Acknowledgements

This Annual Review is made possible by the valuable contributions of the following people and organisations, and their assistance is gratefully acknowledged: South African Sugar Millers' Association NPC, South African Sugar Association Cane Testing Service, South African Sugarcane Research Institute, South African Sugar Terminals, SMRI Member and Affiliate Member mill laboratories, SMRI laboratories and staff, and the staff of the various mills and milling groups.

REFERENCES

Singels A, Leslie GW, McFarlane SA, Schoeman J and Gabriel A (2016). A review of South African sugarcane production in the 2015/2016 season: testing times. *Proc S Afr Sug Technol Ass* 89 (in press).

Smith GT, Davis SB, Madho S and Achary M (2015). Ninetieth annual review of the milling season in southern Africa (2014-2015). *Proc S Afr Sug Technol Ass* 88: 23-54.

APPENDIX DATA TABLES

Table A1: Cane crushed and sugar made, cane composition and time accounts, performances and losses – South African factories (Season 2015/16)

Table A2: Cane crushed and sugar made, cane composition and time accounts, performances and losses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2015/16)

Table B1: Analysis of bagasse, juices, filter cake, syrup and final molasses – South African factories (Season 2015/16)

Table B2: Analysis of bagasse, juices, filter cake, syrup and final molasses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2015/16)

Table C1: Massecuites, exhaustions, clarifying agents and additional fuels – South African factories (Season 2015/16)

Table C2: Massecuites, exhaustions, clarifying agents and additional fuels – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2015/16)

Table D: Comparative manufacturing data of recent years (South African factories)

Table E: Average manufacturing results by monthly periods for South African factories (Season 2015/16)

Table F: Cane varieties and rainfall (Season 2015/16)

Table G: Transport summary – South African factories (Season 2015/16)

Table H: Comparative data of reporting South African factories from 1925 onward.

TABLE A2 (continued)
CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES
SWAZILAND, MALAWI , ZIMBABWE ,ZAMBIA ,TANZANIA AND MOZAMBIQUE FACTORIES (SEASON 2015 - 2016)

