

SIXTY-SECOND ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (1986–1987)

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Abstract

Performance data for South Africa, Swaziland, Zimbabwe and Malawi are listed and commented upon. Unfavourable weather during the growing season of the cane harvested in 1986 and on-going eldana infestation has adversely affected the South African cane crop. The season was very good in the other countries covered in this review where the sugar production was:

Swaziland 506 349 tons
Zimbabwe 484 713 tons
Malawi 155 806 tons

The trend towards replacement of NCo 376 by N14 in the northern irrigated areas and in Swaziland has continued while that of N12 has progressed more slowly. There has been an improvement in sucrose % cane (12,80) and mixed juice purity (85,44) when compared with average figures for the preceding decade but cane quality remained the major factor limiting better overall recovery. Figures are quoted for UF to illustrate the effect of an improvement in cane quality on factory performance. There was a notable improvement in industrial average time efficiency (81,74) and the average mill extraction (97,66) was a record for South Africa. The season average extraction reported by Illovo (IL) (98,25) is a record for South Africa. The average boiling house recovery (87,70) of South African mills was relatively low but very high values were reported by some factories in Swaziland and Zimbabwe. The quality of the sugar produced in South Africa was excellent and exceeded the specifications set by the industry. The industries based on by-products and other industries associated with sugar mills are listed and various modifications to the process or equipment used for sugar production are commented upon.

Introduction

Weights of cane crushed and sugar produced by South African mills have been deleted from the tables in this review at the request of the industry.

In Zimbabwe and in Malawi part of the cane is converted into ethanol at Triangle (TR) and Dwanga (DW) respectively, and the boiling house figures of these two factories have therefore not been reported. A relatively small amount of high test molasses has been produced by Mount Edgcombe (ME) and Darnall (DL) and converted into equivalent sugar for the calculation of boiling house data.

All data listed in the tables are as reported by the mills except for the cane varieties and cane transport figures which were supplied by the Sugar Industry Central Board. The recovery and performance parameters have been calculated using "made and estimated" sugar weights reported by the mills to take into account massecuite kept in stock between seasons.

Comparison of some of the performance data of South African mills with those of Malawi, Swaziland and Zimbabwe mills is affected by the fact that in South Africa the main input and output streams are sucrose based, while in the neighbouring countries they are pol based. Sucrose in

mixed juice and in final molasses is calculated for all South African mills by dividing the pol data by a pol-to-sucrose ratio which is determined at weekly intervals on composite samples from each mill.

Weather and Crop Conditions*

The summer of 1984/85 was generally very dry and cane growing during this period was subjected to periodic stress except on the lower South Coast where rainfall was adequate. Rainfall during the 1985/86 summer was little better and estimates for the 1986/87 crop in the rain fed areas were reduced accordingly. There was sufficient water in the northern irrigated areas to keep the local crops growing well until the spring of 1986 when irrigation had to be curtailed, and the crop became stressed particularly at Pongola.

Eldana levels remained reasonably low during the 1984/85 growing season but infestations spread and intensified after December 1985. Carry-over cane in Zululand was severely infested, resulting in very poor quality cane being crushed at the beginning of the 1986/87 season. Eldana infestations intensified during the remainder of the milling season and growers made particular efforts during this period to harvest as much as possible from the infested area in the coastal belt.

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Cane Varieties*

The trends established in 1985 in the variety pattern have been confirmed in the past season. N14 continued to replace NCo 376 in the northern irrigated areas, and accounted for 62,7 and 45,5 % of the crush at Malelane (ML) and Pongola (PG) respectively. This compares with 46,4 and 34 % for the 1985/86 season, and shows that the adoption of N14 was more rapid in the Eastern Transvaal than in the PG area. The increase in N14 was not entirely at the expense of NCo 376, as was the case in previous years, and both N52/219 and J59/3, which were not widely grown, have shown a reduction of 2 % in tonnage crushed at ML.

The Swaziland growers continued to expand their areas of N14, albeit at a slower rate than their South African counterparts. A reason given for this caution is that N14 has been found to be less tolerant of unfavourable conditions than NCo 376. During the 1986 season N14 accounted for 27,9 %, 26,3 % and 21,9 % of the cane supplied to Mhlume (MH), Ubombo Ranches (UR) and Simunye (SM) respectively.

In the other areas of the industry N12 continued to gain in popularity at a slow rate, and accounted for 2,8 % of the cane crushed in South Africa. However, in certain areas this figure was considerably higher, notably at Noodsberg (NB) where 11,3 % of the cane crushed was N12. Other mills which crushed over 5 % N12 were Umfolosi (UF), Union-Co-operative (UC) and Illovo (IL).

The UF area continued to reduce the proportion of the smut prone NCo 310 at a fast rate and this variety accounted for 10 % of the cane milled. Five years ago NCo 310 was the

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major variety at UF comprising 66,6 % of the cane crushed during the 1980/81 season. Whilst much of the area previously devoted to NCo 310 has been planted to NCo 376, both N14 and N12 are widely grown in the UF area.

Cane Quality

Sucrose % cane (12,80) was lower than for the preceding season (13,13) but nevertheless higher than the average for the preceding decade (12,66). The low sucrose was however compensated by a good mixed juice purity (85,44) which was also significantly higher than the 1975–1984 average of 84,98, and had a favourable influence on overall recovery.

Fibre % cane (15,24) continued its downward trend and was the lowest value recorded since 1978. It is probably due to better topping of the cane to reduce transport cost which has been observed at a number of mills. The incidence of new low fibre varieties (N12 and N14), and the lower age of the cane because of eldana are other contributory factors.

Cane quality is generally recognised as the single most important factor which influences factory efficiency under present conditions in South Africa and yet, surprisingly it is a subject on which there is a minimum of reliable data apart from that discussed in the preceding two paragraphs. The industry has developed a complicated and expensive procedure to analyse for sucrose, monosaccharides and ash in mixed juice and molasses but has done very little towards systematic analysis of cane consignments for trash, tops and sand content. A notable exception has been the Tongaat-Hulett Group which has been analysing cane delivered at three of its mills for extraneous matter over a number of seasons (Table 1).

Table 1

Extraneous matter in cane				
	AK*	DL	ME	Average
Tops %	2,5	2,5	3,3	2,6
Trash %	3,8	6,2	2,8	4,4
Tops + trash %	6,3	8,7	6,1	7,0

* AK results are biased because of selective sampling of poor consignments.

Comments received from the mills indicate that cane quality was generally poor except at UC, NB, IL, AK, PG and UF. At this last mill a determined effort has been made to improve cane quality by better communication with the cane growers and by modifying the mill's cane payment formula to include fibre % cane in the recoverable sugar calculation. Comparative results of the 1985/86 and 1986/87 season are listed in Table 2. According to the UF mill management, the spectacular improvement in performance during the 1986 season is attributable mainly to cane quality.

Table 2

Cane analysis and factory performance data - UF			
	Season		Difference
	1986/87	1985/86	
Suc. % cane	12,93	12,25	0,68
Fibre % cane	13,10	15,52	-2,42
Mixed juice purity	87,10	85,06	2,04
Ash % cane	1,49	2,40	-0,91
Extraction	97,23	96,93	0,30
Boiling house recovery	88,51	86,70	1,81
Overall recovery	86,06	84,04	2,02
Cane to sugar ratio	9,0	9,7	-0,7

The effect on overall recovery is shown graphically in Figure 1 in which the performance of UF is compared with the industrial average for the past 10 seasons.

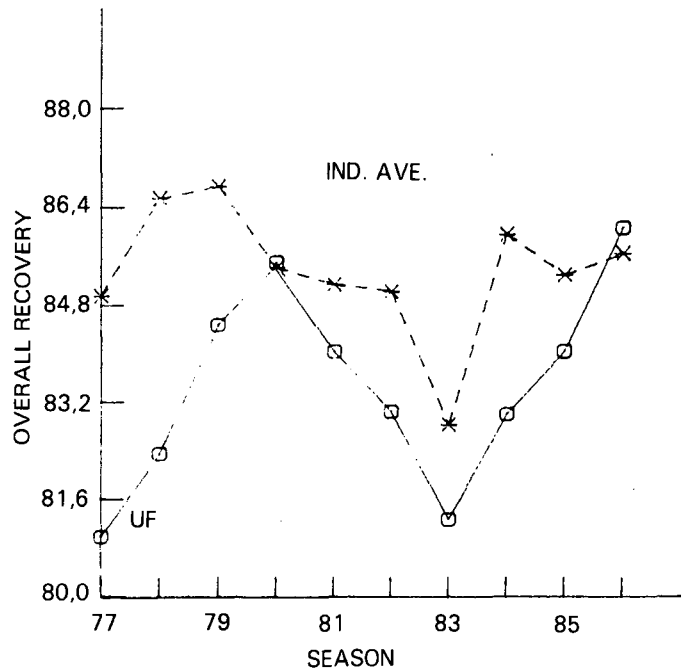


FIGURE 1 Overall recovery UF and Ind. Average 1977 to 1985.

The burn-to-cut-to-crush delay is also a cause for concern because of its effect on juice purity. Limited attempts have been made to record this delay by tagging consignments, but the results have not always been reliable when the cane is off-loaded at transfer zones. The SMRI has related delay to ethanol concentration in cane juice, but the precision of this method for estimating delay has been disappointingly low (about 40 hours). Work done at six mills during the season has shown that the average delay, which had been estimated by the mills at three days, was in fact four and a half days. The systematic measurement of cane staleness by all mills and the publication of comparative data would stimulate the milling of fresher cane which could potentially be of more benefit to the industry than major expenditure in the mills.

The mixed juice monthly purity curve for the season has been plotted in Figure 2 where it is compared with the 1985/86 season curve and with the AK curve. In 1985, there was a normal increase in purity until July, when the peak mixed juice purity was reached and this was followed by a steep decline. In 1986, the industrial average purity kept at about the same level from July to October and only dropped slightly in November and December. The AK curve is typical of a number of mills both on the north coast and on the south coast.

Cane Transport*

The drastic transportation changes seen last year did not continue into 1986/87. This year was clearly one of consolidation, with the overall contribution of various modes of transport virtually identical to those of 1985/86. Only deliveries by trams showed a slight increase due to the re-establishment of the tram line at Umfolozi.

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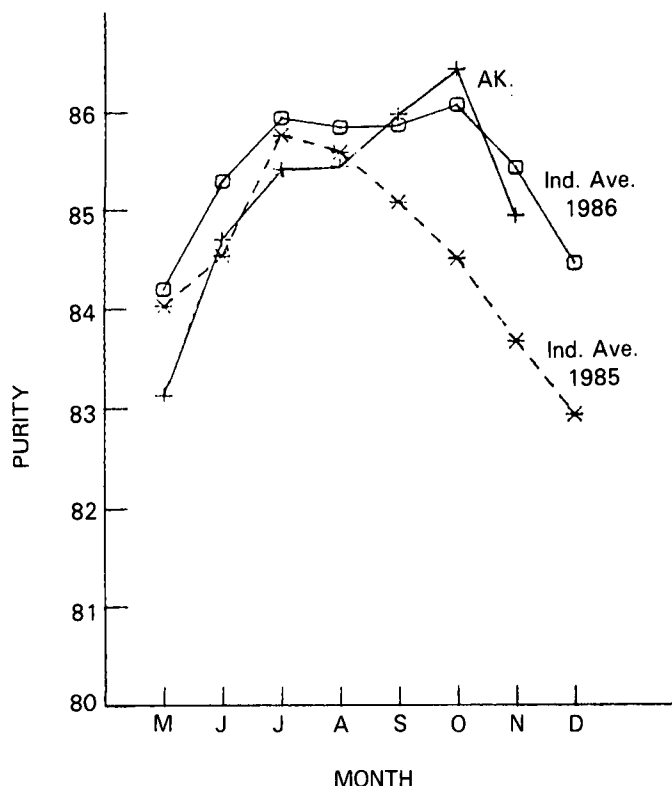


FIGURE 2 Monthly values of mixed juice purity.

Deliveries by S.A. Transport Services almost disappeared from Felixton (FX) and rail transport is now a significant factor only at ML (6,4%), UF (37,3%) and ME (17%), totalling 3,5% for the industry as a whole.

Small shifts in transport mode occurred at individual mills. For example, an increase in deliveries by tractors was experienced at PG, AK, MS, GH and NB as opposed to increased lorry deliveries at EN and hilo deliveries at FX, DL and UK.

This is the first time that the "Articulated Truck Driven Vehicles" mode has been subdivided into different classes and it is interesting to note that interlink type vehicles transported 23,32% of the total cane in the industry. This mode of transport made a major impact at FX (47,8%), AK (40,4%), DL (31,7%), ME (42,4%), MS (41,7%), IL (96,6%) and UK (41,9%). The most popular single mode of transport is still the standard hilo truck consisting of mechanical horse and single semi trailer (averaging 20 ton payloads), which delivered 39,1% of all the cane in the industry.

Cane spillage from trucks onto public roads became a serious issue during the year. Co-operation between hauliers, growers, and loading zone operators and proper zone management will be required to overcome this problem. Cane spillage was exacerbated by the quest for maximum payload and to some extent by loose cane loading.

