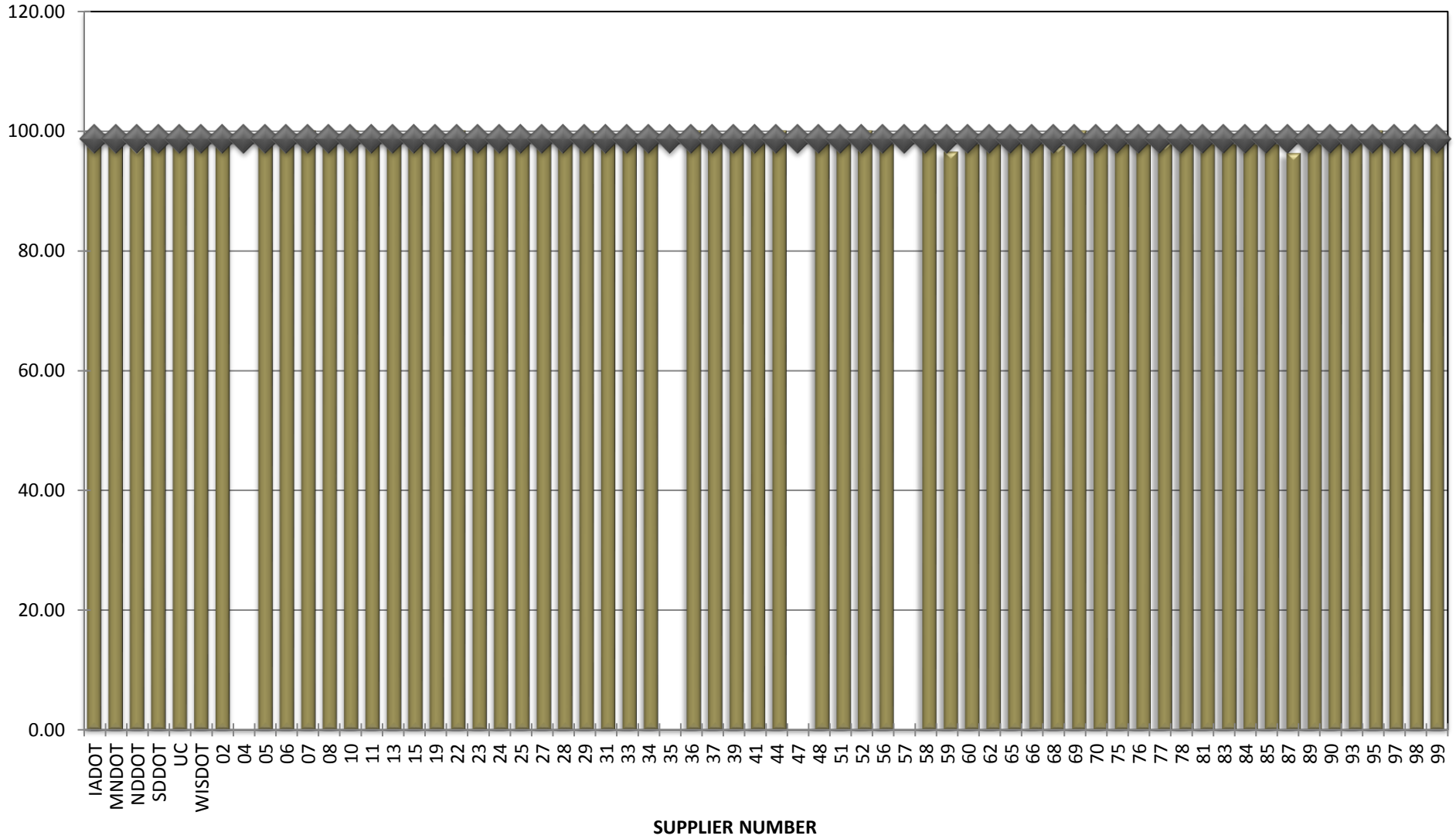
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4