SYMBOLS OF FACTORIES	TR-A *	TR-B	TR-AVE	NK-A	NK-B	NK-AVE	MW *	RU *	MA *	MB *	XN *
TONS SUGAR MADE AND ESTIMATED	-	-	207688	-	-	380433	52069	69635	67792	63850	168748
Refined % total sugar	-	-	0.00	-	-	11.64	0.00	0.00	0.00	0.00	0.00
Moisture % all sugar	-	-	-	-	-	0.09	0.10	0.09	0.11	0.12	0.11
Pol % all sugar	-	-	99.54	-	-	99.43	99.20	99.26	99.22	98.97	99.13
Tons cane crushed total			1687704			3101726	466429	667813	608109	545885	1446988
Tons cane crushed per tandem	1156260	531444		1650142	1451585						
Season started on	-	-	28-Apr-15	-	-	9-Apr-15	26-May-15	8-Jun-15	14-May-15	19-May-15	15-Apr-15
Season completed on	-	-	30-Nov-15	-	-	27-Dec-15	16-Jan-16	25-Feb-16	15-Oct-15	25-Nov-15	27-Nov-15
Length of season (days)	-	-	216	-	-	262	235	262	154	190	226
TIME ACCOUNT											
Overall time efficiency %	86.57	64.94	75.78	84.94	86.54	85.72	82.67	75.04	71.12	77.45	76.56
Scheduled stops% gross available time	4.84	7.55	6.19	3.36	3.93	3.64	2.87	2.91	3.00	3.59	5.77
Lack of cane % gross available time	1.25	17.86	9.54	2.86	2.89	2.88	8.83	12.64	7.76	8.37	8.37
Other stops % gross available time	7.34	9.64	8.49	8.84	6.62	7.76	5.58	9.02	16.11	9.83	8.49
Foreign matter % gross available time	0.00	0.01	0.00	0.01	0.02	0.01	0.05	0.39	2.01	0.76	0.81
Lost time % available crush.time	7.81	12.93	10.07	9.42	7.11	8.30	6.32	10.73	18.47	11.26	9.98
Force majeure stops (hours)	0	0	0	2	6	4	0	23	7	33	8
THROUGHPUTS PER CRUSHING HOUR #											
Tons cane	251.82	154.99	367.56	352.96	320.36	663.45	98.17	144.30	236.61	156.34	400.54
Tons fibre in bagasse	35.73	21.62	51.88	49.18	41.70	89.60	13.93	18.58	30.05	22.03	56.36
Tons brix in mixed juice	41.92	25.03	60.62	56.58	51.35	106.35	14.48	20.45	35.28	24.27	61.50
Tons pol in mixed juice	36.33	21.67	52.51	48.73	44.30	91.66	12.26	17.41	30.70	20.89	52.53
Tons non-pol. in mixed juice	5.60	3.36	8.11	7.85	7.05	14.69	2.23	3.04	4.58	3.39	8.97
Tons of sugar produced	-	-	45.23	-	-	81.37	10.96	15.05	26.38	18.29	46.71
COMPOSITION OF CANE CRUSHED											
Pol % cane	14.80	14.49	14.70	14.38	14.33	14.36	13.13	12.74	13.59	13.83	13.45
Fibre % cane	14.51	14.31	14.45	13.87	13.84	13.85	16.08	15.61	13.48	15.21	14.07
Brix % cane	17.46	17.20	17.38	17.00	16.88	16.95	15.87	15.28	16.01	17.68	16.09
Ash % cane	0.69	0.69	0.69	-	-	-	2.77	2.84	1.69	1.78	1.32
ERC % cane	12.40	12.08	12.30	12.04	12.03	12.03	10.69	10.44	11.40	10.74	11.12
ERC % pol in cane	83.77	83.35	83.64	83.70	83.92	83.81	81.40	81.97	83.87	77.64	82.67
EXTRACTION											
Extraction (pol based)	97.49	96.51	97.19	95.99	96.50	96.23	95.11	94.74	95.47	96.57	97.51
Corrected reduced extraction	97.01	95.80	96.63	95.17	95.49	95.32	94.67	93.75	94.19	96.07	97.15
Imbibition % fibre	382	340	369	300	312	305	213	309	267	253	370
Diffusion Rate Index	-	-	-	-	-	-	-	-	-	-	-
Preparation index	91	92	91	89	90	89	84	82	89	91	91
Pol factor	101.77	100.04	101.23	99.04	98.80	98.93	98.66	94.46	98.17	99.26	99.22
Brix factor	103.40	102.15	103.01	100.09	99.50	99.82	100.03	95.42	100.06	109.35	100.37
RECOVERIES											
Boiling house recovery (pol based)	-	-	85.74	-	-	88.27	88.70	85.77	85.25	86.64	88.14
Overall recovery (pol based)	-	-	83.33	-	-	84.94	84.37	81.26	81.40	83.67	85.94
Ton cane per ton sugar	-	-	8.13	-	-	8.15	8.96	9.59	8.97	8.55	8.57
Ton cane per ton 96^0 pol sugar	-	-	7.84	-	-	7.87	8.67	9.28	8.68	8.29	8.30
BALANCES											
Pol lost % pol in cane											
- lost in bagasse	-	-	2.81	-	-	3.77	4.89	5.26	4.53	3.43	2.49
- lost in filter cake	-	-	0.31	-	-	0.24	0.36	0.53	0.53	0.32	-
- lost in final molasses	-	-	7.52	-	-	8.38	8.53	9.77	7.47	10.11	8.60
- undetermined losses	-	-	6.03	-	-	2.67	1.85	3.17	6.08	2.47	2.96
Non pol ratio	-	-	1.04	-	-	1.03	0.92	1.02	1.05	1.01	1.14