Mill Performance

Length of Season, Time Efficiency, Throughput

The 1986/87 season in South Africa started at UC on 7 April 1986 and ended at ML on 18 January 1987. The overall length of the season was 286 days and the average number of crushing days 229. The corresponding figures for Swaziland, Zimbabwe and Malawi were 220, 250 and 202 crushing days respectively.

The industrial average time efficiency (81,74) broke the record set the previous season (79,60) with only five mills reporting time efficiencies of less than 80 and GH a high value of 92,73. Once again the average time efficiency for Swaziland (89,37) was far better than the South African average, and HV in Zimbabwe reported the highest value of all mills covered in this review with 94,59. A time account for HV, GH and South African and Swazi averages is given in Table 3.

Table 3

Time account

	HV	GH	Average Swaziland	Average South Africa
Overall time efficiency %	94,59	92,73	89,37	81,74
Scheduled stops % gross avail. time	3,03	5,37	4,95	7,83
Lack of cane stop % gross avail. time	0,02	0,04	0,84	4,85
Other stops % gross avail. time	2,36	1,86	4,83	5,58
Lost time % avail. crush. time	2,43	1,96	5,10	6,39

The main advantages of the Swaziland mills over their South African counterparts lie in their lower scheduled stops (4,95) and especially their lower lack of cane stops (0,84). It is sometimes difficult to differentiate between these two types of stops and a typical example is provided by FX where scheduled stops (15,24) were deliberately increased because of a poor crop to enable the factory to crush at a higher hourly tonnage in order to be more fuel efficient. Both HV and GH reported very low values for lack of cane stops and for other stops with GH leading for lost time % available crushing time (1,96) which is the best measure we have of the mechanical efficiency of a factory.

HV produced 274 042 tons of sugar and broke the record set by SZ in 1984 for the highest sugar production by any one mill in Southern Africa.

Extraction

The average extraction for the season was a record 97,66 and the individual plants can be grouped into four categories according to their performance:

- 96,0 to 96,5 : MH(B), NH(A), TR(B)
- 96,5 to 97,0 : EN, MS(B), GD, DW
- 97,0 to 97,5 : PG, UF, ME, SZ(A), SZ(B), UK, UR(B)
- 97,5 to 98,0 : ML, FX(B), DL, MS(A), NB, UC, MH(A), SM, HV(A), HV(B), TR(A)
- 98,0 to 98,5 : FX(A), AK, GH(A), GH(B), IL, UR(A)

The progress made in extraction can be better appreciated by referring to Table J. Average extraction was only 95,00 for the decade 1965 to 1974. It increased to 96,57 for the period 1975 to 1984 and has been higher than 97 for every season since 1981.

The best extraction (98,25) was reported by IL. It was only marginally better than the record set by DL in 1981/82 (98,24). Except for GH(B) all the extraction plants listed in the 98,0 to 98,5 category above are cane diffusers, and a comparison of their main features is listed in Table 4, which indicates that a higher imbibition rate is required for the diffusers with a lower screen area per tch (IL, AK and UR(A)) and that in all cases a good cane preparation (90-92 P.I.) is a prerequisite for an exceptional extraction. The wide vari-

ations in screen area per tch and in power required for cane preparation indicate that there is still room for optimisation in the design of extraction equipment, although it must be pointed out that these parameters have been calculated on the basis of installed capacity and that some of these units were working at below rated throughput.

Table 4
Cane diffusers reporting over 98 extraction

	IL	AK	UR(A)	GH(A)	FX(A)
Diff. screen area m ² tch	1,89	1,91	1,43	2,21	3,13
Cane preparation kW/tch	115	99	86	199	124
Preparation index	91	92	91	90	90
Pol % bagasse	0,78	0,71	0,87	0,70	0,72
Moisture % bagasse	48,94	52,38	50,17	50,42	52,35
Imbibition % fibre	427	411	420	372	345
Extraction	98,25	98,18	98,10	98,05	98,00

The high extraction was favoured by a relatively low fibre loading at most mills but cannot be credited only to the lower fibre in cane. The pol % fibre in bagasse value of 2,03 listed in Table J was the lowest ever recorded in South Africa. The increase in extraction could be partly attributed to the steady increase in imbibition % fibre recorded for the industry (Table J). Although it is apparently advantageous to increase imbibition to improve profitability, this step should only be taken after considering all costs involved including that of fuel, boilers, evaporators and degradation in the evaporator due to higher residence times.

Moisture % bagasse (51,27) was the lowest value reported since the early 1950's, and it is worth repeating that what we call moisture in bagasse is not water but thin juice, and that a reduction in moisture content has therefore a direct bearing on extraction. The lowest moisture in bagasse (46,0) was reported by PG.

The following points of interest were noted at the mills during the season:

- The use of aluminium bronze juice pump impellers at ME to improve wear resistance
- Improved extraction at SZ when the bed height in the diffuser was increased to 1,5 m
- An improvement in percolation rate in the AK diffuser following the increase in screen hole diameter from 9 to 12 mm
- The use of high density plastic wear strips on the return track of the BMA diffuser chain at GD
- Polypropylene bushes on the swing knives of the cane billeters at FX
- The installation of data loggers on the mills at UK to record various parameters which helped identify irregular feed to the first mill and contributed to an increase in extraction from 96,40 in 1985 to 97,06 in 1986.

Clarification and Evaporation

There have been no new developments in clarification. The figures listed in Table D1 show that flocculant usage has decreased marginally from 4,1 to 4,0 ppm on mixed juice. The mill to mill variation is surprisingly large with a low of 0,8 reported by ML and high values of 7,0 at NB and SZ. Tons lime per 1 000 tons cane has increased from 0,9 in 1985 to 1,2 in 1986, but since lime used for refining and effluent treatment is included, the increase may be due to

other causes than juice defecation. Enzymes for starch destruction have dropped from 12,2 to 9,5, but again wide variations exist between mills. Some of the factories with back end refineries (ML and UF) used no enzymes while DL used as much as 19,1 ppm on sugar for the season. UF still uses the natural enzyme process with mixed juice limed to pH 6 and kept for 10 minutes to destroy starch. SZ reports having substantially reduced its enzyme consumption by dosing enzyme undiluted.

A plate type heat exchanger was installed at GD to heat clear juice and has proved to be very satisfactory. It is the second heat exchanger of this type to be used for clear juice heating in South Africa and the cost advantage over shell and tube heaters is appreciable. GH has altered its liming circuit to introduce saccharate of lime into the eye of a mixed juice centrifugal pump. They report excellent results with very clear juice and good pH control. There are strong indications that the very large heating surfaces required in the first and second effect of evaporators as a result of extensive bleeding of first and second vapours may lead to sucrose destruction because of long retention times at relatively high temperatures. PG used its vapour compressor for a very limited period this season and by-passed one of its first effect vessels. A reduction in sugar destruction and in undetermined losses has been noted. At FX, which has very large first and second effect vessels, high acidity of the condensates, probably as a result of sugar destruction, has led to corrosion of the condensate piping.

Sugar destruction in the evaporators also results in a drop in pH which is easily measured. Unfortunately pH is affected by temperature so that the pH values reported in Tables C₁ and C₂ do not reflect the acidity of the juice at the operating temperature in the evaporators. For example a pH of 6,2 measured on a syrup sample at 20°C in the laboratory is equivalent to a pH of 5,9 at 70°C in the evaporator.

Chemical cleaning of the first two long tube vessels of the FX evaporator which scaled heavily has been carried out during the season. The cost (6,7 cents/tc) has proved to be lower than the figure quoted for UF in 1984.

At IL and UC, water sprays have been fitted under the wire mesh screens of the evaporator entrainment separators and regular cleaning with hot water has considerably reduced the frequency of the cleaning with sodium hydroxide. At UC water is sprayed for five minutes every two hours.

Boiling House

The industrial average boiling house recovery was 87,70 compared with 87,51 for the preceding season. A comparison of historical trends in BHR is distorted by the change over from sucrose to pol based factory control in 1972 and back again to sucrose in 1981. There is no doubt, however, that the overall trend has been downwards in spite of a reduction in final molasses purity from an average of 37,9 for the 1975-1984 decade to 36,7 during the past season. The industrial average boiling house losses for the past five seasons are listed below:

Table 5
Ind. ave. boiling house losses (1982-1986)

	1986/87	1985/86	1984/85	1983/84	1982/83
Sucrose lost in filtercake	0,30	0,30	0,34	0,36	0,33
Sucrose lost in final mol	9,51	9,95	9,40	11,48	9,74
Sucrose lost undetermined	2,20	1,91	1,73	2,35	1,91
Total boiling house losses	12,01	12,16	11,47	14,19	11,98

The only trend which is apparent is a small drop in filter cake losses. Final molasses losses and undetermined losses do not follow any identifiable trend in spite of all efforts put into reducing these losses during the past years.

The Corrected Reduced Boiling House Recovery (C.R.B.) formula which was discussed in the last review has been applied systematically to monthly data during the past season to correct the main factors known to affect boiling house recovery. The season average results are listed in Table 6 in decreasing order of CRB.

Table 6

Corrected reduced boiling house recovery (C.R.B.) South African mills 1986/87 season

Mill	Sucrose mixed juice purity	Actual sucrose boiling house recovery	C.R.B.
UC	87,9	90,8	87,8
UF	87,1	88,5	87,6
SZ	84,7	88,0	87,2
AK	84,9	88,0	87,1
IL	87,4	89,8	86,7
MS	83,5	86,4	86,6
GH	84,4	86,6	86,6
UK	86,7	89,3	86,4
PG	85,7	87,1	86,2
ML	85,6	87,5	86,1
NB	87,1	88,4	86,1
DL	84,0	86,8	86,0
ME	85,5	87,8	85,9
FX	84,7	86,1	85,8
GD	86,7	87,0	84,7
EN	87,4	87,2	84,6

The highest C.R.B. values have been reported by UC (87,8), UF (87,6), SZ (87,2) and AK (87,1) while the industrial average was 86,5. The corresponding actual boiling house recoveries were UC (90,8), UF (88,5), SZ (88,0) and AK (88,0).

Although a comparison of factory performance based on C.R.B. is much more valid than one based on actual boiling house recovery, it should be stressed that the corrections for various factors which are built into the formula are only approximations. They will correct for large differences in mixed juice purity or in molasses target purity difference, but the accuracy of the formula is insufficient to prove, for example, that UC (87,8) was doing better boiling house work than UF (87,6). It is not, however, any more inaccurate than other formulae such as Corrected Reduced Extraction and molasses Target Purity Difference which are widely used for this type of comparison. The C.R.B. formula reflects the advantages of cane diffusion factories because the losses in filter cake are lower for diffusion factories than for milling factories. The real value of this formula is to compare the monthly performances of a given mill.

Factories in neighbouring countries have not been included in the C.R.B. comparison because their control is pol based and the accuracy of the C.R.B. formula would be considerably reduced if calculated from pol data. Nevertheless, the very high actual pol based boiling house recoveries reported by MH (92,80), SM (92,75), HV (92,16) and UR (92,07) are well above the corresponding values achieved by most South African mills, and are excellent by any standard. The undetermined losses of these factories were all very low: MH (0,89), SM (0,96), HV (0,58) and UR (0,39).

Boiling house work was generally been easy during the season, but some mills have reported high viscosities and

slow crystal growth which are attributed to very low mixed juice purities and dirty cane. Under these conditions it may be advantageous to reduce viscosity, at the expense of final molasses purity, by boiling higher purity C-masseccutes and by curing to a relatively high C-sugar purity to get rid of more impurities in final molasses. It is interesting to note that the factory with the highest boiling house recovery (UC) kept down the viscosity in its C-station by:

- (a) Boiling C-masseccute to an average brix of 96,8
- (b) Curing to obtain a C-sugar purity of 85
- (c) Back blending molasses on C-masseccute
- (d) Cooling C-masseccute to 42°C and not lower and re-heating the masseccute to not more than 56–58°C.

FX reported problems due to scaling of the masseccute side of the tubes in their continuous A-pan during a few days of the season. These conditions coincided with a rainy period during which very poor quality cane was processed. They have been reported before at other mills in batch pans which have had to be boiled with water at varying intervals to dissolve the scale. In the case of continuous pans, discharging the masseccute to boil with water takes several hours and can cause serious production problems, and the conditions which cause this scaling will have to be identified and kept under control in order not to limit the use of continuous pans on A-masseccute.

There has been no spectacular progress in pan instrumentation during the season. GH, and IL report that conductivity control of the A-pans had resulted in a consistent brix of masseccute while MS achieved the same results by means of radio frequency probes. Instrumentation of a pilot pan at the SMRI has shown that a small personal computer to record temperatures, conductivity and stirrer speed was not more expensive than the use of pen-type recorders and provided data logging facilities as a bonus. Experience with this pan which boils syrups from various factories has also shown that boiling point elevation (BPE) was a more reliable control parameter than conductivity, provided that a correction was applied for hydrostatic head, a simple step with a computer.

The first continuous centrifugal screens to be manufactured in South Africa were installed on a centrifugal at MS at the end of the season. They will have to undergo further testing next season, but the availability of a local manufacturer raises interesting possibilities for the development of new types of screens better suited to the small crystals and high viscosity which is typical of South African C-masseccutes.

