

**INSTRUCTION MANUAL**

**EVAPORATION PAN**

**CLASS A**

QUALITY SYSTEM  
**ISO**  
**9001**  
2000  
CERTIFIED

**HYDROLOGICAL SERVICES PTY LTD**  
PO BOX 332, LIVERPOOL B.C NSW 1871, AUSTRALIA  
Phone: (Int.) 612 9601 2022 Fax:(Int.) 612 9602 6971  
Phone: (Nat.) (02) 9601 2022 Fax:(Nat.) (02) 9602 6971  
Email: [sales@hydrologicalservices.com](mailto:sales@hydrologicalservices.com)

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**I HYDROLOGICAL SERVICES STANDARD WARRANTY TERMS**

WARRANTY, DISCLAIMER AND LIMITATION OF LIABILITY:

We warrant this product to be free from defects in material and workmanship for a period of three years from the date of shipment hereof or its total rated life, whichever first occurs. During the warranty period, we will repair or replace this product if it is returned to us with shipping charges prepaid and we determine it to be defective. This warranty shall not apply if this product has been subjected to misuse, negligence, accidents, or misapplied, or modified or repaired by unauthorised persons, or improperly installed, and we shall not be liable to any person for personal injury or property damage caused by such a product.

All other warranties, express and implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, are disclaimed. All other remedies and liabilities, including incidental, consequential, and special damages, losses, and expenses, are excluded.

Note: It is Hydrological Services' policy to support all of our products. If design or workmanship problems arise after this statutory warranty period we request that you contact us.

**CLASS A EVAPORATION PAN**

**II GENERAL**

The Class A Evaporation Pan is used for measurement of water evaporation. It is normally installed on a wooden platform set on the ground in a grassy location. The pan is filled with water and exposed to represent an open body of water. The pan is filled to the datum in the fixed point gauge. The evaporation rate can be measured by hook gauge or by refilling to the datum in the fixed point gauge.



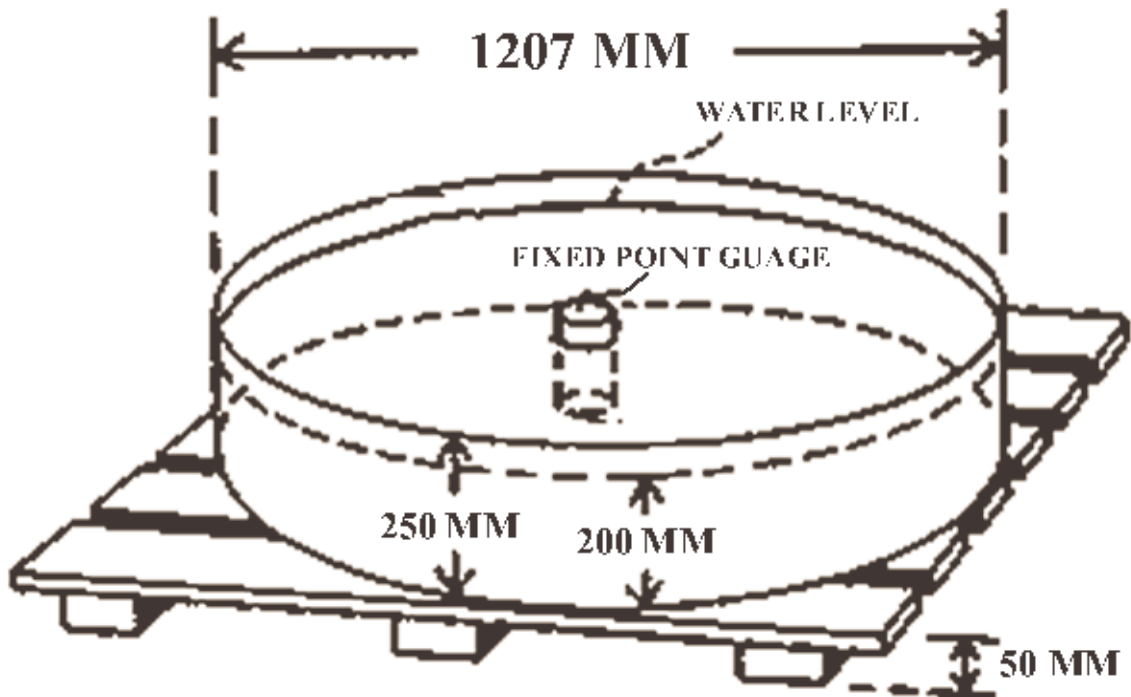
***Figure 1:*** CLASS A EVAPORATION PAN WITH FIXED POINT GAUGE AND MEASURING CYLINDER

### III SPECIFICATION

Material:	Galvanised iron.
Construction:	Welded.
Size:	255 mm x 1207 mm diameter.
Packed Weight:	65 Kg Crated.

### IV INSTALLATION

The Class A Evaporation Pan is normally installed on a wooden platform on the ground. Please refer to figure below for details.



**Figure 2:** CLASS A EVAPORATION PAN INSTALLED ON A WOODEN PLATFORM

V OPERATION

A. Rainfall

To calculate the evaporation it is necessary to measure the rainfall and the water level in the pan at the same time.

