Dryer Moisture Balance: Wet and Dry Basis

Water to evaporate in a dryer from the wet feed rate and the inlet and outlet moisture on a wet basis, with dry-basis moistures and the product rate.

Method: Dry-solids balance; X = M/(1 − M)

Input parameters

Unit system: SI

Parameter	Value	Unit
Wet feed rate	2,000.0	kg/h
Inlet moisture (wet basis)	35.000	%
Outlet moisture (wet basis)	8.0000	%

Calculated results

Parameter	Value	Unit
Dry solids	1,300.0	kg/h
Dried product	1,413.0	kg/h
Water evaporated	586.96	kg/h
Inlet moisture (dry basis)	0.53846	
Outlet moisture (dry basis)	0.086957	

Formula and method

$$\dot{m}_s = \dot{m}_F(1 - M_1), \quad \dot{m}_P = \frac{\dot{m}_s}{1 - M_2}, \quad \dot{m}_w = \dot{m}_F - \dot{m}_P, \quad X = \frac{M}{1 - M}$$

Variables

$\dot{m}_F$	Wet feed rate	kg/s
M_1	Inlet moisture (wet basis)	-
M_2	Outlet moisture (wet basis)	-
$\dot{m}_s$	Dry solids	kg/s
$\dot{m}_P$	Dried product	kg/s
$\dot{m}_w$	Water evaporated	kg/s
X_1	Inlet moisture (dry basis)	-
X_2	Outlet moisture (dry basis)	-

Method and standards

Dry-solids balance.

Assumptions and limits

- No solids loss.

References

- Dry-solids balance; X = M/(1 − M)

Report details

Report reference	FCC-CBR0-MG1Q (the same inputs always give the same reference)
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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/chemical/separation/dryer-moisture-balance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.