New vertical C-crystallizers of the Toury type were installed at GD and have operated satisfactorily during the season. The cooling water tubes of these crystallizers have a diameter of only 50 mm.

Refining

There has been an increased demand for refined sugar during the season and the Tongaat-Hulett central refinery in Durban and all back end refineries have been operating at maximum capacity. Record throughputs were reported by the Durban refinery (83 tons/h) and by UF which processed an average of 25 tons of sugar per hour in a refinery designed for 16 tons. In both cases the good performance is attributed to better quality raws. NB back end refinery processed not only its own raws but also 15 000 tons of UC sugar. This refinery has started using one ton tote bags for local distribution of part of its sugar.

During the season pan stirrers were fitted to most of the refinery pans at GH and PG and both report very good results. At GH yield improved from 529 to 658 kg sugar/m³ massecuite after the stirrers were fitted and both colour and conglomerate counts were reduced. GH also reduced caking of its refined sugar by cooling to a lower temperature.

Steam and Power

UC commissioned a new boiler during the season, which was probably the only new major equipment to be installed in the South African sugar industry.

Cane supply has had varying effects on the fuel balance of factories. At FX, which had a very poor crop, coal had to be burnt to replace the bagasse fibre sent to the paper mill, while at UK the mill generated electricity during week-end stops to reduce the bagasse surplus and maximum demand charges. The burning of coal at FX caused problems in the flue gas scrubber. The acidity of the scrubber water when burning coal was neutralised by addition of milk of lime which reacted with the sulphur in solution to form calcium sulphate. The precipitation of sulphate on the sieve plates clogged the scrubber.

Close attention to water side boiler cleanliness during the past few years has led to the use of modern crystal habit modifying polymers in conjunction with the residual phosphate programmes previously used, and boiler cleaning frequency has been reduced from once every two to three years to at least seven years. The use of chelant/polymer programmes at DL and UC has also resulted in very clean boilers. Current cost of chemical treatment is reported to be of the order of 2 to 3 cents per ton steam.

Vapour compressors at NB and SZ suffered from major mechanical problems during the season, and it has become obvious that this equipment requires a high level of maintenance and sophisticated controls for reliable operation.

Sugar Quality

The average pol of all raw sugars produced by South African mills was 99,32. In the neighbouring countries, the average pol was 99,1 for Zimbabwe and 99,3 for Malawi. The Swaziland sugar factories produced a lower pol sugar which averaged 98,7.

The average moisture of VHP sugars supplied to the terminal was the same as for the previous season (0,09). Ash content averaged 0,24, starch 120 ppm, gums 725 ppm and ICUMSA colour 1281. All these values were slightly higher than for the previous season but still within the specifications set by the industry. Fines remained at the same level as for the previous seasons (23 %).

By-Products

By-products and associated industries

The availability of relatively low priced B-pool cane and sugar has given new stimulus to the investigation of other cane or sugar-based industries and it may be appropriate to survey the state of the by-product industry in 1986.

Fermentation industries based on final molasses are active in the major industrial areas, but this survey will be limited to industries physically located next to sugar mills.

- ML supplies fibre to a particle board factory and produces a molasses based cattle feed.
- FX supplies fibre to a paper mill.
- EN operates a cattle feed plant which uses both molasses and bagasse.
- GH supplies fibre to an adjacent paper mill.
- MS also produces cattle feed from molasses and bagasse.
- IL markets edible syrups made from raw sugar.
- Tongaat-Hulett refinery also produced edible syrups.
- High Test molasses is produced at DL and ME.
- SZ has an important chemical industry based on the production of furfural from bagasse.
- Finally at UC wattle extract and glues are produced from wattle bark in a plant which is attached to the sugar factory and which shares some of the facilities and personnel.

In the neighbouring sugar industries, the production of ethanol, mainly from B-molasses, is carried out at DW in Malawi and at TR in Zimbabwe. This latter also has a cattle feed plant.

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TABLE B₁
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION,
SOUTH AFRICAN MILLS

SYMBOLS OF FACTORIES	ML *	PG **	UF	EN **	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *
TONS SUGAR MADE AND ESTIMATED	-	-	-	-	-	-	-	-	-	-	-
Refined % total sugar	-	-	-	-	-	-	-	-	-	-	-
Moisture raw sugar	-	-	0.45	0.25	-	-	0.09	0.11	0.10	-	-
Pol raw sugar	98.02	-	98.41	99.05	-	-	99.42	99.43	99.46	-	-
Tons cane crushed total	-	-	-	-	-	-	-	-	-	-	-
Tons cane crushed per tandem	-	-	-	-	-	-	-	-	-	-	-
Season started on	23.04.86	28.04.86	6.05.86	3.05.86	-	-	3.05.86	10.04.86	11.04.86	-	-
Season completed on	18.01.87	30.11.86	17.12.86	23.11.86	-	-	30.11.86	24.11.86	19.12.86	-	-
Number of crushing days	270	216	225	204	-	-	211	228	252	-	-
TIME ACCOUNT											
Overall time efficiency %	81.85	80.14	73.88	73.48	78.04	76.18	77.11	84.53	79.75	82.24	83.57
Sched.stops% gross avail.time	7.73	9.31	7.31	8.65	15.20	15.28	15.24	9.76	9.60	6.35	3.90
Lack of cane % gross	4.49	3.96	8.11	3.79	2.08	2.85	2.47	3.07	7.28	4.14	6.61
Other stops % gross	5.93	6.58	10.70	14.07	4.69	5.68	5.19	2.64	3.37	7.27	5.91
Lost time % avail.crush.time	6.75	7.59	12.65	16.07	5.66	6.94	6.30	3.03	4.05	8.12	6.61
THROUGHPUTS / ACTUAL CRUSHING											
Tons of cane crushed	-	-	-	-	-	-	-	-	-	-	-
Tons of fibre milled	-	-	-	-	-	-	-	-	-	-	-
Tons of brix processed	-	-	-	-	-	-	-	-	-	-	-
Tons of sugar produced	-	-	-	-	-	-	-	-	-	-	-
Tons sucrose in mixed Juice	-	-	-	-	-	-	-	-	-	-	-
Tons non-suc. in mixed Juice	-	-	-	-	-	-	-	-	-	-	-
COMPOSITION OF CANE CRUSHED											
Sucrose % cane	13.35	12.98	12.93	13.97	12.97	13.01	12.99	12.78	11.99	11.61	11.81
Pol % cane	13.18	12.81	12.78	13.84	12.85	12.90	12.87	12.60	11.78	11.43	11.58
Fibre % cane	13.91	14.33	13.10	14.47	16.66	16.89	16.77	15.05	16.51	15.80	15.82
Brix % cane	15.80	15.32	15.10	16.26	15.59	15.73	15.66	15.24	14.51	14.14	14.37
Ash % cane	1.35	-	1.49	1.42	2.25	2.26	2.25	0.90	-	-	-
ERC % cane	11.51	11.20	11.26	12.19	11.00	10.97	10.99	10.91	10.09	9.73	9.90
ERC % sucrose in cane	86.22	86.26	87.05	87.21	84.79	84.36	84.57	85.42	84.13	83.80	83.86
EXTRACTION											
Extraction	97.97	97.45	97.23	96.81	98.00	97.93	97.96	98.18	97.67	97.60	96.98
Corrected reduced extraction	97.63	97.10	96.18	96.21	98.16	98.12	98.14	98.14	97.82	97.78	97.08
Imbibition % cane	42.98	52.02	43.05	58.24	57.24	57.72	57.48	61.67	53.13	57.37	58.15
Imbibition % fibre	313	377	374	422	345	343	344	411	341	367	386
Preparation index	92	92	90	90	90	91	90	92	91	91	90
Pol factor	99.01	100.06	99.91	99.79	99.46	100.66	100.05	100.07	99.57	97.95	99.86
Brix factor	99.90	100.74	99.99	100.75	101.53	103.01	102.26	101.29	100.55	99.81	101.79
RECOVERIES											
Boiling house recovery	87.47	87.13	88.51	87.22	-	-	86.06	87.98	86.75	-	-
Overall recovery	85.69	84.91	86.06	84.44	-	-	84.31	86.38	84.74	-	-
Ton cane per ton sugar	8.73	9.07	8.96	8.43	-	-	9.08	9.01	9.79	-	-
Ton cane per ton 96 sugar	8.39	8.71	8.62	8.14	-	-	8.77	8.70	9.45	-	-
BALANCES											
Suc. lost % suc. in cane											
- in bagasse (a)	2.03	2.55	2.77	3.19	-	-	2.04	1.82	2.33	-	-
- in filter cake (b)	0.18	0.36	0.58	0.63	-	-	0.47	0.10	0.42	-	-
- in final molasses (c)	9.12	9.25	9.36	8.89	-	-	10.50	9.73	10.30	-	-
- undetermined (d)	2.98	2.94	1.24	2.85	-	-	2.69	1.98	2.21	-	-
Boiling house losses(b+c+d)	12.28	12.54	11.17	12.37	-	-	13.65	11.80	12.94	-	-
Sum of all losses(a+b+c+d)	14.31	15.09	13.94	15.56	-	-	15.69	13.62	15.26	-	-
Non sucrose ratio	1.03	1.08	0.98	1.04	-	-	1.01	0.97	1.02	-	-
Pol lost % pol in cane											
- in bagasse	2.06	2.58	2.80	3.22	-	-	2.06	1.84	2.37	-	-
- in filter cake	0.18	0.36	0.58	0.64	-	-	0.47	0.10	0.43	-	-
- in final molasses	8.26	8.23	9.07	8.80	-	-	10.11	9.16	9.59	-	-
- undetermined	2.66	2.74	0.47	2.11	-	-	2.29	1.35	1.37	-	-
Fructose ratio FM/MJ	0.88	0.91	0.73	0.80	-	-	0.95	0.93	0.84	-	-
Glucose ratio FM/MJ	0.71	0.62	0.48	0.71	-	-	0.80	0.79	0.66	-	-

* Cane diffuser
 ** Bagasse diffuser

THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES (Season 1986-1987)

MS-AVE	ME	GD **	GH-A *	GH-B	GH-AVE	NB	UC *	IL *	SZ-A *	SZ-B *	SZ-AVE	UK	AVERAGE
-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.12	0.28	0.12	-	-	0.09	0.08	0.09	0.13	-	-	0.10	0.26	0.14
99.40	98.88	99.30	-	-	99.51	99.44	99.48	99.45	-	-	99.41	98.89	99.32
-	-	-	-	-	-	-	-	-	-	-	-	-	-
23.04.86	24.04.86	12.05.86	-	-	25.04.86	17.04.86	7.04.86	15.04.86	-	-	10.04.86	14.04.86	7.04.86
14.12.86	14.12.86	14.12.86	-	-	8.12.86	9.11.86	3.11.86	8.12.86	-	-	20.12.86	10.12.86	18.01.87
235	234	216	-	-	227	206	210	237	-	-	254	240	286
82.86	78.64	82.39	92.92	92.54	92.73	81.83	83.61	84.84	85.62	86.84	86.23	82.57	81.74
5.22	9.72	2.71	4.98	5.76	5.37	6.92	6.63	3.67	5.93	5.98	5.96	11.54	7.83
5.29	8.40	8.81	0.04	0.03	0.04	5.24	5.51	5.74	3.62	2.14	2.88	2.46	4.95
6.64	3.25	6.09	2.05	1.67	1.86	6.01	4.25	5.75	4.83	5.03	4.93	3.42	5.58
7.42	3.97	6.88	2.16	1.77	1.96	6.84	4.84	6.34	5.34	5.48	5.41	3.98	6.39
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.70	12.83	13.42	12.00	11.96	11.97	13.78	14.06	13.64	12.42	12.40	12.41	12.84	12.80
11.50	12.58	13.27	11.84	11.78	11.80	13.57	13.93	13.49	12.27	12.24	12.26	12.69	12.63
15.81	14.57	14.51	16.11	15.66	15.81	14.72	14.18	15.30	16.01	15.84	15.93	15.34	15.24
14.24	15.23	15.73	14.42	14.36	14.38	16.07	16.13	15.77	14.94	14.93	14.94	15.12	15.22
-	1.34	-	-	-	-	1.33	1.41	2.13	1.27	1.29	1.28	1.18	1.47
9.81	11.01	11.64	10.15	10.14	10.14	11.99	12.39	11.92	10.52	10.49	10.51	11.07	10.99
83.83	85.81	86.70	84.64	84.77	84.72	87.00	88.11	87.43	84.71	84.63	84.67	86.19	85.90
97.32	97.40	96.88	98.05	98.08	98.07	97.50	97.74	98.25	97.43	97.43	97.43	97.06	97.66
97.47	97.08	96.49	98.22	98.11	98.15	97.05	97.32	98.16	97.58	97.55	97.57	96.87	97.56
57.72	44.87	43.51	59.52	54.79	56.38	44.90	54.35	64.75	67.69	65.92	66.79	51.51	54.34
375	325	306	372	367	368	328	389	427	425	418	421	356	368
91	90	87	90	90	90	90	91	91	91	91	91	91	91
98.80	99.84	99.91	99.78	99.13	99.35	99.69	101.25	99.82	99.74	100.04	99.89	99.71	99.71
100.69	100.84	100.82	100.09	99.59	99.76	101.29	102.53	100.42	100.74	101.12	100.93	100.45	100.81
86.52	88.33	87.01	-	-	86.61	88.55	90.82	89.75	-	-	88.03	89.30	87.70
84.20	86.04	84.29	-	-	84.94	86.34	88.77	88.18	-	-	85.76	86.68	85.65
10.09	8.96	8.78	-	-	9.82	8.40	7.97	8.27	-	-	9.34	8.89	9.08
9.75	8.70	8.49	-	-	9.44	8.07	7.69	7.98	-	-	9.02	8.63	8.76
2.68	2.60	3.12	-	-	1.93	2.50	2.26	1.75	-	-	2.57	2.94	2.34
0.30	0.26	0.33	-	-	0.23	0.62	0.13	0.13	-	-	0.11	0.41	0.30
11.30	8.46	9.83	-	-	10.60	8.58	7.46	8.03	-	-	9.56	8.04	9.51
1.52	2.65	2.43	-	-	2.30	1.96	1.39	1.91	-	-	1.99	1.94	2.20
13.12	11.37	12.59	-	-	13.13	11.17	8.97	10.07	-	-	11.66	10.38	12.01
15.80	13.96	15.71	-	-	15.06	13.66	11.23	11.82	-	-	14.24	13.32	14.35
0.98	0.97	1.06	-	-	1.00	1.01	1.03	1.03	-	-	1.00	1.01	1.01
2.73	2.65	3.15	-	-	1.96	2.53	2.28	1.77	-	-	2.60	2.97	2.37
0.31	0.27	0.33	-	-	0.24	0.63	0.13	0.13	-	-	0.11	0.41	0.31
10.70	7.99	9.32	-	-	10.15	7.91	6.73	7.61	-	-	8.89	7.59	8.93
0.59	1.39	1.94	-	-	1.51	1.23	1.25	1.37	-	-	1.55	1.33	1.59
0.85	0.77	0.97	-	-	0.85	0.87	0.90	0.87	-	-	0.95	0.86	0.88
0.69	0.68	0.75	-	-	0.68	0.59	0.49	0.67	-	-	0.77	0.68	0.70