Normal Rainfall Situation:

1. Read the raingauge every day at 8:00 or 9:00 O' clock. If the raingauge is empty no entry need to be made against the date [i.e in column (L)]. [see figure (4) and figure (6)].
2. If the reading is 0.1 mm (i.e below the first graduation in the measure) enter the word "trace" in column (L) [see figure (4) and figure (6)] . **Note:** Days in which rainfall is less than 0.1 mm are not considered as rain days.
3. If the amount measured is due entirely to frost, fog or dew please write the word "frost", "fog" or "dew" beside the entry of the amount. **Note:** although an amount of 0.2 mm or more may be entered these particular days are not counted as rain days.
4. If there is an error in the raingauge reading due to "raingauge overflow", "raingauge leaking" or "funnel blocked by hail" enter the amount and enter the reason for suspecting the reading in the "remarks" section.

Unusual Heavy Rainfall

1. In addition to the routine check of rainfall at 8:00 or 9:00 O'clock, it is valuable to provide information of the actual time when heavy rainfall occurs.
2. If heavy rainfall has been falling for some hours a reading of the raingauge at the time is considered a valuable information.
3. A reading of the raingauge at the end of a thunderstorm also provides valuable information.

B. Class A Evaporation Pan

1. Measure the evaporation daily at 8:00 or 9:00 O'clock.
2. If an observation is missed leave the columns for that day blank and enter the time interval since the previous observation in the remarks section (e.g. "72 hours period" entered on Monday when Saturday and Sunday are missed).

Case1: Water level in the pan is **below** the fixed point proceed as follow:

- (a). Let "A" be the amount of water added to the pan, enter the "A" value in column (F) of the observation chart.

- (b). Water should only be added using the supplied **measuring cylinder**.  
**Always full measures** should be used.



**Figure 3:** Refilling water to the fixed point gauge (datum).

- (c). Let “G” be the **number** of full measures (i.e filled to the zero mark in the measuring cylinder).
- (d). Add the “G” value to column (G) in the observation chart and times the “G” value by 4.
- (e). Let “H” be the value of full measure **amount** added to the pan. Therefore the H value is obtained as shown in equation (1) below.

$$G \times 4 = H \quad (\text{Equation 1}).$$

Let say  $G=5 \Rightarrow H = 5 \times 4 = 20 \text{ mm}$  (Equation 2)

- (f). Add the “H” value to the observation chart as shown in figure (4) below.

Rainfall, Evaporation Observations					Station: <i>SYDNEY</i>					Time: <i>9:00</i>		Date: <i>13/8/20</i>	
Day	Water Temperature (°C)				Amount of Water Added or Removed(mm)					Rainfall (mm)	for office use only	Evaporation (mm)	Remarks
	before touching		after setting		A or R	no. of full measures	full measures amount	part measure amount	total				
	max	min	max	min						if A in col. R L-K = M			
	B	C	D	E	F	G x 4 = H	J	(H+J)=K	L		M		
1	26	21	22	22	A	5 x 4 =	20.0	2.4	22.4	0.6	23	5 FULL MEASURES	
2						x 4 =							

**Figure 4:** Example (1)- When adding water to the pan.

- (g). When the water level just reaches the fixed point **read**, to the nearest 0.2 mm, the level of the water remaining in the measure.
- (h). Let “J” be the level of the water remaining in the measure. Add this value to the observation chart (see figure 4)

Let Say:  $J = 2.4 \text{ mm}$  (equation 3)

- (i). Let “K” be the entries added in column “H” and “J”

Therefore:  $K = H + J$  (equation 4)

Substitute equations (2) and (3) in equation (4)

Therefore  $K = 20 + 2.4 = 22.4 \text{ mm}$  (equation 5)

- (j). Add the rainfall value in column “L” to the “K” value and enter the result in column “M” of the observation chart

Therefore the evaporation to the nearest 0.2 mm is calculated as follows:

$M = L + K$  (equation 6)

By looking at the example in figure (4) the value of “M” will be:

$M = 0.6 + 22.4 = 23.0 \text{ mm}$

**Note:** Please note equation (6) is only used when water is added to the evaporation pan by the observer.

**Case2: Water level in the pan is *above* the fixed point proceed as follow:**

- (a). Let “R” be the amount of water removed from the pan, enter the “R” value in column (F) of the observation chart.
- (b). Water should only be removed using a vessel and the supplied **measuring cylinder**. Remove water with a vessel and pour into measuring cylinder till you reach the **zero mark**. Continue with the operation until the level of water required in the pan is reached. If the last measure is **partly filled** read value to the nearest 0.2 mm.
- (c). Let “G” be the **number** of full measures removed (i.e filled to the zero mark in the measuring cylinder).
- (d). Add the “G” value to column (G) in the observation chart and times the “G” value by 4.

