

DATA ENTRY SHEET FOR LEAKAGE BENCHMARKING IN SOUTH AFRICA

Note: Note: An example has been included to assist you in completing this data sheet. The example input data can be seen in the pale blue shaded areas. Your input data should appear in the pale yellow shaded areas. The light green shaded areas are protected calculation fields and nothing can be entered in these fields.

Use the units as shown. If you have to use other units; you have to change the appropriate cells.

D1. GENERAL

Name of Water Undertaking	Khara Hais Municipality	
Name of Water Supply System	Uppington Waterworks and Reticulation Network	
Contact Details:	Name	Mr IAB van der Westhuizen
	Address	Private Bag X6003
		Uppington
		8800
	Telephone	054-332 5911 extension 2191
	Fax	054-331 3885
E-mail	tech@kharahaismunicipality.co.za	

D2. SYSTEM DATA

Input Description	Variable	Example Data	Actual Data	Units	
Length of Mains (Transmission + Distribution)	Lm	1500	247	km	
Number of Service Connections	Ns	60000	12555	Number	See Notes 1 & 2
Density of Service Connections (per km of mains)	Ns/Lm	40	51	Per km	
Percentage of time system is pressurised during year	T	100	100	%	See Note 3
Average operating pressure when system pressurised	P	45	25	metres	See Note 4
Population served by the supply system	Pop	100000	64669	Number	

Note 1: The number of service connections is not always the same as the number of meters or billed accounts. For South African conditions, however, you can use the total of the number of metered accounts plus the estimated number of unmetered connections

Note 2: In South Africa customer meters are usually located close to the street/stand boundary. If this is not the case for your system, then add a note here.

Insert your comments in this space.

Note 3: Use T in % eg. If T = 80%, use 80 and not 0.8

Note 4: If you do not have an accurate figure, please make a best estimate and provide brief details of how you derived it.

CCT consumers on the Cape Flats (approx 80% of the consumers in the CCT area) are supplied from reservoirs at 110m above MSL

D3. UNAVOIDABLE ANNUAL REAL LOSSES (UARL)

Details	Calculation	Example Result	Actual Data	Units
On mains	$18 \times Lm \times P \times 365 \times T/10^6$	443	41	$10^3 \text{ m}^3/\text{yr}$
On Service Connections	$0.8 \times Ns \times P \times 365 \times T/10^6$	788	92	$10^3 \text{ m}^3/\text{yr}$
Total Volume of UARL		1232	132	$10^3 \text{ m}^3/\text{yr}$
UARL in litres/service conn./day when the system is pressurised	Annual Volume of UARL $\times 10^6 / (Ns \times 365 \times T/100)$	56	29	Litres/ conn./day

D4. ANNUAL WATER BALANCE DATA

D4a. Data Period

12-MONTH PERIOD FOR WHICH DATA APPLIES	Example Data		Actual Data	
	Start Date	April 1, 1998	October 1, 2001	
	End Date	March 31, 1999	October 31, 2002	

D4b. System Input Volume

Water Supplied	Example Data				Actual Data					
	Metered 10 ³ m ³ /yr	Correction to Source Meter data		Unmetered 10 ³ m ³ /yr	Total 10 ³ m ³ /yr	Metered 10 ³ m ³ /yr	Correction to Source Meter data		Unmetered 10 ³ m ³ /yr	Total 10 ³ m ³ /yr
		+/- %	10 ³ m ³ /yr				+/- %	10 ³ m ³ /yr		
From Own Sources:	36000	2.00%	720		36720	13888	0.50%	69		13957
From Other Suppliers:	1000			280	1280					
Total:	37000		720	280	38000	13888		69		13957