TABLE C₁
ANALYSIS OF BAGASSE, JUICES, FILTER
SOUTH AFRICAN MILLS

SYMBOLS OF FACTORIES	HL #	PG **	UF	EN **	FX-A #	FX-B #	FX-AVE	AK #	DL	MS-A #	MS-B #
FINAL BAGASSE											
Pol % bagasse	0.96	1.25	1.44	1.45	0.72	0.73	0.73	0.71	0.84	0.75	1.05
Moisture % bagasse	49.34	46.00	51.02	52.56	52.35	52.37	52.36	52.38	51.37	56.63	53.70
Fibre % bagasse	48.82	51.94	46.30	44.91	45.94	45.88	45.91	46.16	46.88	41.90	44.25
Bagasse % cane	28.17	26.56	24.88	30.75	36.16	36.73	36.44	32.52	33.20	37.30	34.01
Ash % bagasse	3.79	-	2.10	1.97	-	-	4.12	1.78	2.34	-	-
LCV in kJ per kg bagasse	7265	-	7222	6933	-	-	6577	7041	7131	-	-
MIXED JUICE											
Mixed juice % cane	114.81	125.46	118.18	127.49	121.08	120.99	121.04	129.15	119.93	120.08	124.13
Brix	13.31	11.77	12.22	12.14	12.36	12.47	12.41	11.43	11.62	11.32	11.01
Sucrose purity	85.63	85.67	87.10	87.38	84.94	84.44	84.69	84.94	84.04	83.38	83.74
Apparent purity	84.48	84.47	86.06	86.53	84.10	83.73	83.91	83.78	82.54	82.03	82.10
Purity difference(MJ - DAC)	0.30	0.28	1.36	0.57	-0.05	-0.21	-0.13	0.09	0.58	-0.33	-0.06
Reducing susars/pol ratio	7.33	6.75	7.71	4.35	-	-	5.24	5.73	7.61	-	-
Pol/sucrose ratio	0.9865	0.9860	0.9880	0.9903	0.9901	0.9916	0.9908	0.9863	0.9821	0.9838	0.9804
Suspended solids % mixed juice	0.14	0.42	1.34	0.52	0.04	0.03	0.04	0.03	0.79	0.15	0.62
CLARIFIED JUICE											
Brix	13.26	11.72	12.32	12.51	-	-	11.99	10.89	10.83	-	-
Apparent purity	84.11	83.58	85.71	85.75	-	-	83.80	83.78	82.79	-	-
Purity difference(CJ - MJ)	-0.37	-0.89	-0.35	-0.78	-	-	-0.11	.00	0.25	-	-
Reducing susars/pol ratio	7.39	7.00	7.39	4.26	-	-	5.29	6.25	6.86	-	-
Average pH	7.2	7.1	7.3	7.6	-	-	7.0	7.0	6.9	-	-
FILTER CAKE											
Pol % filter cake	2.23	0.99	1.44	2.06	-	-	1.53	0.79	1.01	-	-
Moisture % filter cake	76.33	69.44	71.53	74.20	-	-	75.42	78.30	73.39	-	-
Filter cake % cane	1.08	4.65	5.17	4.30	-	-	3.96	1.56	5.00	-	-
Filter wash index	100.4	100.4	99.2	97.1	-	-	103.5	105.0	107.3	-	-
Purity diff.(CJ - filtrate)	1.87	1.04	1.73	0.51	-	-	1.57	0.41	-0.60	-	-
SYRUP											
Brix	67.65	65.16	63.52	63.30	-	-	65.48	65.71	65.27	-	-
Apparent purity	84.12	84.04	85.77	86.13	-	-	83.94	84.17	83.19	-	-
Purity difference(Syrup - MJ)	-0.36	-0.43	-0.29	-0.40	-	-	0.03	0.39	0.65	-	-
Reducing susars/pol ratio	7.63	7.46	7.65	3.80	-	-	5.46	5.97	5.52	-	-
Average pH	6.3	6.2	6.7	6.8	-	-	6.0	6.0	6.2	-	-
FINAL MOLASSES											
Refracto brix	86.37	79.98	82.04	80.90	-	-	82.80	82.34	81.78	-	-
Pol/refracto brix purity	31.33	30.28	38.54	37.57	-	-	35.93	34.48	32.77	-	-
Suc/refracto brix purity	35.05	34.52	40.24	38.33	-	-	37.63	37.13	35.82	-	-
Pol/sucrose ratio	0.8939	0.8772	0.9578	0.9801	-	-	0.9548	0.9286	0.9148	-	-
Purity difference(true-target)	3.1	2.5	2.2	5.0	-	-	4.6	3.7	4.2	-	-
Reducing susars %	17.13	13.76	7.70	10.61	-	-	12.46	14.51	14.47	-	-
Sulphated ash %	14.97	14.55	18.98	14.69	-	-	14.64	14.80	14.36	-	-
Reducing susars/ash ratio	1.14	0.95	0.41	0.72	-	-	0.85	0.98	1.01	-	-
Fructose %	9.07	8.04	4.77	5.93	-	-	6.96	8.09	8.20	-	-
Glucose %	8.06	5.72	2.93	4.68	-	-	5.50	6.42	6.27	-	-
Final mol at 85 brix % cane	4.09	4.09	3.54	3.81	-	-	4.26	3.94	4.06	-	-

* Cane diffuser

** Bagasse diffuser

LCV = 18 309 - 31,14 Bx % bagasse - 207,63 moisture % bagasse - 196,05 ash % bagasse

CAKE, SYRUP AND FINAL MOLASSES (Season 1986-1987)

MS-AVE	ME	GD **	GH-A *	GH-B	GH-AVE	NB	UC *	IL *	SZ-A *	SZ-B *	SZ-AVE	UK	AVERAGE
0.87	1.15	1.32	0.70	0.76	0.74	1.15	1.07	0.78	0.92	0.96	0.94	1.25	0.95
55.39	50.24	52.84	50.42	49.15	49.60	52.16	51.58	48.94	52.36	50.65	51.52	49.62	51.27
42.89	47.64	44.85	48.13	49.30	48.88	45.69	46.77	49.62	45.73	47.37	46.54	47.94	46.87
35.84	28.99	31.69	33.25	30.32	31.30	29.97	29.84	30.53	34.85	33.28	34.06	30.18	31.53
-	2.09	-	-	-	-	3.02	2.17	5.06	-	-	2.87	2.14	2.30
-	7403	-	-	-	-	6822	7125	7112	-	-	6990	7513	7158
121.88	115.88	111.82	126.27	124.48	125.08	114.93	124.51	134.22	132.84	132.64	132.73	121.33	122.81
11.18	12.61	13.41	11.04	11.16	11.12	13.42	12.56	11.42	10.75	10.76	10.76	11.85	11.91
83.54	85.50	86.71	84.41	84.45	84.44	87.07	87.90	87.43	84.77	84.60	84.69	86.68	85.44
82.06	83.83	85.70	83.30	83.20	83.24	85.70	87.06	86.48	83.69	83.53	83.61	85.64	84.29
-0.21	0.36	0.55	0.92	0.75	0.81	-0.06	-0.40	0.39	0.76	0.65	0.70	1.07	0.38
7.40	6.96	5.66	-	-	6.08	5.84	4.53	4.59	-	-	5.31	5.36	6.15
0.9823	0.9804	0.9883	0.9869	0.9852	0.9858	0.9843	0.9904	0.9892	0.9872	0.9873	0.9873	0.9880	0.9864
0.36	0.65	0.27	0.08	0.57	0.41	0.90	0.18	0.11	0.06	0.06	0.06	0.72	0.37
10.38	11.71	12.82	-	-	10.69	12.75	12.63	11.29	-	-	10.38	11.51	11.55
81.93	83.74	86.19	-	-	83.14	87.07	87.17	86.20	-	-	83.74	86.02	84.24
-0.13	-0.09	0.49	-	-	-0.10	1.37	0.11	-0.28	-	-	0.13	0.38	-0.05
7.29	6.90	6.06	-	-	5.77	4.76	4.83	4.70	-	-	5.69	5.18	6.11
7.1	7.1	6.9	-	-	7.1	7.1	7.0	7.1	-	-	7.0	7.0	7.1
0.88	0.74	1.79	-	-	0.71	1.59	0.88	1.19	-	-	0.69	1.06	1.15
74.93	71.93	0.00	-	-	68.80	69.83	78.53	74.05	-	-	77.40	78.06	72.57
4.00	4.59	2.47	-	-	3.93	5.39	2.00	1.48	-	-	1.97	4.88	3.39
107.7	107.7	104.6	-	-	104.0	105.3	99.4	101.1	-	-	103.6	103.0	103.1
2.97	2.04	2.74	-	-	1.77	0.84	2.09	0.82	-	-	0.89	0.97	1.28
67.80	67.73	67.78	-	-	66.20	67.47	68.33	64.92	-	-	64.86	69.49	66.23
82.53	84.25	86.66	-	-	83.47	87.10	87.49	86.59	-	-	83.88	86.23	84.50
0.47	0.42	0.96	-	-	0.23	1.40	0.43	0.11	-	-	0.27	0.59	0.21
7.32	6.65	6.18	-	-	5.80	4.81	5.17	5.04	-	-	5.85	5.01	6.10
6.0	6.1	6.4	-	-	6.0	6.0	6.4	6.1	-	-	6.0	6.3	6.2
83.47	81.13	82.31	-	-	80.66	80.30	82.66	82.96	-	-	82.91	82.15	82.48
35.33	33.06	36.72	-	-	34.98	33.59	31.82	33.82	-	-	32.83	33.58	33.98
37.95	35.67	39.19	-	-	37.02	36.98	35.57	36.10	-	-	35.75	35.98	36.67
0.9309	0.9268	0.9369	-	-	0.9449	0.9084	0.8945	0.9369	-	-	0.9183	0.9335	0.9266
5.4	3.0	5.7	-	-	4.0	3.8	1.9	3.7	-	-	3.6	3.2	3.8
13.73	13.98	12.26	-	-	13.08	11.62	10.07	11.69	-	-	14.06	13.85	13.37
14.60	14.53	15.10	-	-	14.36	12.54	14.83	13.98	-	-	13.74	14.57	14.61
0.94	0.96	0.81	-	-	0.91	0.93	0.68	0.84	-	-	1.02	0.95	0.91
7.77	7.83	7.13	-	-	7.48	7.37	6.88	6.96	-	-	8.04	7.80	7.62
5.96	6.15	5.13	-	-	5.60	4.25	3.19	4.72	-	-	6.02	5.70	5.73
4.10	3.58	3.96	-	-	4.03	3.76	3.47	3.57	-	-	3.90	3.37	3.90

TABLE B₂
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION, THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCE AND LOSSES SWAZILAND, MALAWI AND ZIMBABWE MILLS
 (Season 1986-1987)