Jnr @ 100 Pa



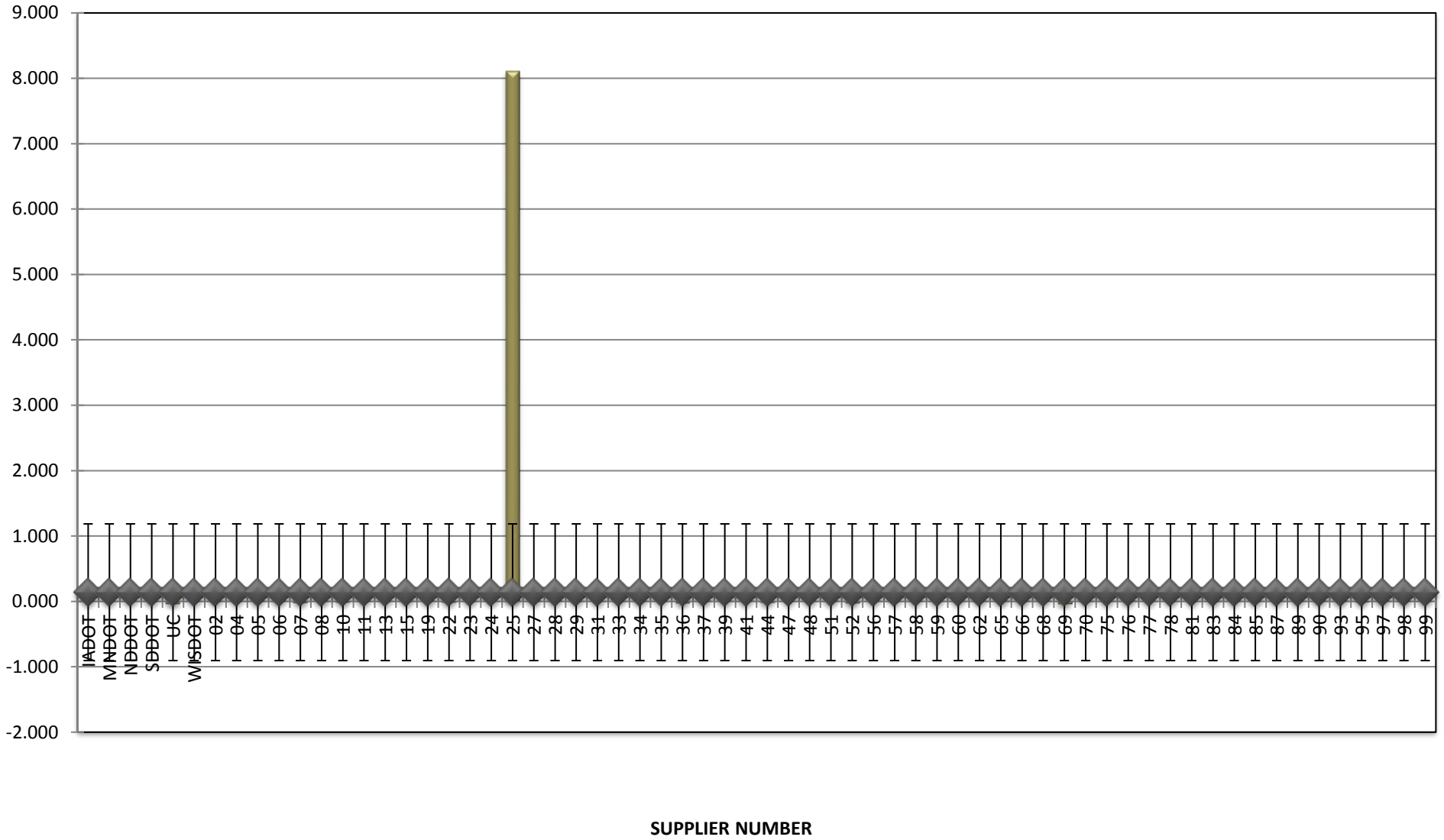
COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4

