Stirrup Cutting Length, Number and Steel Weight

Cutting length of a closed rectangular stirrup with two hooks and bend deductions, the number of stirrups over a beam length and their total weight.

Method: Bar bending schedule practice

Input parameters

Unit system: SI

Parameter	Value	Unit
Beam width	300.00	mm
Beam overall depth	450.00	mm
Clear cover to stirrup	25.000	mm
Stirrup bar diameter	8.0000	mm
Hook length (bar diameters, each)	10.000	
Deduction per 90° bend (bar diameters)	2.0000	
Deduction per 135° bend (bar diameters)	3.0000	
Length to be stirruped	6.0000	m
Stirrup spacing	150.00	mm

Calculated results

Parameter	Value	Unit
Inside width (centreline)	242.00	mm
Inside height (centreline)	392.00	mm
Cutting length	1,332.0	mm
Number of stirrups	41.000	
Steel weight	21.549	kg

Notes for this case

• Centreline perimeter 2(a + h) with a = b − 2c − φ, h = D − 2c − φ, plus two hooks, less three 90° and two 135° bend deductions. Hook length and deductions are the user's code or site practice (common values: hook 10φ or 75 mm minimum, 2φ per 90° and 3φ per 135° bend). Steel density 7,850 kg/m³.

Formula and method

$$L_c = 2(a+h) + 2k_h\phi - 3k_{90}\phi - 2k_{135}\phi, \quad n = \left\lfloor \frac{L}{s} \right\rfloor + 1$$

Variables

b	Beam width	m
D	Beam overall depth	m
c	Clear cover to stirrup	m
ϕ	Stirrup bar diameter	m
k_h	Hook length (bar diameters, each)	-
k_{90}	Deduction per 90° bend (bar diameters)	-
k_{135}	Deduction per 135° bend (bar diameters)	-
L	Length to be stirruped	m
s	Stirrup spacing	m
a	Inside width (centreline)	m

h	Inside height (centreline)	m
L_c	Cutting length	m
n	Number of stirrups	-
m	Steel weight	kg

Method and standards

Stirrup schedule.

Assumptions and limits

- Closed rectangular stirrups with two 135° hooks.

References

Bar bending schedule practice

Report details

Report reference	FCC-22RT-DQXD (the same inputs always give the same reference)
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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/civil/quantities/stirrup-cutting-length

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.