SYMBOLS OF FACTORIES	MH-A *	MH-B	MH-AVE	UR-A *	UR-B	UR-AVE	SM	NH-A **	NH-B	NH-AVE	DM *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE
TONS SUGAR MADE AND ESTIMATED	-	-	170939	-	-	171303	164107	-	-	95340	60466	-	-	274042	-	-	210671
Refined % total sugar	-	-	-	-	-	14.94	-	-	-	32.44	81.18	-	-	7.33	-	-	8.12
Moisture raw sugar	-	-	0.22	-	-	0.29	0.26	-	-	0.19	0.13	-	-	0.14	-	-	-
Pol raw sugar	-	-	98.63	-	-	98.73	98.64	-	-	99.12	99.58	-	-	99.08	-	-	99.28
Tons cane crushed total	-	-	1373337	-	-	1396954	-	-	-	841780	-	-	-	2060349	-	-	1983998
Tons cane crushed per tandem	669447	703890	-	739516	657438	-	1314098	305017	536763	-	558126	1014885	1045464	-	1295291	688707	-
Season started on	-	-	5.05.86	-	-	1.05.86	19.04.86	-	-	16.04.86	16.05.86	-	-	21.04.86	-	-	4.04.86
Season completed on	-	-	8.12.86	-	-	21.12.86	15.11.86	-	-	18.11.86	21.11.86	-	-	25.11.86	-	-	11.01.87
Number of crushing days	-	-	217	-	-	234	210	-	-	216	189	-	-	218	-	-	282
TIME ACCOUNT																	
Overall time efficiency %	89.45	90.12	89.79	88.92	88.18	88.55	89.78	76.53	81.88	79.20	75.45	94.44	94.73	94.59	87.75	71.68	80.19
Sched.stops% gross avail.time	5.32	4.69	5.00	4.38	3.64	4.01	5.85	8.77	8.25	8.51	9.33	2.99	3.08	3.03	5.15	11.39	8.09
Lack of cane % gross	0.18	0.29	0.24	0.23	0.08	0.16	2.12	7.25	5.14	6.20	11.51	0.04	0.00	0.02	0.76	7.45	3.91
Other stops % gross	5.04	4.90	4.97	6.47	8.09	7.28	2.24	7.45	4.73	6.09	3.71	2.53	2.19	2.36	6.34	9.47	7.82
Lost time % avail.crush.time	5.34	5.16	5.25	6.79	8.40	7.60	2.44	8.87	5.46	7.14	4.69	2.61	2.26	2.43	6.74	11.67	8.88
THROUGHPUTS / ACTUAL CRUSHING																	
Tons of cane crushed	145.07	151.40	296.48	150.16	133.98	284.14	290.65	76.57	125.91	202.48	163.09	214.56	217.49	432.04	220.60	161.34	381.95
Tons of fibre milled	20.10	20.64	40.75	21.10	17.90	39.00	34.83	11.87	19.49	31.36	25.66	33.04	33.52	66.56	33.89	24.24	58.13
Tons of brix processed	22.67	22.96	45.63	23.41	20.50	43.91	44.78	11.68	19.11	30.78	25.91	36.21	34.68	70.89	34.84	25.50	60.34
Tons of sugar produced	-	-	36.91	-	-	34.85	36.30	-	-	23.12	17.67	-	-	57.47	-	-	40.56
Tons pol in mixed juice	19.47	19.75	39.23	19.98	17.45	37.44	38.60	9.93	16.23	26.37	22.11	31.59	30.25	61.83	30.54	22.26	54.11
Tons non-pol in mixed juice	3.20	3.20	6.40	3.43	3.05	6.48	6.18	1.75	2.87	4.62	3.80	4.63	4.43	9.05	4.30	3.23	7.53
COMPOSITION OF CANE CRUSHED																	
Sucrose % cane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pol % cane	13.71	13.55	13.63	13.56	13.38	13.48	13.60	13.44	13.50	13.48	14.02	15.06	14.25	14.65	14.17	14.36	14.24
Fibre % cane	14.14	14.48	14.32	14.36	14.24	14.30	12.85	15.50	15.48	15.49	15.73	15.68	15.69	15.69	15.81	15.52	15.71
Brix % cane	16.14	15.96	16.04	16.20	16.02	16.12	16.09	15.90	15.79	15.83	16.86	17.50	16.58	17.03	16.37	16.73	16.49
Ash % cane	-	-	-	-	-	-	3.30	-	-	-	-	-	-	-	-	-	-
ERC % cane	11.86	11.71	11.78	11.61	11.43	11.52	11.75	11.56	11.70	11.65	11.92	13.14	12.41	12.77	12.39	12.51	12.43
ERC % sucrose in cane	86.53	86.41	86.47	85.60	85.40	85.51	86.39	85.99	86.70	86.44	85.07	87.26	87.09	87.18	87.49	87.08	87.34
EXTRACTION																	
Extraction	97.90	96.32	97.09	98.10	97.36	97.75	97.64	96.45	95.51	95.85	96.71	97.78	97.62	97.70	97.71	96.07	97.14
Corrected reduced extraction	97.53	95.66	96.58	97.82	96.83	97.37	96.77	96.37	95.40	95.75	96.62	97.57	97.48	97.52	97.58	95.70	96.94
Imbibition % cane	63.84	56.66	60.16	58.96	53.11	56.21	43.14	40.73	38.63	39.39	45.84	61.23	55.63	58.39	56.52	54.73	55.90
Imbibition % fibre	461	416	438	420	398	410	360	263	250	254	291	398	361	379	368	364	367
Preparation index	91	86	88	91	91	91	90	86	87	87	88	93	93	93	90	90	90
Pol factor	99.92	99.99	99.95	98.71	97.37	98.08	100.03	-	-	-	99.33	99.77	99.77	99.77	-	-	-
Brix factor	101.11	101.08	101.09	99.85	98.79	99.35	100.99	-	-	-	100.90	100.67	100.67	100.67	-	-	-
RECOVERIES																	
Boiling house recovery	-	-	92.80	-	-	92.07	92.75	-	-	87.14	-	-	-	92.16	-	-	-
Overall recovery	-	-	90.10	-	-	90.00	90.57	-	-	83.52	-	-	-	90.04	-	-	-
Ton cane per ton sugar	-	-	8.03	-	-	8.15	8.01	-	-	8.83	-	-	-	7.52	-	-	-
Ton cane per ton 96 sugar	-	-	7.82	-	-	7.91	7.79	-	-	8.53	-	-	-	7.28	-	-	-
BALANCES																	
Pol lost % pol in cane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- in bagasse (a)	-	-	2.91	-	-	2.25	2.36	-	-	4.15	3.29	-	-	2.30	-	-	2.86
- in filter cake (b)	-	-	0.14	-	-	0.10	0.17	-	-	0.55	0.13	-	-	0.07	-	-	0.16
- in final molasses (c)	-	-	5.96	-	-	7.26	5.94	-	-	9.28	-	-	-	7.01	-	-	-
- undetermined (d)	-	-	0.89	-	-	0.39	0.96	-	-	2.50	-	-	-	0.58	-	-	-
Boiling house losses (b+c+d)	-	-	6.99	-	-	7.75	7.08	-	-	12.33	-	-	-	7.66	-	-	-
Sum of all losses (a+b+c+d)	-	-	9.90	-	-	10.00	9.43	-	-	16.48	-	-	-	9.96	-	-	-
Non pol ratio	-	-	1.01	-	-	0.97	0.96	-	-	0.78	-	-	-	0.95	-	-	-
Red.sug. in F.M.% R.S.in M.J.	-	-	138.64	-	-	86.32	87.60	-	-	110.56	-	-	-	88.32	-	-	-

* Cane diffuser
 ** Bagasse diffuser

TABLE C₂
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SWAZILAND, MALAWI AND ZIMBABWE MILLS
(Season 1986-1987)

SYMBOLS OF FACTORIES	MH-A *	MH-B	MH-AVE	UR-A *	UR-B	UR-AVE	SM	NH-A **	NH-B	NH-AVE	DW *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE
FINAL BAGASSE																	
Pol % bagasse	1.01	1.76	1.39	0.87	1.30	1.07	1.27	1.45	1.96	1.77	1.41	1.06	1.07	1.06	1.00	1.74	1.25
Moisture % bagasse	49.63	49.10	49.36	50.17	48.21	49.29	49.85	50.98	47.95	49.09	48.81	49.22	49.45	49.34	51.05	50.86	50.99
Fibre % bagasse	48.59	48.10	48.34	47.76	49.14	48.38	47.45	47.06	50.07	48.94	48.23	48.80	48.56	48.68	47.19	46.30	46.88
Bagasse % cane	28.52	28.35	28.43	29.42	27.19	28.37	25.26	32.93	30.92	31.65	32.61	31.55	31.75	31.65	32.56	32.45	32.52
Ash % bagasse	-	-	-	-	-	-	4.20	-	-	-	-	-	-	1.54	-	-	-
LCV in kJ per kg bagasse	-	-	7989	-	-	8005	7052	-	-	8056	8084	-	-	7702	-	-	7658
MIXED JUICE																	
Mixed Juice % cane	135.32	128.31	131.73	129.54	125.93	127.84	117.89	107.80	107.72	107.74	113.23	129.68	123.88	126.74	123.96	122.28	123.38
Brix	11.55	11.82	11.68	12.03	12.15	12.09	13.07	14.15	14.09	14.11	14.03	13.02	12.87	12.94	12.74	12.92	12.80
Apparent purity	85.88	86.05	85.96	85.37	85.11	85.25	86.19	85.00	84.97	84.98	85.34	87.22	87.24	87.23	87.66	87.32	87.54
Purity difference(MJ - DAC)	-0.10	0.23	0.06	0.65	0.40	0.54	0.86	-	-	-	0.82	0.42	0.52	0.47	-	-	-
Reducing susars/pol ratio	-	-	4.42	-	-	6.14	5.42	-	-	-	3.07	6.61	-	3.99	-	-	4.76
Suspended solids % mixed juice	0.21	0.66	0.44	0.24	0.70	0.45	0.73	-	-	-	-	0.22	0.22	0.22	0.36	0.41	0.38
CLARIFIED JUICE																	
Brix	-	-	11.67	-	-	12.22	12.78	-	-	14.20	13.05	-	-	12.88	-	-	12.42
Apparent purity	-	-	86.46	-	-	85.11	85.46	-	-	87.28	85.75	-	-	87.19	-	-	87.32
Purity difference(CJ - MJ)	-	-	0.50	-	-	-0.14	-0.73	-	-	2.30	0.41	-	-	-0.04	-	-	-0.22
Reducing susars/pol ratio	-	-	4.39	-	-	5.89	5.34	-	-	2.35	6.20	-	-	4.10	-	-	4.67
Average pH	-	-	7.1	-	-	7.2	7.3	-	-	7.1	6.9	-	-	6.9	-	-	7.0
FILTER CAKE																	
Pol % filter cake	-	-	0.83	-	-	0.43	0.70	-	-	2.16	0.88	-	-	1.47	-	-	0.89
Moisture % filter cake	-	-	-	-	-	-	75.90	-	-	71.14	73.68	-	-	73.74	-	-	-
Filter cake % cane	-	-	2.27	-	-	3.17	3.32	-	-	3.42	2.02	-	-	0.70	-	-	2.52
Filter wash index	-	-	1.00	-	-	0.99	1.02	-	-	0.99	1.08	-	-	1.00	-	-	1.03
Purity diff.(CJ - filtrate)	-	-	2.22	-	-	1.39	0.73	-	-	2.23	-	-	-	0.61	-	-	1.04
SYRUP																	
Brix	-	-	62.87	-	-	68.82	65.33	-	-	66.93	65.71	-	-	68.02	-	-	64.14
Apparent purity	-	-	86.13	-	-	86.26	85.62	-	-	87.77	86.26	-	-	87.11	-	-	87.22
Purity difference(Syrup - MJ)	-	-	0.17	-	-	1.01	-0.57	-	-	2.79	0.92	-	-	-0.12	-	-	-0.32
Reducing susars/pol ratio	-	-	3.40	-	-	6.50	5.88	-	-	4.10	6.37	-	-	4.47	-	-	3.69
Average pH	-	-	6.1	-	-	6.4	6.3	-	-	6.7	6.5	-	-	6.2	-	-	6.2
FINAL MOLASSES																	
Refracto brix	-	-	87.34	-	-	83.90	84.36	-	-	78.31	-	-	-	83.58	-	-	-
Pol/refracto brix purity	-	-	28.44	-	-	31.79	29.77	-	-	42.06	-	-	-	35.27	-	-	-
Suc/refracto brix purity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purity difference(true-target)	-	-	-	-	-	4.78	-	-	-	-	-	-	-	6.95	-	-	-
Reducing susars %	-	-	24.79	-	-	19.03	19.59	-	-	11.55	-	-	-	14.48	-	-	-
Sulphated ash %	-	-	-	-	-	15.23	15.38	-	-	-	-	-	-	14.00	-	-	-
Reducing susars/ash ratio	-	-	-	-	-	1.25	1.27	-	-	-	-	-	-	1.03	-	-	-
Final mol at 85 brix % cane	-	-	3.36	-	-	3.62	3.19	-	-	3.50	-	-	-	3.42	-	-	-

* Cane diffuser
 ** Bagasse diffuser

TABLE D₁
MASSECUITES, EXHAUSTIONS, CLARIFYING AGENTS AND ADDITIONAL FUELS
SOUTH AFRICAN MILLS (Season 1986-1987)

