Grain Mash: Water, Slurry Solids and Mash Flow

Water to mix with milled grain for a target slurry solids, the mash flow and the water-to-grain ratio, by a dry-solids balance.

Method: Dry-solids balance

Input parameters

Unit system: SI

Parameter	Value	Unit
Grain	250.00	t/d
Grain moisture	13.000	%
Target slurry dry solids	30.000	%

Calculated results

Parameter	Value	Unit
Water (and backset) to add	475.00	t/d
Mash (slurry)	725.00	t/d
Water-to-grain ratio	1.9000	

Formula and method

$$\dot{m}_s = \frac{\dot{m}_g(1-w)}{TS}, \quad \dot{m}_w = \dot{m}_s - \dot{m}_g$$

Variables

$\dot{m}_g$	Grain	kg/s
w	Grain moisture	-
TS	Target slurry dry solids	-
$\dot{m}_w$	Water (and backset) to add	kg/s
$\dot{m}_s$	Mash (slurry)	kg/s
r	Water-to-grain ratio	-

Method and standards

Dry-solids balance.

Assumptions and limits

- Steady flow.
- Backset (thin stillage) is counted as water, but it carries several per cent of dissolved solids, so the real slurry solids are somewhat above TS when backset is used. Count those solids in the target if you need the true figure.

References

- Dry-solids balance

Report details

Report reference	FCC-HFBE-6SYD (the same inputs always give the same reference)
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Calculator	Grain Mash: Water, Slurry Solids and Mash Flow
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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/sugar-ethanol/ethanol/grain-mash-water-ratio

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.