*** Cane diffuser**

 # 2015/16 season's throughputs, for factories with double tandems, were calculated using concurrent crushing hours.

TABLE B1
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2015 - 2016)

SYMBOLS OF FACTORIES	ML *	KM-A *	KM-B *	KM-AVE	PG *	UF *	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *	MS-AVE
FINAL BAGASSE														
Pol % bagasse	1.29	1.36	1.42	1.39	2.05	1.61	0.62	0.62	0.62	0.95	-	-	0.93	0.93
Moisture % bagasse	53.15	47.10	47.86	47.48	51.72	51.81	51.16	51.12	51.14	50.52	-	-	52.19	52.19
Fibre % bagasse	44.65	50.64	49.79	50.21	44.95	45.57	47.25	47.22	47.24	47.69	-	-	46.00	46.00
Ash % bagasse	2.72	-	-	2.84	2.91	-	-	-	-	5.54	-	-	-	-
LCV (kJ per kg bagasse) #	6692	-	-	7840	6918	-	-	-	-	6735	-	-	-	-
MIXED JUICE														
Mixed juice(adj.) % cane	118.23	112.93	114.75	113.84	113.42	111.19	124.41	129.44	126.53	132.74	-	-	127.69	127.69
Brix % mixed juice(adj.)	13.92	13.79	13.72	13.76	13.70	13.70	12.32	11.87	12.13	10.87	-	-	11.53	11.53
Sucrose purity (MJ adj.)	86.21	86.37	86.39	86.38	85.67	85.16	83.91	83.80	83.86	81.54	-	-	83.60	83.60
Apparent purity(MJ adj.)	85.15	85.45	85.46	85.40	84.61	84.19	83.27	83.22	83.07	80.88	-	-	82.93	82.29
Purity difference(MJ adj. - DAC)	-0.27	-0.15	-0.22	-0.18	0.36	-1.02	-0.22	-0.19	-0.21	-0.66	-	-	-0.02	-0.02
(Glucose + fructose) % sucrose(MJ unad	5.37	-	-	5.04	5.16	5.35	-	-	5.32	5.86	-	-	-	5.07
Suspended solids % MJ(unadj.)	0.10	0.34	0.35	0.34	0.09	0.20	0.39	0.39	0.39	0.08	-	-	0.14	0.14
Pol/sucrose ratio (MJ unadj.)	0.9891	0.9894	0.9892	0.9893	0.9900	0.9894	0.9924	0.9931	0.9927	0.9948	-	-	0.9919	0.9919
CLARIFIED JUICE														
Brix % clarified juice	14.49	-	-	13.59	14.21	13.30	-	-	12.89	11.60	-	-	-	11.56
Apparent purity (%)	85.64	-	-	85.35	84.67	83.70	-	-	81.75	79.67	-	-	-	81.02
Purity difference(CJ - MJ)	0.49	-	-	-0.05	0.05	-0.49	-	-	-1.32	-1.21	-	-	-	-1.27
Average pH	7.1	-	-	7.0	7.0	7.0	-	-	7.2	7.0	-	-	-	7.1