SYMBOLS OF FACTORIES	ML	PG	UF	EN	FX	AK	DL	MS	ME	GD	GH	NB	UC	IL	SZ	UK	AVERAGES
Brix in mixed Juice % cane	15.28	14.77	14.44	15.48	15.03	14.77	13.93	13.63	14.61	15.00	13.90	15.43	15.64	15.33	14.28	14.38	14.63
A - MASSECUITE																	
#3 per ton brix in mixed Juice	1.03	1.11	1.04	1.17	1.00	0.97	0.88	0.95	0.82	1.04	1.02	1.16	1.00	1.00	0.98	1.02	1.00
Ref brix of massecuite	92.67	92.00	93.02	92.64	92.89	92.90	93.17	92.18	91.86	91.57	92.47	92.58	92.54	92.67	93.41	91.87	92.65
Purity of massecuite	84.41	84.12	86.45	86.12	84.44	84.60	83.90	83.24	84.83	86.12	85.35	87.11	87.00	86.40	84.54	86.00	85.04
Purity of A - molasses	67.52	67.14	71.62	72.58	68.49	65.88	63.79	63.71	65.42	71.79	65.39	69.07	68.40	67.71	65.25	68.57	67.12
Purity drop	16.89	16.98	14.83	13.54	15.95	18.72	20.11	19.55	19.41	14.33	19.96	18.04	18.60	18.69	19.29	17.43	17.92
Exhaustion	61.61	61.43	60.45	57.34	59.95	64.85	66.19	64.70	66.17	58.98	67.57	66.96	67.66	66.99	65.66	64.48	64.10
Pty of A-mass - purity syrup	0.29	0.08	0.68	-0.01	0.50	0.43	0.71	0.73	0.58	-0.54	1.88	0.01	-0.49	-0.19	0.66	-0.23	0.54
Pty of remelt	85.21	83.07	87.14	87.81	86.43	85.80	87.95	82.70	85.34	88.29	84.54	84.83	88.05	84.37	86.45	85.85	85.64
B - MASSECUITE																	
#3 per ton brix in mixed Juice	0.45	0.43	0.43	0.39	0.35	0.27	0.31	0.26	0.30	0.50	0.38	0.37	0.38	0.29	0.34	0.39	0.36
Ref brix of massecuite	95.17	93.01	95.69	94.28	94.52	94.30	93.80	93.18	92.90	93.28	94.26	94.58	94.53	94.27	95.23	93.30	94.34
Purity of massecuite	69.50	66.97	70.37	72.26	68.89	66.93	65.67	63.20	65.98	72.02	66.86	68.80	68.90	68.56	66.27	68.72	67.90
Purity of B - molasses	42.94	42.76	50.36	52.94	45.65	41.06	42.49	42.72	42.99	50.59	43.66	45.14	43.23	41.88	39.59	44.62	43.85
Purity drop	26.56	24.21	20.01	19.32	23.24	25.87	23.18	20.48	22.99	21.43	23.20	23.66	25.67	26.77	26.68	24.10	24.05
Exhaustion	66.97	63.16	57.28	56.81	62.07	65.58	61.38	56.57	61.42	60.22	61.59	62.69	65.63	67.09	66.64	63.33	63.08
C - MASSECUITE																	
#3 per ton brix in mixed Juice	0.26	0.27	0.24	0.26	0.25	0.26	0.30	0.30	0.22	0.24	0.28	0.25	0.20	0.21	0.25	0.26	0.26
Ref brix of massecuite	98.67	95.99	98.23	97.42	96.84	97.41	96.47	95.31	95.79	96.25	96.29	95.40	96.87	96.90	97.01	96.61	96.78
Purity of massecuite	50.16	50.99	53.66	54.63	55.40	54.12	53.80	55.02	54.34	54.22	50.80	52.92	49.24	51.97	50.34	52.20	52.70
Purity of C - molasses	31.33	30.28	38.54	37.57	35.93	34.48	32.77	35.33	33.06	36.72	34.98	33.59	31.82	33.82	32.83	33.58	33.98
Crystal content	27.06	28.51	24.17	26.63	29.43	29.20	30.17	29.02	30.45	26.62	23.42	27.77	24.75	26.57	25.28	27.08	27.44
Exhaustion	54.67	58.25	45.85	50.03	54.86	55.39	58.14	55.34	58.51	51.00	47.89	55.00	51.90	52.76	51.78	53.69	53.81
TOTAL VOLUME ALL RAW MASSECUITES																	
#3 per ton brix in mixed Juice	1.74	1.81	1.70	1.82	1.60	1.51	1.49	1.51	1.34	1.78	1.68	1.78	1.58	1.50	1.56	1.66	1.61
WHITE SUGAR MASSECUITES																	
Kg sugar per #3 massecuite	639	529	767	595	-	-	-	-	-	-	634	553	-	-	-	-	618
Tons limestone per 1000 tons white sugar	0.0	-	-	-	-	-	-	-	-	-	47.5	-	-	-	-	-	-
Tons coke/1000 tons white sugar	-	5.5	-	-	-	-	-	-	-	-	4.3	-	-	-	-	-	-
Tons phos acid/1000 tons white sugar	-	-	-	0.46	-	-	-	-	-	-	-	1.15	-	-	-	-	-
Tons sulphur/1000 tons white sugar	0.03	0.07	5.05	-	-	-	-	-	-	-	0.06	-	-	-	-	-	-
Phos. acid PPM mixed Juice	-	-	-	-	-	-	-	-	-	-	2.9	-	-	-	-	-	-
Flocculant PPM mixed Juice	0.8	4.6	4.2	3.4	5.7	3.5	3.2	2.8	3.2	2.8	3.3	7.0	2.5	5.6	7.0	1.0	4.0
Tons lime per 1000 tc	2.5	-	1.4	1.0	1.0	0.8	0.7	0.9	0.6	0.7	-	0.8	0.5	0.6	0.6	0.5	1.2
Enzyme PPM sugar	-	0.7	-	8.7	-	0.5	19.1	15.0	19.1	15.0	8.0	13.3	9.4	6.8	5.9	12.7	9.5
ADDITIONAL FUELS PER 1000 TC																	
Tons of coal	11.23	9.66	8.34	27.37	12.90	1.37	0.15	18.64	0.54	11.47	-	19.07	6.91	1.66	-	0.29	-
Tons of wood	-	0.21	-	0.72	0.14	-	0.69	0.06	0.22	2.61	-	0.65	3.14	0.46	0.27	0.11	-
Converted into bagasse	44.92	38.88	33.35	110.36	51.77	5.47	1.43	74.63	2.44	49.01	-	77.07	31.43	7.18	0.32	1.31	-

* Part of bagasse used for by-products
 ** 1 ton coal equivalent to 4 tons of bagasse
 1 ton firewood equivalent to 1,2 tons of bagasse
 # Includes lime used in refinery

TABLE D₂
MASSECUITES, EXHAUSTIONS, CLARIFYING AGENTS AND ADDITIONAL FUELS
SWAZILAND, MALAWI AND ZIMBABWE MILLS
(Season 1986-1987)

SYMBOLS OF FACTORIES	MH	UR	SM	NH	DW	HV	TR
Brix in mixed Juice % cane	15.39	15.45	15.41	15.20	15.88	16.40	15.80
A - MASSECUITE							
m3 per ton brix in mixed Juice	0.93	1.03	0.99	1.15	1.31	0.99	0.90
Ref brix of massecuite	93.52	91.97	92.84	91.66	92.57	92.61	91.99
Purity of massecuite	86.48	85.28	84.86	86.11	90.04	87.80	87.78
Purity of A - molasses	67.47	67.05	66.63	72.88	80.42	71.29	72.90
Purity drop	19.01	18.23	18.23	13.23	9.62	16.51	14.88
Exhaustion	67.57	64.88	64.38	56.65	54.57	65.50	62.55
Purity of A-mass - pty syrup	0.35	-0.98	-0.76	-1.66	3.78	0.69	0.56
Purity of remelt	-	85.45	83.52	98.50	93.50	87.30	-
B - MASSECUITE							
m3 per ton brix in mixed Juice	0.35	0.38	0.26	0.48	0.70	0.36	0.27
Ref brix of massecuite	94.76	94.20	95.24	94.39	92.60	94.77	92.94
Purity of massecuite	68.73	68.34	66.21	74.99	77.75	72.00	75.07
Purity of B - molasses	42.61	43.14	43.21	57.39	56.27	49.36	54.13
Purity drop	26.12	25.20	23.00	17.60	21.48	22.64	20.94
Exhaustion	66.22	64.85	61.17	55.08	63.18	62.09	60.81
C - MASSECUITE							
m3 per ton brix in mixed Juice	0.22	0.23	0.25	0.28	-	-	-
Ref brix of massecuite	97.92	97.16	97.74	97.67	-	96.34	-
Purity of massecuite	52.22	53.32	53.69	59.45	-	53.48	-
Purity of C - molasses	28.44	31.79	29.77	42.06	-	35.27	-
Crystal content	32.54	30.67	33.29	29.31	-	27.10	-
Exhaustion	63.64	59.20	63.45	50.48	-	52.60	-
TOTAL VOLUME ALL RAW MASSECUITES							
m3 per ton brix in mixed Juice	1.50	1.65	1.50	1.91	-	-	-
WHITE SUGAR MASSECUITES							
Kg sugar per m3 massecuite	-	563	-	503	583	840	-
Tons phos acid/1000 tons white sugar	-	-	-	0.63	-	-	-
Tons sulphur/1000 tons white sugar	-	0.09	-	-	0.13	0.40	-
Phos. acid ppm mixed Juice	-	-	-	5.0	-	-	-
Flocculant ppm mixed Juice	2.5	1.3	1.0	3.9	1.9	3.9	-
Tons lime per 1000 tc	0.5	0.6	0.5	1.2	2.2	0.6	0.6
Enzyme ppm sugar	-	-	0.6	-	24.8	-	-
ADDITIONAL FUELS PER 1000 TC							
Tons of coal	1.31	0.39	0.93	-	-	0.52	9.43
Tons of wood	-	-	-	0.40	0.51	-	-
Converted into bagasse	5.24	1.55	3.71	0.48	0.61	2.07	37.72

Includes lime used in refinery

TABLE E
COMPARATIVE MANUFACTURING DATA OF RECENT YEARS
(SOUTH AFRICAN MILLS)

Season	:1986/87	:1985/86	:1984/85	:1983/84	:1982/83
Throughput and time efficiency					
Tons cane per hour	: -	: 253.19	: 251.28	: 217.42	: 232.96
Tons fibre per hour	: -	: 37.44	: 37.56	: 33.61	: 34.76
Time efficiency	: 81.41	: 79.60	: 77.06	: 74.40	: 78.39
Cane					
Sucrose % cane	: 12.80	: 13.13	: 12.27	: 12.33	: 12.86
Fibre % cane	: 15.24	: 15.38	: 15.62	: 16.15	: 15.61
Mixed Juice					
Sucrose purity	: 85.44	: 84.55	: 85.69	: 84.20	: 85.12
Reducing sugars/pol ratio	: 6.15	: 6.71	: 5.76	: 6.06	: 5.80
Milling					
Imbibition % fibre	: 368	: 358	: 344	: 356	: 345
Extraction	: 97.66	: 97.47	: 97.42	: 97.02	: 97.02
Pol % bagasse	: 0.95	: 1.04	: 0.99	: 1.08	: 1.19
Moisture % bagasse	: 51.27	: 51.64	: 51.35	: 52.68	: 51.35
Bagasse % cane	: 31.53	: 31.93	: 31.97	: 34.14	: 32.13
LCV bagasse kJ/kg	: 7158	: 7140	: 7174	: 6906	: 7153
Avail. kJ in bag./kg brix in M.J.	: 15430	: 15055	: 16438	: 16597	: 15676
Recoveries					
Boiling house recovery	: 87.70	: 87.51	: 88.23	: 85.37	: 87.64
Overall recovery	: 85.65	: 85.30	: 85.96	: 82.83	: 85.03
Tons cane per ton sugar	: 9.08	: 8.88	: 9.43	: 9.74	: 9.10
Filter cake					
Pol % filter cake	: 1.15	: 1.14	: 1.13	: 1.07	: 1.11
Filter cake % cane	: 3.39	: 3.50	: 3.70	: 4.18	: 3.87
Final molasses					
Brix	: 82.48	: 82.39	: 82.58	: 81.35	: 82.03
Gravity purity	: 36.67	: 36.35	: 36.95	: 38.22	: 36.56
Fin. mol. - tons 85 Bx % cane	: 3.90	: 4.23	: 3.67	: 4.36	: 4.03
Average sugar polarisation					
	: 99.52	: 99.51	: 99.50	: 99.50	: 99.48
Sucrose balance					
Lost in bagasse	: 2.34	: 2.53	: 2.58	: 2.98	: 2.98
Lost in filter cake	: 0.30	: 0.30	: 0.34	: 0.36	: 0.33
Lost in final molasses	: 9.51	: 9.95	: 9.40	: 11.48	: 9.74
Undetermined losses	: 2.20	: 1.91	: 1.73	: 2.35	: 1.91
Lost in boiling house	: 12.01	: 12.16	: 11.47	: 14.19	: 11.98
Total losses	: 14.35	: 14.69	: 14.05	: 17.17	: 14.96
M3 massecuite per ton Bx in M.J.					
A - massecuite	: 1.00	: 0.98	: 1.04	: 1.06	: 1.05
B - massecuite	: 0.36	: 0.35	: 0.39	: 0.41	: 0.42
C - massecuite	: 0.26	: 0.26	: 0.26	: 0.29	: 0.27
Total	: 1.61	: 1.59	: 1.69	: 1.75	: 1.73
Exhaustion of massecuites					
A - massecuite	: 64.10	: 63.28	: 63.65	: 61.80	: 62.61
B - massecuite	: 63.08	: 62.48	: 61.83	: 59.87	: 61.29
C - massecuite	: 53.81	: 54.60	: 53.88	: 49.99	: 52.48
Brix of syrup					
	: 66.33	: 66.65	: 66.48	: 66.76	: 67.32

