C5 WORKSHEET SERIES · WATER & EFFLUENT

WATER BALANCE WORKSHEET

A fill-in worksheet for closing the water balance of a food factory — intake and treatment, consumption by use and required quality, losses and product carry-over, effluent by stream, and recovery. Use it before sizing the treatment plant or the ETP, and again when a consent, a reuse project or an expansion changes the numbers.

VERSION 1.0 · JUL 2026 6 SHEETS · 1 BALANCE CHECK GATES: CONCEPT · BASIC ENGINEERING · CONSENT

HOW TO USE THIS WORKSHEET

1. Work in **m³ per day** throughout, and record the peak day as well as the average — treatment trains are sized on the peak, consents are written against both.
2. The balance must close: **intake = product + losses + effluent**. Sheet 6 checks it. A gap greater than a few percent means a stream is missing, not that the water vanished.
3. Record the **quality required** per use, not just the volume. Water contacting product must meet the applicable potable standard (IS 10500 or local equivalent); boiler feed, cooling make-up and floor wash do not.
4. Characterise effluent **by stream before mixing**. A strong stream segregated at source is far cheaper to treat than the diluted average of everything.

01 BASIS

COMPLETE FIRST

Specific water consumption (m³ per tonne of product) is the number to benchmark and the one your consent will eventually be argued over.

Project / site		Prepared by / date	
Production basis	T/DAY	Operating hours / days	
Water source(s)		Abstraction limit / consent	M³/D
Discharge consent limit	M³/D	Discharge route	
CIP circuits / cycles per day		Target m³ per tonne	M³/T

ASSUMPTIONS & OPEN QUESTIONS

02 INTAKE & TREATMENT

Include every reject stream — RO reject and softener regeneration are intake you paid for and effluent you must treat.

SOURCE / TRAIN	TREATMENT	PEAK M³/D	AVG M³/D	REJECT M³/D
TOTAL INTAKE (A)				

03 CONSUMPTION BY USE

One row per use point: ingredient water, CIP, sanitation, boiler feed, cooling make-up, washdown, domestic, laboratory, fire reserve turnover.

USE POINT	QUALITY REQUIRED	PEAK M³/D	TO PRODUCT	TO EFFLUENT
TOTAL USE				

04 WATER LEAVING OTHER THAN AS EFFLUENT

The stream most often forgotten: water that leaves in the product, in the boiler stack, off the cooling tower, or in the sludge cake.

ROUTE OUT	BASIS OF ESTIMATE	PEAK M³/D	AVG M³/D
In the product			
Evaporation — process			
Cooling tower — evaporation & drift			
Steam — vented / lost condensate			
Moisture in waste / sludge cake			
TOTAL OUT, NOT EFFLUENT (B)			

05 EFFLUENT BY STREAM

Characterise before mixing. Segregating one strong stream at source usually costs less than treating the diluted whole.

STREAM	M³/D	BOD MG/L	COD MG/L	O&G	pH
TOTAL EFFLUENT (C)					

06 RECOVERY & REUSE

Assign reuse to the lowest-quality duty that will accept it, and state the extra treatment each route needs. Non-product uses first.

RECOVERED STREAM	REUSED FOR	TREATMENT NEEDED	M³/D
TOTAL RECOVERED (D)			

BALANCE CHECK

The balance closes when **A = B + C** — intake equals what left other than as effluent, plus effluent. Recovered water (D) reduces fresh intake; it is not a new source.

A INTAKE	_____ M³/D	B OUT, NOT EFFLUENT	_____ M³/D
C EFFLUENT	_____ M³/D	GAP A − (B + C)	_____ M³/D
SPECIFIC CONSUMPTION	_____ M³/T	RECOVERY D / A	_____ %