Bar Bending: Cutting Length of a Bent Bar

Cutting length of a reinforcing bar from its straight lengths, number of bends and hooks, with deductions for bends and lengths for hooks as set by your standard.

Method: Cutting length = straight lengths − bend deductions + hooks (bar bending schedule practice)

Input parameters

Unit system: SI

Parameter	Value	Unit
Sum of the straight lengths (outside dimensions)	4.8000	m
Bar diameter	16.000	mm
Number of 45° bends	2.0000	
Number of 90° bends	2.0000	
Number of hooks	0	
Deduction per 45° bend (× d) Your code or detailing standard; commonly 1 d.	1.0000	
Deduction per 90° bend (× d) Commonly 2 d.	2.0000	
Length per hook (× d) Commonly 9 d for a 180° hook.	9.0000	
Number of bars	20.000	

Calculated results

Parameter	Value	Unit
Cutting length of one bar	4.7040	m
Total length	94.080	m
Total mass (steel 7850 kg/m³)	148.49	kg

Notes for this case

- Deductions and hook lengths follow your detailing standard; the defaults are common site values.

Formula and method

$$L_c = \Sigma L - (n_{45}k_{45} + n_{90}k_{90})d + n_h k_h d, \quad L_t = nL_c, \quad m = 7850\ \text{kg/m}^3 \cdot L_t \frac{\pi d^2}{4}$$

Variables

ΣL	Sum of the straight lengths (outside dimensions)	m
d	Bar diameter	m
n_{45}	Number of 45° bends	-
n_{90}	Number of 90° bends	-
n_h	Number of hooks	-
k_{45}	Deduction per 45° bend (× d)	-
k_{90}	Deduction per 90° bend (× d)	-
k_h	Length per hook (× d)	-
n	Number of bars	-
L_c	Cutting length of one bar	m
L_t	Total length	m
m	Total mass (steel 7850 kg/m³)	kg

Method and standards

Bar bending schedule rule.

Assumptions and limits

- Values from the detailing standard; the defaults (1 d, 2 d, 9 d) are common site rules that depend on bend radius and code.
- There is no separate 135° bend (stirrup hook) input: fold its allowance into the hook length k_h.
- Steel density 7 850 kg/m³.

References

- Cutting length = straight lengths − bend deductions + hooks (bar bending schedule practice)

Report details

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Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/concrete/bar-bending-length

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.