TABLE F
AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS
FOR SOUTH AFRICAN MILLS (Season 1986-1987)

End of month period	April 26 1986	May 31 1986	June 28 1986	August 2 1986	August 30 1986	Sept. 27 1986	Nov. 2 1986	Nov. 29 1986	Dec. 27 1986	Jan. 18 1987
Tons of sugar made and estimated	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -
	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -
Tons cane crushed	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -
	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -
Tons cane crushed per hour actual crushing	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -	Month : -
	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -	To-date : -
Sucrose % cane	Month : 10.39	Month : 11.58	Month : 12.55	Month : 13.38	Month : 13.91	Month : 13.62	Month : 13.16	Month : 12.25	Month : 11.88	Month : 11.91
	To-date : 10.39	To-date : 11.39	To-date : 11.86	To-date : 12.38	To-date : 12.71	To-date : 12.86	To-date : 12.92	To-date : 12.84	To-date : 12.80	To-date : 12.80
Fibre % cane	Month : 16.36	Month : 15.19	Month : 14.68	Month : 14.39	Month : 14.71	Month : 15.36	Month : 15.79	Month : 16.29	Month : 15.92	Month : 15.69
	To-date : 16.36	To-date : 15.36	To-date : 15.09	To-date : 14.85	To-date : 14.82	To-date : 14.92	To-date : 15.07	To-date : 15.21	To-date : 15.23	To-date : 15.24
Tons cane per ton sugar	Month : 11.58	Month : 10.13	Month : 9.19	Month : 8.61	Month : 8.32	Month : 8.48	Month : 8.80	Month : 9.59	Month : 10.06	Month : 10.45
	To-date : 11.58	To-date : 10.35	To-date : 9.84	To-date : 9.38	To-date : 9.13	To-date : 9.01	To-date : 8.97	To-date : 9.04	To-date : 9.08	To-date : 9.08
Extraction	Month : 96.63	Month : 97.45	Month : 97.69	Month : 97.77	Month : 97.85	Month : 97.81	Month : 97.74	Month : 97.55	Month : 97.35	Month : 97.57
	To-date : 96.63	To-date : 97.33	To-date : 97.48	To-date : 97.59	To-date : 97.65	To-date : 97.68	To-date : 97.69	To-date : 97.67	To-date : 97.66	To-date : 97.66
Imbibition % fibre	Month : 346	Month : 361	Month : 364	Month : 368	Month : 377	Month : 373	Month : 368	Month : 371	Month : 369	Month : 338
	To-date : 346	To-date : 359	To-date : 361	To-date : 363	To-date : 366	To-date : 367	To-date : 367	To-date : 368	To-date : 368	To-date : 368
Pol % bagasse	Month : 0.99	Month : 0.93	Month : 0.95	Month : 1.00	Month : 0.99	Month : 0.95	Month : 0.92	Month : 0.90	Month : 0.94	Month : 0.91
	To-date : 0.99	To-date : 0.94	To-date : 0.94	To-date : 0.96	To-date : 0.97	To-date : 0.96	To-date : 0.96	To-date : 0.95	To-date : 0.95	To-date : 0.95
Moisture % bagasse	Month : 53.09	Month : 51.94	Month : 51.42	Month : 51.04	Month : 50.90	Month : 50.79	Month : 50.90	Month : 51.19	Month : 52.03	Month : 49.64
	To-date : 53.09	To-date : 52.14	To-date : 51.85	To-date : 51.59	To-date : 51.44	To-date : 51.33	To-date : 51.25	To-date : 51.24	To-date : 51.28	To-date : 51.27
Boiling house recovery	Month : 84.65	Month : 87.05	Month : 88.32	Month : 88.42	Month : 87.95	Month : 88.15	Month : 87.89	Month : 86.86	Month : 85.73	Month : 82.04
	To-date : 84.65	To-date : 86.71	To-date : 87.41	To-date : 87.78	To-date : 87.82	To-date : 87.88	To-date : 87.88	To-date : 87.78	To-date : 87.70	To-date : 87.70
Overall recovery	Month : 81.77	Month : 84.82	Month : 86.28	Month : 86.44	Month : 86.06	Month : 86.22	Month : 85.90	Month : 84.73	Month : 83.46	Month : 80.05
	To-date : 81.77	To-date : 84.39	To-date : 85.21	To-date : 85.67	To-date : 85.76	To-date : 85.44	To-date : 85.85	To-date : 85.74	To-date : 85.65	To-date : 85.65
Mixed juice sucrose purity	Month : 83.28	Month : 84.20	Month : 85.29	Month : 85.94	Month : 85.84	Month : 85.86	Month : 86.07	Month : 85.42	Month : 84.45	Month : 84.48
	To-date : 83.28	To-date : 84.06	To-date : 84.59	To-date : 85.09	To-date : 85.26	To-date : 85.37	To-date : 85.50	To-date : 85.49	To-date : 85.44	To-date : 85.44
RS/pol ratio in mixed juice	Month : 7.62	Month : 7.29	Month : 6.47	Month : 6.11	Month : 6.14	Month : 5.70	Month : 5.35	Month : 5.53	Month : 6.54	Month : 7.33
	To-date : 7.62	To-date : 7.34	To-date : 6.96	To-date : 6.67	To-date : 6.55	To-date : 6.39	To-date : 6.20	To-date : 6.13	To-date : 6.15	To-date : 6.15
Pol/sucr. ratio in mixed juice	Month : 0.9819	Month : 0.9816	Month : 0.9833	Month : 0.9840	Month : 0.9837	Month : 0.9893	Month : 0.9920	Month : 0.9913	Month : 0.9905	Month : 0.9884
	To-date : 0.9819	To-date : 0.9817	To-date : 0.9824	To-date : 0.9830	To-date : 0.9831	To-date : 0.9843	To-date : 0.9857	To-date : 0.9863	To-date : 0.9864	To-date : 0.9864
Purity final molasses	Month : 37.92	Month : 35.49	Month : 34.87	Month : 36.09	Month : 36.02	Month : 36.88	Month : 37.98	Month : 38.43	Month : 39.32	Month : 40.29
	To-date : 37.92	To-date : 35.85	To-date : 35.45	To-date : 35.67	To-date : 35.72	To-date : 35.95	To-date : 36.31	To-date : 36.54	To-date : 36.65	To-date : 36.67
Sucrose lost in final molasses	Month : 11.40	Month : 9.88	Month : 9.06	Month : 8.97	Month : 9.13	Month : 9.18	Month : 9.46	Month : 10.15	Month : 11.18	Month : 14.47
% sucrose in cane	Month : 11.40	Month : 10.10	Month : 9.65	Month : 9.40	Month : 9.33	Month : 9.31	Month : 9.34	Month : 9.43	Month : 9.49	Month : 9.51
Undetermined lost sucrose % sucrose in cane	Month : 3.03	Month : 2.38	Month : 2.02	Month : 2.10	Month : 2.40	Month : 2.11	Month : 2.06	Month : 2.33	Month : 2.43	Month : 2.90
	To-date : 3.03	To-date : 2.48	To-date : 2.28	To-date : 2.21	To-date : 2.26	To-date : 2.23	To-date : 2.20	To-date : 2.20	To-date : 2.20	To-date : 2.20
Pol/sucrose ratio FM	Month : 0.9438	Month : 0.9200	Month : 0.8978	Month : 0.8939	Month : 0.8998	Month : 0.9356	Month : 0.9589	Month : 0.9722	Month : 0.9570	Month : 0.8793
	To-date : 0.9438	To-date : 0.9239	To-date : 0.9133	To-date : 0.9064	To-date : 0.9057	To-date : 0.9104	To-date : 0.9193	To-date : 0.9254	To-date : 0.9271	To-date : 0.9266

TABLE G
CANE VARIETIES AND RAINFALL
(Season 1986-1987)
PERCENTAGE BY WEIGHT

MILL	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	J	MIXED	UNKNOWN	RAINFALL
	7	8	11	12	13	14	16	17	52/219	53/216	55/805	293	310	334	376	382	59,3	VARIETY	AND	OTHER	
ML	-	-	1.9	-	-	62.7	-	1.8	8.0	-	-	-	-	1.0	17.9	-	3.8	0.1	2.1	326	
PG	-	-	1.4	-	-	45.4	-	2.0	2.1	-	-	-	-	0.4	29.9	-	-	0.9	17.4	170	
UF	0.1	2.6	0.6	6.4	0.1	19.0	-	-	0.7	-	1.1	-	10.9	-	47.2	0.5	0.3	5.7	3.8	290	
EN	-	-	0.3	3.0	1.1	-	0.2	-	-	-	0.2	12.3	-	-	82.6	-	-	-	-	327	
FX	-	1.8	0.4	1.3	-	4.2	-	-	0.1	-	1.5	-	3.8	-	46.7	-	-	0.9	38.6	423	
AK	-	0.2	0.1	2.4	0.8	0.4	0.2	-	-	-	2.2	0.2	1.1	-	57.7	-	-	4.1	30.0	341	
DL	-	0.1	0.3	0.8	0.9	-	0.3	-	-	-	3.1	-	0.1	-	91.6	-	-	2.2	-	572	
MS	-	0.3	0.8	1.0	1.6	0.1	0.9	-	0.1	0.1	5.3	0.4	0.7	-	82.2	0.1	-	1.2	4.4	395	
ME	-	0.5	1.5	3.0	1.7	-	0.1	-	-	-	2.7	13.5	0.5	-	68.4	-	-	4.7	2.5	448	
GD	-	-	0.4	-	-	-	-	-	-	-	0.1	0.1	-	-	98.7	-	-	0.3	-	353	
GH	-	0.1	-	0.6	1.0	0.2	0.2	-	-	-	4.5	-	0.3	-	90.9	0.3	-	0.4	0.8	329	
NB	0.1	0.1	3.1	11.3	0.3	0.1	0.2	-	-	0.8	0.5	49.2	-	-	21.2	4.5	-	0.2	6.7	241	
UC	-	-	0.6	6.6	2.3	-	0.1	-	-	0.4	-	58.1	-	-	13.6	1.6	-	0.5	15.1	291	
IL	1.3	-	0.6	6.5	0.6	-	0.1	-	-	0.1	1.9	22.0	-	-	45.2	-	-	4.0	17.0	526	
SZ	-	-	3.2	3.4	0.7	-	0.6	-	0.2	-	1.7	-	0.6	-	82.2	-	-	1.9	4.6	803	
UK	-	-	0.7	3.5	1.4	0.1	0.6	-	0.4	-	0.5	6.4	0.5	-	73.2	-	0.1	0.7	11.1	801	
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SA Mills	-	0.4	1.1	2.8	0.7	9.8	0.2	0.2	1.0	-	1.9	6.7	1.3	0.1	59.0	0.3	0.4	1.8	11.1	-	
MH	-	-	-	-	-	27.9	-	0.9	0.1	-	-	-	-	1.5	69.1	-	-	-	-	117	
UR	-	-	-	-	-	26.3	-	2.7	2.8	-	-	-	-	-	64.7	-	-	-	-	238	
SH	-	-	-	-	-	21.9	-	-	-	-	-	-	-	0.6	76.9	-	0.1	-	-	135	
NH	-	-	-	-	-	3.7	-	-	-	-	-	-	12.8	-	78.9	-	-	-	-	168	
DW	-	-	0.1	-	-	6.7	-	-	0.3	-	-	-	-	-	73.8	-	-	-	-	129	
HV	-	-	-	-	-	0.4	-	-	0.6	-	-	-	-	-	96.7	-	-	-	-	54	
TR	-	-	0.1	-	-	0.8	-	-	-	-	-	-	-	-	98.3	-	-	-	0.8	343	

