Equipment Cost Scaling: Six-Tenths Rule and Cost Index

Cost of equipment or a plant of a different capacity from a known cost by the capacity exponent (six-tenths rule), brought up to date with a cost index.

Method: Capacity-exponent cost scaling and cost-index escalation

Input parameters

Unit system: SI

Parameter	Value	Unit
Known cost (your currency)	1.0000e+07	
Capacity of the known item	50.000	
Capacity wanted	120.00	
Capacity exponent	0.60000	
Cost index when the known cost applied	600.00	
Cost index now	800.00	

Calculated results

Parameter	Value	Unit
Estimated cost now	2.2546e+07	
Size factor	1.6909	
Escalation factor	1.3333	
Cost per unit of capacity	187,882	

Notes for this case

• Equipment cost rises less than in proportion to size, roughly as capacity to the power 0.6 (the six-tenths rule), because wall area, controls and engineering grow more slowly than volume. Exponents range from about 0.4 to 0.9 by equipment type. A cost index (such as the Chemical Engineering Plant Cost Index or a national wholesale price index) brings an old cost to today's prices. Use for order-of-magnitude estimates (±30 %), within about a factor of ten in size.

Formula and method

$$C_2 = C_1 \left(\frac{S_2}{S_1}\right)^n \frac{I_2}{I_1}$$

Variables

C_1	Known cost (your currency)	-
S_1	Capacity of the known item	-
S_2	Capacity wanted	-
n	Capacity exponent	-
I_1	Cost index when the known cost applied	-
I_2	Cost index now	-
C_2	Estimated cost now	-
$(S_2/S_1)^n$	Size factor	-
I_2/I_1	Escalation factor	-
C_2/S_2	Cost per unit of capacity	-

Method and standards

Six-tenths rule.

Assumptions and limits

- Same technology and site conditions.

References

Capacity-exponent cost scaling and cost-index escalation

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/general/economics/six-tenths-rule-cost-scaling

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.