Warp Sizing: Size Add-On and Size Consumption

Size solids added to warp yarn from wet pick-up and size concentration, the add-on percentage, and the size material and water used per day on a sizing machine.

Method: Definitions and mass and energy balances

Input parameters

Unit system: SI

Parameter	Value	Unit
Wet pick-up (size liquor per kg dry yarn)	1.0000	kg/kg
Size solids in the liquor	10.000	%
Warp yarn through the machine (dry)	8.0000	t/d

Calculated results

Parameter	Value	Unit
Size add-on on dry yarn	10.000	%
Size solids used	33.333	kg/h
Water evaporated in the drying cylinders	300.00	kg/h

Notes for this case

- Typical add-on is 8–15 % for cotton; the water picked up must all be dried off on the cylinders.

Formula and method

$$AO = PU \cdot c, \quad \dot{M}_s = \dot{M}_y AO, \quad \dot{M}_w = \dot{M}_y PU(1-c)$$

Variables

PU	Wet pick-up (size liquor per kg dry yarn)	kg/kg
c	Size solids in the liquor	-
$\dot{M}_y$	Warp yarn through the machine (dry)	kg/s
AO	Size add-on on dry yarn	-
$\dot{M}_s$	Size solids used	kg/s
$\dot{M}_w$	Water evaporated in the drying cylinders	kg/s

Method and standards

Mass balance.

Assumptions and limits

- Steady running.
- The sized yarn is taken to leave bone dry; in practice it enters and leaves with some regain (moisture), so the water evaporated is slightly overstated.

References

- Definitions and mass and energy balances

Report details

Report reference	FCC-6DF5-RG4A (the same inputs always give the same reference)
Generated	17 November 2026, 19:50 UTC
Calculator	Warp Sizing: Size Add-On and Size Consumption
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/textile-rice-oil/warp-sizing-add-on

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.