TABLE H
TRANSPORT SUMMARY SOUTH AFRICAN MILLS
(Season 1986-1987)
PERCENT OF CANE TRANSPORTED

MILLS	ML	PG	UF	EN	FX	AK	DL	ME	MS	GH	NB	UC	GD	IL	SZ	UK	AVERAGE
SOUTH AFRICAN RAILWAYS	6.4	-	37.3	-	0.4	-	-	17.0	-	-	-	-	-	-	-	-	3.5
TRAMS	-	-	62.5	-	-	-	-	-	-	-	-	-	-	-	-	-	3.4
ARTICULATED TRUCK DRIVEN VEHICLES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Interlink	-	-	-	-	47.8	40.4	31.7	42.4	41.7	3.8	-	-	-	96.6	-	41.9	23.3
- Tri-Axle	-	-	-	-	1.9	6.9	10.1	-	13.2	2.7	1.4	-	-	-	-	-	2.8
- Hilo	82.7	55.5	-	-	16.6	20.5	30.2	28.7	35.1	68.6	46.2	23.8	51.5	2.6	74.5	8.2	39.1
RIGID CHASSIS VEHICLES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Truck	-	-	-	-	-	0.7	-	4.5	-	-	9.1	27.7	2.8	-	22.2	42.2	6.5
- Lorry	-	-	-	14.2	-	0.4	5.3	6.1	0.6	1.7	16.1	19.5	15.7	-	3.2	4.9	3.4
TRACTOR DRIVEN VEHICLES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Tractor Hilo	-	-	-	-	0.1	-	0.9	-	1.3	-	-	-	-	-	-	-	0.1
- Tractor Ris	10.8	44.4	-	85.7	33.0	30.8	21.4	1.1	7.6	23.0	26.9	28.8	29.8	0.6	-	2.6	17.3

TABLE J
COMPARATIVE DATA OF REPORTING S.A. MILLS FROM 1925 ONWARDS

PERIOD (SEASON)	Percent Cane		Cane / Sugar Ratio		Extraction	Pol % in Bagasse	Percent Bagasse		Inhibition Percent		Mixed Juice		Final Molasses Purity	Boiling House Recovery	Overall Recovery
	Sucrose	Fibre	Tel Quel	96 Pol Susar			Pol	Moisture	Cane	Fibre	Purity	Reducing Susar Ratio			
Average 1925 - 1934	13.19	15.78	9.86	9.64	89.83	8.86	3.88	50.57	27.6	175	85.09	3.65	45.3	83.67	75.12
Average 1935 - 1944	13.53	15.30	8.96	8.73	92.05	7.05	3.11	51.60	32.6	213	86.01	3.22	43.3	88.36	81.34
Average 1945 - 1954	13.79	16.06	8.60	8.36	93.04	5.95	2.69	51.32	33.8	210	85.95	3.29	40.7	89.46	83.23
1955	13.87	15.74	8.51	8.28	92.32	6.76	2.91	53.18	32.1	204	85.96	3.40	39.6	90.51	83.56
1956	13.35	15.81	8.87	8.62	92.93	5.98	2.60	53.12	35.2	222	85.49	3.32	39.9	89.79	83.44
1957	13.11	15.38	8.93	8.67	93.36	5.66	2.47	53.06	34.5	224	85.10	3.69	38.5	90.43	84.42
1958	13.12	15.92	9.09	8.82	92.87	5.89	2.55	52.38	32.9	207	84.46	4.3	39.1	89.49	83.11
1959	13.66	15.92	8.74	8.44	92.86	6.16	2.66	53.26	34.6	218	85.52	3.51	40.3	89.42	83.04
1960	13.69	15.22	8.70	8.41	93.35	5.98	2.60	53.01	36.2	238	85.63	3.31	40.3	89.40	83.45
1961	13.75	14.52	8.51	8.26	94.21	5.50	2.43	52.54	36.7	253	86.04	3.31	39.5	89.72	84.53
1962	13.29	15.49	8.97	8.73	94.15	5.02	2.24	52.17	41.2	266	83.36	5.11	39.6	87.81	82.67
1963	13.55	15.50	8.66	8.42	94.08	5.16	2.29	52.46	39.8	258	85.30	3.44	39.4	89.60	84.30
1964	13.90	15.38	8.42	8.20	94.16	5.23	2.34	52.64	39.4	256	85.52	3.32	39.9	89.65	84.42
Average 1955 - 1964	13.53	15.49	8.75	8.49	93.43	5.73	2.51	52.78	36.3	235	85.24	3.67	39.6	89.58	83.69
1965	12.99	15.57	9.20	8.97	93.99	5.00	2.20	52.98	40.6	261	84.22	3.73	39.9	87.67	82.40
1966	13.72	15.09	8.63	8.40	94.22	5.24	2.29	53.52	39.9	262	85.06	3.63	40.6	88.38	83.27
1967	12.92	15.01	9.28	9.06	94.15	5.04	2.19	53.47	39.2	261	83.41	3.81	38.8	87.52	82.33
1968	13.11	15.32	9.06	8.83	94.74	4.51	1.98	53.32	41.1	268	83.60	4.23	39.4	87.40	82.72
1969	12.88	15.03	9.10	8.86	94.98	4.30	1.89	53.30	41.2	274	84.25	4.17	38.3	88.58	84.13
1970	13.61	15.34	8.64	8.34	95.41	4.06	1.80	53.07	43.2	285	84.99	3.80	38.9	88.57	84.51
1971	12.97	14.82	8.93	8.63	95.91	3.58	1.61	52.66	41.1	277	85.14	4.20	39.4	89.41	85.76
1972	13.26	14.82	8.77	8.47	95.55	3.98	1.75	52.85	41.3	279	86.66	4.17	40.0	89.48	85.50
1973	13.08	15.64	8.93	8.62	95.55	3.87	1.69	53.19	45.0	288	85.66	4.70	39.2	89.13	85.17
1974	13.08	15.59	8.97	8.65	95.49	3.94	1.73	53.10	44.6	286	85.01	5.05	38.4	88.76	84.76
Average 1965 - 1974	13.16	15.22	8.95	8.68	95.00	4.35	1.91	53.15	41.7	274	84.80	4.15	39.3	88.49	84.06
1975	12.60	15.67	9.33	9.00	95.38	3.87	1.68	53.52	43.7	279	84.70	5.31	38.8	88.68	84.58
1976	12.43	15.52	9.41	9.08	95.48	3.79	1.66	53.20	41.7	281	84.47	5.58	38.2	88.99	84.97
1977	12.83	15.79	9.12	8.80	95.87	3.51	1.56	52.55	45.6	302	84.39	5.67	38.3	88.62	84.96
1978	12.64	15.22	9.07	8.77	96.63	2.95	1.35	51.59	45.4	314	85.36	5.27	38.0	89.58	86.55
1979	12.96	15.49	8.85	8.54	96.92	2.70	1.23	52.04	49.1	333	85.40	5.11	38.3	89.48	86.73
1980	13.34	15.95	8.73	8.42	96.89	2.73	1.24	52.10	52.2	344	84.80	5.25	38.7	88.17	85.42
1981	12.30	16.13	9.50	9.18	97.02	2.38	1.10	51.57	52.4	341	85.67	5.27	37.1	87.75	85.14
1982	12.86	15.61	9.10	8.79	97.02	2.57	1.19	51.35	51.5	345	85.12	5.80	36.6	87.64	85.03
1983	12.33	16.15	9.74	9.40	97.02	2.37	1.08	52.68	55.0	356	84.20	6.06	38.2	85.37	82.83
1984	12.27	15.62	9.43	9.11	97.42	2.12	0.99	51.35	51.5	344	85.69	5.76	37.0	88.23	85.96
Average 1975 - 1984	12.66	15.71	9.23	8.91	96.57	2.90	1.31	52.20	48.8	324	84.98	5.51	37.9	88.25	85.22
1985	13.13	15.38	8.88	8.57	97.47	2.25	1.04	51.64	52.9	358	84.55	6.71	36.3	87.51	85.30
1986	12.80	15.24	9.08	8.76	97.66	2.03	0.95	51.27	54.3	368	85.44	6.15	36.7	87.70	85.65

TABLE K
EQUIPMENT AND POWER USED
SOUTH AFRICAN AND SWAZILAND MILLS

SYMBOL OF FACTORIES		ML	PG	UF	EN	A	FX	B	AK	DL	A	HS	B	HE
EXTRACTION PLANT														
Total installed power	kW/tfh	156	151	202	107	182	181	138	201	140	207	150		
Cane preparation	kW/tfh	92	93	101	39	124	123	99	90	98	82	63		
Mills:Total roller volume	m ³ /tch	0.23	0.60	1.34	0.62	0.33	0.33	0.53	1.23	0.20	1.35	1.26		
Diffuser:Screen area	m ² /tch	(C)2.04	(B)2.00	-	(B)1.06	(C)3.13	(C)3.15	(C)1.91	-	(C)2.12	-	-		
CLARIFICATION AND EVAPORATION														
Juice heaters:Heating surface	m ² /tch	11.8	10.9	8.2	10.3	11.4	7.9	5.8	8.9	7.1				
Clarifiers:Volume	m ³ /tch	(E) 3.5	(T) 0.9	T(1.4)	(E) 2.5	(T) 1.2	(E) 1.6	(E) 2.0	(E) 2.0	(E) 2.6				
Evaporators:Heating surface	m ² /tch	32.1	43.7	45.3	40.3	58.3	40.2	42.2	43.7	38.9				
Filters:Screening area	m ² /tch	0.33	0.71	0.68	0.64	0.67	0.45	0.59	0.46	0.72				
BOILING HOUSE														
Vacuum pans:Volume	m ³ /tch	1.5	1.5	1.7	2.0	0.52	1.10	1.7	1.6	1.0	0.5	1.9		
Crystallizers:Volume A	m ³ /tch	-	1.11	<u>1.11</u>	0.77	-	1.30	<u>0.49</u>	0.78	<u>1.64</u>	-	-	1.52	-
Volume B	m ³ /tch	<u>0.49</u>	0.38	<u>1.38</u>	0.77	-	0.66	<u>0.69</u>	0.49	<u>1.09</u>	-	1.01	0.51	-
Volume C	m ³ /tch	<u>1.49</u>	0.38	<u>1.53</u>	0.62	<u>0.58</u>	1.22	-	2.65	<u>2.06</u>	-	<u>2.03</u>	0.51	<u>2.45</u>
CENTRIFUGALS														
Batch:A - massecuite	D3H/tch	69.2	93.3	61.0	50.9	33.4	58.1	49.5	37.9	46.9				
Continuous:B - massecuite	W2V/tch	159.9	149.6	186.4	262.1	206.1	141.5	116.3	103.4	113.2				
C - massecuite	W2V/tch	216.9	299.3	223.6	351.3	309.2	371.5	302.4	293.0	283.1				
STEAM AND POWER GENERATION														
Electricity	kW/tch	60.9	35.8	23.2	54.9	60.6	24.2	25.8	21.3	43.5				
Boilers:	M.C.R. Tons steam/tch	0.88	0.83	0.84	0.92	0.61	0.69	0.85	0.54	0.79				

- * C-Cane diffuser, B-Bagasse diffuser
- ** D-Basket diameter, H-Basket height
- *** Electricity generated by steam driven prime movers
- E-Conventional clarifiers, T-Trayless clarifiers
- M-Average milling tandems, d-Average diffusers
- # Excluding diffuser juice heaters
- ## W-Speed of rotation, V-Volume of cone formed by basket
- ### Continuous 'A' centrifugals
- N-batch 'B' centrifugals
- & Continuous pans

Crystallizers: Underlined figures denote water cooled.

FOR RAW SUGAR PRODUCTION
(Season 1985-1986)

GD	GH		NB		UC		IL		SZ		UK		TOTALS		UR		SH		MH	
A	B						A	B					SA	MILLS				A	B	
146	258	198	212	187	199	174	176	188	206(N)	168(d)	189	245	184	226						
55	199	95	104	101	115	111	113	95	101	-	86	90	100	73						
0.81	0.41	1.34	1.15	0.61	0.31	0.36	0.37	0.98	0.7	0.31	1.51	1.07	0.48	0.99						
0.1.62	(C)2.21	-	-	(C)2.07	(C)1.89	(C)2.05	(C)2.05	-	2.01(C)	1.71(B)	1.43(C)	-	-	(C)1.29	-					
7.6	8.0	7.9	7.3	10.0	15.1	7.1	9.5	7.6	5.6	6.1										
(E) 2.2	(T) 1.3	(E) 1.8	(E+T) 2.4	(E+T) 2.0	(T) 1.0	(E) 2.4	1.3(E)	0.5(T)	2.3	(E) 1.6	(E+T) 1.8									
24.5	43.5	48.0	38.0	47.1	60.2	34.1	44.9	35.3	29.5	41.4										
0.60	0.66	0.67	0.67	0.31	0.32	0.55	0.55	0.46	0.48	0.44										
1.8	1.1	0.4	1.5	1.8	1.1	1.0	1.4	0.5	1.6	1.3	0.3	1.2	1.4							
2.09	-	2.35	-	1.74	-	1.29	0.59	1.61	1.72	0.43	0.95	0.50	1.36	-	0.70	1.42				
1.59	-	1.57	-	1.28	0.94	0.65	1.67	0.38	1.15	0.38	0.90	0.50	1.75	-	0.23	1.18				
1.70	1.41	-	1.92	0.32	0.71	0.65	2.20	0.19	1.54	-	1.34	0.45	1.75	-	1.53	0.47	1.82			
58.2	40.6	43.6	81.7	57.6	47.1	42.5	51.7	24.4	37.6	42.7										
109.9	124.4	187.2	159.3	208.6	164.9	143.9	157.3	6.5(N)	135.5	120.9	106.7									
233.8	311.0	304.2	462.7	332.4	283.2	287.8	298.0	203.3	194.3	184.0										
40.0	48.2	68.6	27.2	46.7	43.0	39.1	42.4	29.9	24.1	21.9										
0.53	0.83	1.01	0.88	0.80	1.00	0.78	0.79	0.72	0.57	0.62										