Bagasse or Biomass Feeder Capacity and Number of Feeders

Throughput of a drum, belt or screw feeder from its width, fuel bed height, speed and fuel bulk density, and the feeders needed for a firing rate with spares.

Method: Volumetric throughput ṁ = ρ W H v

Input parameters

Unit system: SI

Parameter	Value	Unit
Feeder width	0.60000	m
Fuel bed height	0.25000	m
Feeder surface speed	6.0000	m/min
Fuel bulk density	140.00	kg/m³
Fuel firing rate	30.000	t/h
Spare feeders	1.0000	
Fill and slip factor (1 = full bed, no slip) Real feeders deliver less than the full-bed volume: enter a factor from weighing, or a design margin.	100.00	%

Calculated results

Parameter	Value	Unit
One feeder	7.5600	t/h
Feeders in service	4.0000	
Feeders installed	5.0000	

Notes for this case

- Bulk density of bagasse varies with moisture and packing: calibrate the feeder by weighing.

Formula and method

$$\dot{m}_1 = \phi\,\rho_b W H v, \quad N = \lceil \dot{m}_f / \dot{m}_1 \rceil$$

Variables

W	Feeder width	m
H	Fuel bed height	m
v	Feeder surface speed	m/s
ρ_b	Fuel bulk density	kg/m³
$\dot{m}_f$	Fuel firing rate	kg/s
n_s	Spare feeders	-
ϕ	Fill and slip factor	-
$\dot{m}_1$	One feeder	kg/s
N	Feeders in service	-
N_t	Feeders installed	-

Method and standards

Volumetric feed.

Assumptions and limits

- The fill and slip factor (default 1, full bed) and the spares carry any design margin; with 1 the feeders in service run at 100 % of their volumetric rating.

References

• Volumetric throughput $\dot{m} = \rho\ W\ H\ v$

Report details

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Release checks	3 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/steam-power/bagasse-feeder-capacity

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.