Belt (Conveyor) Dryer Area, Length and Belt Speed

Belt area, length and speed of a through-circulation conveyor dryer from the wet feed rate, residence time, bed loading and belt width.

Method: Hold-up sizing of conveyor dryers

Input parameters

Unit system: SI

Parameter	Value	Unit
Wet feed rate	2,000.0	kg/h
Residence time	45.000	min
Bed loading of wet feed	30.000	kg/m²
Belt width	2.5000	m
Number of passes (stacked belts)	1.0000	

Calculated results

Parameter	Value	Unit
Belt area needed	50.000	m²
Length per pass	20.000	m
Belt speed	0.44444	m/min
Wet hold-up on the belt	1,500.0	kg

Notes for this case

• A conveyor dryer holds the feed for the residence time, so the wet hold-up is feed rate × time; spread at the chosen bed loading it needs that much belt area. The belt then moves one pass length in the residence time divided by the number of passes. Bed loading (kg of wet feed per m²) is limited by air pressure drop and uneven drying through deep beds; drying trials fix both it and the time. Shrinkage and transfer between belts allow some recovery of area.

Formula and method

$$A = \frac{\dot{m}_f \tau}{q_b}, \quad L = \frac{A}{nB}, \quad v = \frac{nL}{\tau}$$

Variables

$\dot{m}_f$	Wet feed rate	kg/s
τ	Residence time	s
q_b	Bed loading of wet feed	kg/m²
B	Belt width	m
n	Number of passes (stacked belts)	-
A	Belt area needed	m²
L	Length per pass	m
v	Belt speed	m/s
m_h	Wet hold-up on the belt	kg

Method and standards

Belt dryer.

Assumptions and limits

- Uniform loading; constant residence time.

References

Hold-up sizing of conveyor dryers

Report details

Report reference	FCC-A74B-A7XD (the same inputs always give the same reference)
Generated	23 November 2026, 17:34 UTC
Calculator	Belt (Conveyor) Dryer Area, Length and Belt Speed
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
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/chemical/drying/belt-dryer-area

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.