% Recovery @ 100 Pa



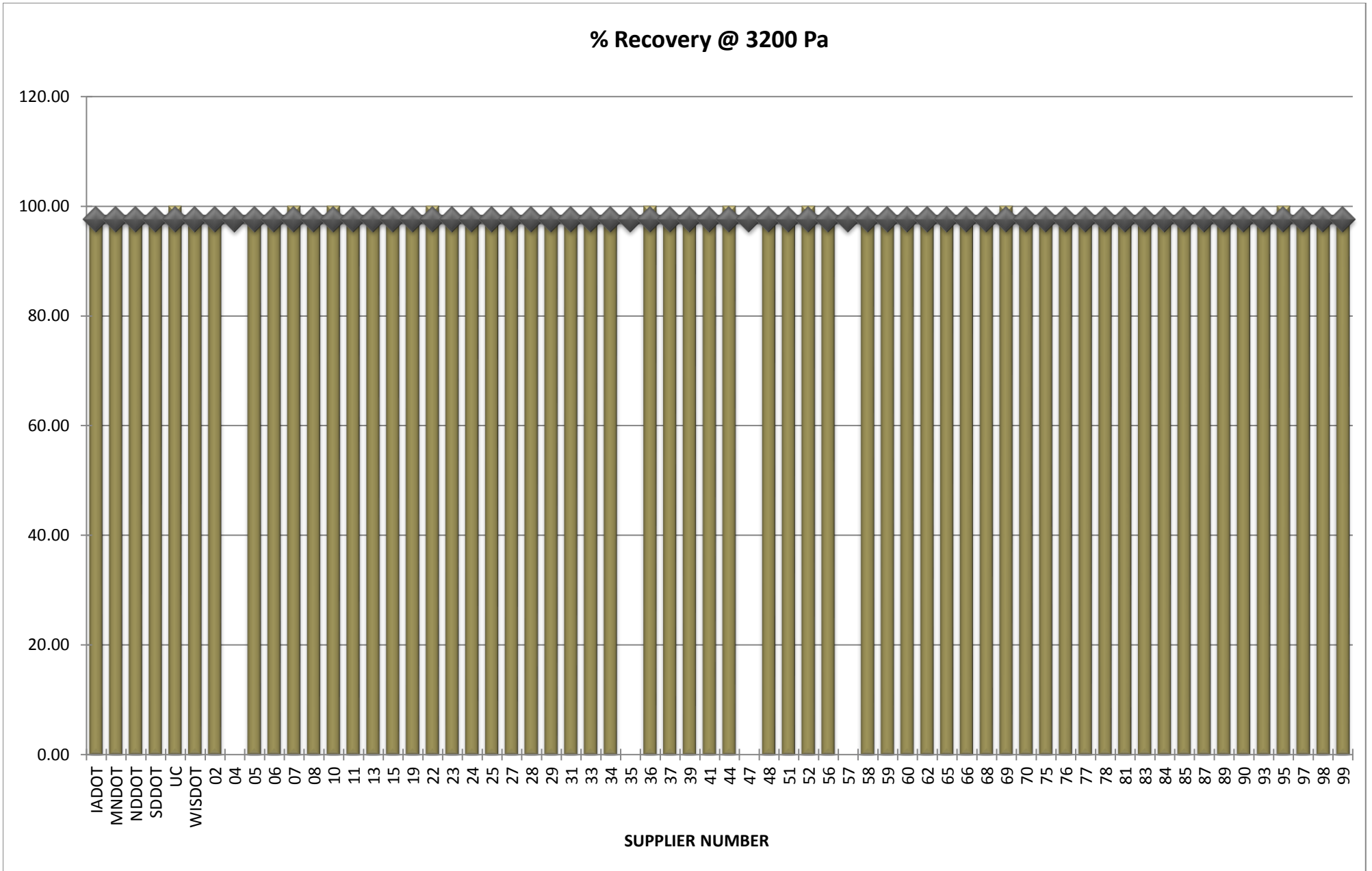
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4**

