Moulding Sand Permeability Number (AFS Test)

AFS permeability number of a rammed moulding sand specimen from the air volume, specimen size, pressure and time, and by the standard 3007.2/t formula.

Input parameters

Unit system: SI

Parameter	Value	Unit
Volume of air passed	2,000.0	cm^3
Specimen height	5.0800	cm
Specimen cross-section	20.268	cm^2
Time for the air to pass	25.000	s
Pressure difference across the specimen	10.000	cmWC

Calculated results

Parameter	Value	Unit
Permeability number	120.31	
Standard-apparatus formula 3007.2/t	120.29	
Air flow through the specimen	4.8000	L/min

Notes for this case

• The permeability number is the air flow (cm^3/min) through a specimen 1 cm long and 1 cm^2 in section under 1 cm of water. The 3007.2/t formula applies only to the standard 2 in × 2 in AFS specimen, 2,000 cm^3 of air and 10 cm water gauge.

Formula and method

$$P = \frac{Vh}{a\,t\,p} \quad (\mathrm{cm^3},\ \mathrm{cm},\ \mathrm{cm^2},\ \mathrm{min},\ \mathrm{cm\ H_2O}), \quad P_{std} = \frac{3007.2}{t\,[\mathrm{s}]}$$

Variables

V	Volume of air passed	m^3
h	Specimen height	m
a	Specimen cross-section	m^2
t	Time for the air to pass	s
p	Pressure difference across the specimen	Pa
P	Permeability number	-
P_{std}	Standard-apparatus formula 3007.2/t	-
Q	Air flow through the specimen	m^3/s

Method and standards

AFS permeability number.

Assumptions and limits

- Laminar flow through the specimen.

Report details

Report reference	FCC-DDBP-QJ25 (the same inputs always give the same reference)
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Calculator	Moulding Sand Permeability Number (AFS Test)
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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/materials/steelmaking-foundry/moulding-sand-permeability-number

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.