CLARIFIER MUD														
Tons clarifier mud	91875	47575	52807	100382	36599	-	92730	72505	165235	41993	-	-	91863	91863
Pol % clarifier mud	12.69	11.46	11.56	11.51	13.27	-	11.25	11.27	11.26	10.09	-	-	9.89	9.89
Brix % clarifier mud	14.99	13.75	13.80	13.78	16.23	-	14.07	14.05	14.06	13.01	-	-	12.54	12.54
Insoluble solids % clarifier mud	2.21	8.83	8.82	8.83	3.64	-	5.25	5.04	5.16	1.69	-	-	1.87	1.87
FILTER CAKE														
Pol % filter cake	-	-	-	-	-	1.86	-	-	-	-	-	-	-	-
Moisture % filter cake	-	-	-	-	-	70.00	-	-	-	-	-	-	-	-
Filter cake % cane	-	-	-	-	-	1.36	-	-	-	-	-	-	-	-
Filter wash index	96.1	-	-	101.3	96.5	103.0	-	-	94.1	93.7	-	-	-	99.7
Purity difference(CJ - filtrate)	-	-	-	-	-	4.64	-	-	-	-	-	-	-	-
SYRUP														
Brix % syrup	68.28	-	-	66.04	65.26	55.03	-	-	64.40	65.88	-	-	-	70.48
Apparent purity (%)	84.36	-	-	85.08	84.12	83.48	-	-	81.53	80.07	-	-	-	82.12
Purity difference(Syrup - MJ)	-0.79	-	-	-0.32	-0.49	-0.71	-	-	-1.54	-0.81	-	-	-	-0.17
Average pH	6.3	-	-	5.9	5.9	6.2	-	-	6.0	6.1	-	-	-	6.1
FINAL MOLASSES														
Refractometer brix	84.57	-	-	86.87	83.90	82.43	-	-	85.31	84.40	-	-	-	86.78
Pol/refractometer brix purity (%)	36.94	-	-	33.25	36.89	36.42	-	-	34.99	40.73	-	-	-	37.00
Sucrose/refractometer brix purity (%)	39.94	-	-	37.72	39.72	40.01	-	-	37.44	40.50	-	-	-	37.65
Conductivity ash %	12.08	-	-	16.62	13.03	13.88	-	-	14.48	13.99	-	-	-	14.90
(Glucose + fructose)/ash ratio	1.35	-	-	0.82	1.03	0.88	-	-	0.85	0.73	-	-	-	0.67
Fructose %	8.94	-	-	8.23	7.81	7.47	-	-	7.27	6.13	-	-	-	6.10
Glucose %	7.38	-	-	5.48	5.57	4.79	-	-	4.99	4.11	-	-	-	3.83
TPD based on molasses (made)	9.3	-	-	4.3	8.2	6.7	-	-	4.6	5.8	-	-	-	3.0
TPD based on mixed juice	8.9	-	-	5.4	8.4	7.4	-	-	5.2	6.7	-	-	-	4.2
Final molasses @ 85^0 brix % cane	4.98	-	-	3.90	4.65	4.54	-	-	5.17	5.29	-	-	-	5.16
Pol/sucrose ratio	0.9248	-	-	0.8815	0.9288	0.9103	-	-	0.9345	1.0058	-	-	-	0.9826