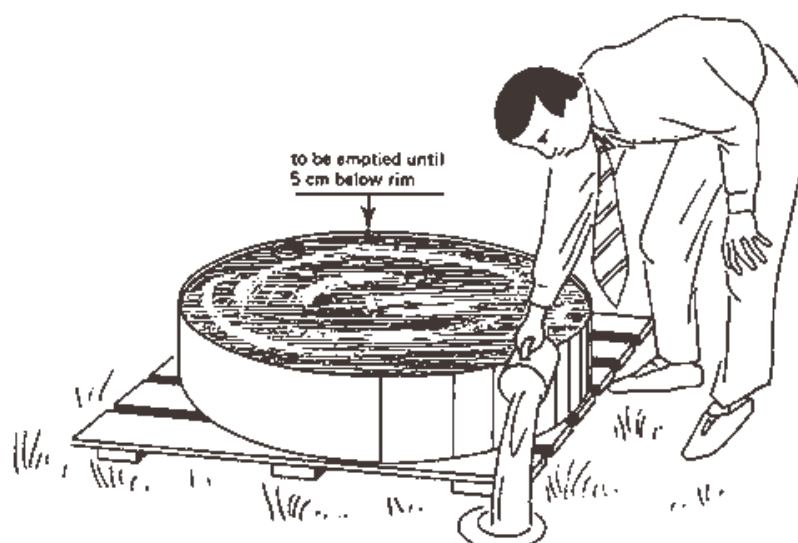


Figure 5: Emptying water to the fixed point gauge (datum).

- (e). Let “H” be the value of full measure **amount** removed from the pan. Therefore the H value is obtained as shown in equation (7) below.

$$G \times 4 = H \quad (\text{equation 7}).$$

Let say  $G = 2 \Rightarrow H = 2 \times 4 = 8 \text{ mm}$  (equation 8)

- (f). Add the “H” value to the observation chart as shown in figure (6) below.

Rainfall, Evaporation Observations					Station: <u>NEWCASTLE</u>					Time: <u>9:30</u>		Date: <u>13/8/12</u>	
Day	Water Temperature (°C)				Amount of Water Added or Removed(mm)					Rainfall (mm)	for office use only	Evaporation (mm)	Remarks
	before touching		after setting		A or R	no. of full measures	full measures amount	part measure amount	total	24 hours to 0900		if A in col. F L+K = M	
	max	min	max	min								if A in col. R L-K = M	
	B	C	D	E	F	G x 4 = H	J	(H+J)=K	L	M			
1	20	16	18	18	R	2 x 4 =	8.0	1.6	9.6	24.8	15.2	2 FULL MEASURES	
2						x 4 =							

Figure 6: Example (2)- When removing water from the pan.

- (g). Let “J” be the level of the water remaining in the partly filled measure. Add this value to the observation chart (see figure 6)

Let Say:  $J = 1.6 \text{ mm}$  (equation 9)

(h). Let “K” be the entries added in column “H” and “J”

Therefore:  $K = H + J$  (equation 10)

Substitute equations (8) and (9) in equation (10)

Therefore  $K = 8 + 1.6 = 9.6 \text{ mm}$  (equation 11)

(i). Subtract the rainfall value in column “L” from the “K” value and enter the result in column “M” of the observation chart

Therefore the evaporation to the nearest 0.2 mm is calculated as follows:

$M = L - K$  (equation 12)

By looking at the example in figure (6) the value of “M” will be:

$M = 24.8 - 9.6 = 23.0 \text{ mm}$

**Note:** Please note equation (12) is only used when water is removed from the evaporation pan by the observer.

In there is a Bird Guard in use with the evaporation pan. Please the gate on the top when adding or removing water from the pan and close when operation is finished.

## **VI OBSERVATION CHART TEMPLATE**

Please Refer to next page for recording template.

Rainfall, Evaporation					Station: _____					Time: _____		Date: ___/___/20___	
Day	Water Temperature (°C)				Amount of Water Added or Removed(mm)					Rainfall (mm)	for office use only	Evaporation (mm)	Remarks
	before touching		after setting		A or R	no. of full measures	full measures amount	part measure amount	total	24 hours to 0900		if A in col. F L+K = M	
	max	min	max	min								if R in col. F L-K = M	
	B	C	D	E	F	G x 4 =	H	J	(H+J)=K	L		M	
1						x 4 =							
2						x 4 =							
3						x 4 =							
4						x 4 =							
5						x 4 =							
6						x 4 =							
7						x 4 =							
8						x 4 =							
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24						x 4 =							
25						x 4 =							
26						x 4 =							
27						x 4 =							
28						x 4 =							
29						x 4 =							
30						x 4 =							
31						x 4 =							
Total									Total Rainfall		Total Evap.		Name Of Observer : _____
Mean													Signature: _____

## HYDROLOGICAL SERVICES PTY LTD

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### VII PART LIST

PART NAME	PART NUMBER	REMARK
Class A Evaporation Pan	SC051-01	
Bird Guard	SC051-02	Optional
Fixed Point Gauge	SC051-03	
Measuring Cylinder	SC051-08	

### VIII REFERENCES

1. Bureau Of Meteorology Australia
2. [WWW.FAO.ORG/](http://WWW.FAO.ORG/)