D4c. Components of Authorised Consumption

Components of Authorised Consumption	Example Data					Actual Data				
	Billed Metered 10 ³ m ³ /yr	Billed Unmetered 10 ³ m ³ /yr	Unbilled Metered 10 ³ m ³ /yr	Unbilled Unmetered 10 ³ m ³ /yr	Total 10 ³ m ³ /yr	Billed Metered 10 ³ m ³ /yr	Billed Unmetered 10 ³ m ³ /yr	Unbilled Metered 10 ³ m ³ /yr	Unbilled Unmetered 10 ³ m ³ /yr	Total 10 ³ m ³ /yr
Water Exported:	1500				1500	454				454
Households:	24500	500			25000	10393	321			10714
Non-households:	6900	100			7000	573				573
Standpipes:		500	10		510				412	412
Firefighting:				100	100				29	29
Mains Flushing:				100	100				24	24
Building water:	1040				1040	328				328
Other (specify):										
Other (specify):										
TOTALS:	33940	1100	10	200	35250	11748	321		465	12534

D4d. Components of Water Losses

Details	Example Result	Actual Result	Units
Water Losses = System Input – Authorised Consumption	2750	1423	10 ³ m ³ /yr
Percentage of Total Losses estimated to represent the Apparent Losses	20	20	%
Apparent Losses	550	285	10 ³ m ³ /yr
Annual Real Losses (ARL) = Water Losses – Apparent Losses	2200	1139	10³ m³/yr

D5. SELECTED OPERATIONAL PERFORMANCE INDICATORS

D5a. Current Annual Real Losses per Connection (CARL) at Current Pressures

Details	Calculation	Example Result	Actual Result	Units
CARL is expressed in Litres/service connection/day, when system is pressurised	$ARL \times 10^6 / (Ns \times T/100 \times 365)$	100	248	Litres /conn./day
Consumption in litres/conn./day		1610	2735	Litres /conn./day

D5b. Infrastructure Leakage Index (ILI)

Details	Calculation	Example Result	Actual Result
ILI is the ratio of Current Annual Real Losses (CARL) to Unavoidable Annual Real Losses	$CARL / UARL$	1.79	8.61

D5c. Non-Revenue Water as a % by Volume of System Input

Description of Unbilled Items	Example Result			Actual Result		
	Volume $10^3 \text{ m}^3/\text{yr}$	System Input $10^3 \text{ m}^3/\text{yr}$	% of System Input	Volume $10^3 \text{ m}^3/\text{yr}$	System Input $10^3 \text{ m}^3/\text{yr}$	% of System Input
Unbilled Consumption	210	38000	0.55	465	13957	3.33
Apparent Losses:	550	38000	1.45	285	13957	2.04
Real Losses:	2200	38000	5.79	1139	13957	8.16
Total Unbilled:	2960	38000	7.79	1888	13957	13.53

D6. SELECTED FINANCIAL PERFORMANCE INDICATORS

D6a. Local Valuation of Real and Apparent Losses

Details	Example Result	Actual Result	Units
Unit Value of Real Losses (eg bulk purchase price)	0.15	0.09	R /m ³
Unit Value of Apparent Losses (eg selling price)	2.70	2.69	R /m ³

D6b. Annual Cost of Running System

Details	Example Cost	Actual Cost	Units
Annual Cost of running system in 1000's of Rand per year	45000	16952	10^3 R/year

D6c. Non-Revenue Water as % by Value of Cost of Running System

Description of Unbilled Items	Example Result				Actual Result			
	Volume $10^3 \text{ m}^3/\text{yr}$	Unit Value R /m ³	Value 10^3 R/year	% of Annual Running Costs Costs	Volume $10^3 \text{ m}^3/\text{yr}$	Unit Value (R /m ³)	Value 10^3 R/year	% of Annual Running Costs Costs
Unbilled Consumption	210	2.70	567	1.26	465	2.69	1251	7.38
Apparent Losses:	550	2.70	1485	3.30	285	2.69	766	4.52
Real Losses:	2200	0.15	330	0.73	1139	0.09	102	0.60
Total Unbilled:	2960		2382.00	5.29	1888		2119	12.50