Jnr @ 3200 Pa



COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A 2018-4

% Recovery @ 3200 Pa



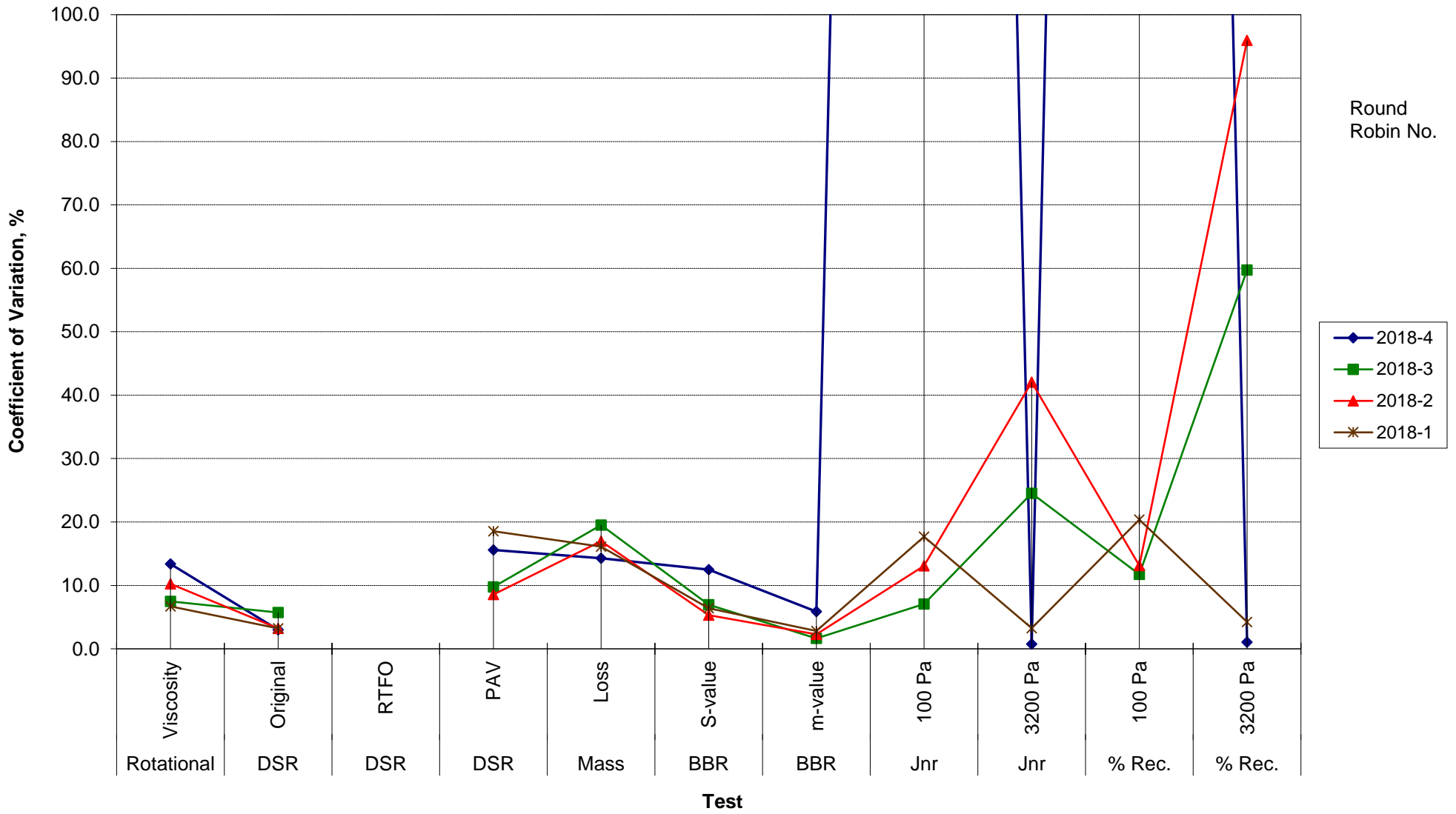
**COMBINED STATE BINDER GROUP ROUND ROBIN
SUMMARY A**

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
2018-4	64	13.380	2.979		15.593	14.268	12.499	5.858	726.903	0.766	744.615	1.061	54.582
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

**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	1.834	5.94		2,613	0.586	245	0.334	0.005	98.77	0.005	97.59
Std. Dev.	0.0895	0.1641		376.09	0.0837	17.11	0.0123	0.0210	0.6869	0.0142	1.0358
Coef. of Var.	4.879	2.765		14.391	14.268	6.977	3.683	432.295	0.695	260.598	1.061

**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	726.9025	0.766385	744.6148	1.061435	54.58176