*** Cane diffuser**

 # Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.60 ash % bagasse

TABLE B1 (continued)
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2015 - 2016)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
FINAL BAGASSE											
Pol % bagasse	0.92	1.49	1.39	1.34	1.56	1.24	0.93	0.94	0.93	-	1.23
Moisture % bagasse	51.43	50.83	50.94	52.65	53.06	51.93	47.71	47.65	47.68	-	50.78
Fibre % bagasse	46.91	46.48	46.56	45.00	44.37	46.23	50.70	50.73	50.72	-	47.06
Ash % bagasse	-	-	2.11	4.30	3.63	5.29	-	-	3.74	-	2.60
LCV (kJ per kg bagasse) #	-	-	7253	6503	6532	6486	-	-	7656	-	7099
MIXED JUICE											
Mixed juice(adj.) % cane	136.72	117.49	120.86	112.05	110.06	122.67	115.57	115.57	115.57	-	118.02
Brix % mixed juice(adj.)	10.51	12.14	11.81	13.74	13.48	12.34	12.76	12.91	12.84	-	12.95
Sucrose purity (MJ adj.)	84.46	85.02	84.92	85.87	85.55	84.90	85.05	84.81	84.92	-	85.15
Apparent purity(MJ adj.)	83.86	84.10	83.83	84.90	84.56	83.91	84.36	84.24	84.07	-	84.18
Purity difference(MJ adj. - DAC)	0.12	0.62	0.53	0.08	-0.16	-0.46	-0.20	-0.43	-0.32	-	-0.20
(Glucose + fructose) % sucrose(MJ unadj	-	-	4.96	5.32	5.08	5.35	-	-	5.12	-	5.23
Suspended solids % MJ(unadj.)	0.18	0.86	0.72	0.73	0.11	0.11	0.25	0.31	0.28	-	0.28
Pol/sucrose ratio (MJ unadj.)	0.9928	0.9891	0.9898	0.9901	0.9895	0.9891	0.9919	0.9932	0.9926	-	0.9906
CLARIFIED JUICE											
Brix % clarified juice	-	-	11.87	13.79	13.82	12.51	-	-	12.71	-	13.18
Apparent purity (%)	-	-	84.49	85.20	84.53	83.75	-	-	83.61	-	84.11
Purity difference(CJ - MJ)	-	-	0.66	0.30	-0.03	-0.16	-	-	-0.46	-	-0.28
Average pH	-	-	7.6	7.0	7.0	7.2	-	-	7.0	-	7.1
CLARIFIER MUD											
Tons clarifier mud	-	-	-	-	-	-	-	-	-	-	527949
Pol % clarifier mud	-	-	-	-	-	-	-	-	-	-	11.37
Brix % clarifier mud	-	-	-	-	-	-	-	-	-	-	13.97
Insoluble solids % clarifier mud	-	-	-	-	-	-	-	-	-	-	4.39
FILTER CAKE											
Pol % filter cake	-	-	1.59	3.87	3.45	2.57	-	-	1.75	-	2.69
Moisture % filter cake	-	-	70.00	75.00	71.87	73.56	-	-	54.91	-	69.96
Filter cake % cane	-	-	4.18	5.92	1.01	1.10	-	-	1.20	-	1.07
Filter wash index	-	-	99.5	99.6	97.5	98.6	-	-	101.0	-	98.3
Purity difference(CJ - filtrate)	-	-	1.59	1.10	5.54	1.44	-	-	0.83	-	2.10
SYRUP											
Brix % syrup	-	-	65.28	70.24	64.52	65.83	-	-	66.53	-	65.81
Apparent purity (%)	-	-	84.59	85.02	84.88	83.90	-	-	83.85	-	83.69
Purity difference(Syrup - MJ)	-	-	0.77	0.12	0.32	-0.01	-	-	-0.22	-	-0.48
Average pH	-	-	6.2	6.0	6.2	6.2	-	-	5.9	-	6.1
FINAL MOLASSES											
Refractometer brix	-	-	82.48	78.81	81.35	82.42	-	-	80.54	-	83.41
Pol/refractometer brix purity (%)	-	-	38.02	37.54	35.62	35.84	-	-	37.97	-	36.56
Sucrose/refractometer brix purity (%)	-	-	39.43	40.78	38.58	39.28	-	-	39.93	-	39.19
Conductivity ash %	-	-	14.24	11.33	12.93	12.91	-	-	12.63	-	13.59
(Glucose + fructose)/ash ratio	-	-	0.67	1.15	0.67	0.85	-	-	0.88	-	0.91
Fructose %	-	-	6.14	7.65	6.14	7.06	-	-	6.78	-	7.35
Glucose %	-	-	3.47	5.35	2.58	3.93	-	-	4.39	-	4.95
TPD based on molasses (made)	-	-	4.7	8.9	5.6	6.5	-	-	7.6	-	6.5
TPD based on mixed juice	-	-	6.5	9.2	8.6	8.2	-	-	8.7	-	7.3
Final molasses @ 85^0 brix % cane	-	-	4.48	5.00	4.14	4.68	-	-	4.78	-	4.70
Pol/sucrose ratio	-	-	0.9642	0.9205	0.9233	0.9124	-	-	0.9510	-	0.9328

*** Cane diffuser**

 # Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.60 ash % bagasse