



calculatoratoz.com



unitsconverters.com

Number of Connectors Required for Building Construction Formulas

Calculators!

Examples!

Conversions!

Bookmark calculatoratoz.com, unitsconverters.com

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

[Please leave your feedback here...](#)



List of 14 Number of Connectors Required for Building Construction Formulas

Number of Connectors Required for Building Construction

1) Maximum Moment in Span given Number of Shear Connectors

$$\text{fx } M_{\max} = \frac{M \cdot N_1 \cdot \beta}{(N \cdot (\beta - 1)) + N_1}$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$\text{ex } 108\text{kN}\cdot\text{m} = \frac{30\text{kN}\cdot\text{m} \cdot 12 \cdot 0.6}{(25 \cdot (0.6 - 1)) + 12}$$

2) Moment at Concentrated Load given Number of Shear Connectors

$$\text{fx } M = \left(\frac{(N \cdot (\beta - 1)) + N_1}{N_1 \cdot \beta} \right) \cdot M_{\max}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$\text{ex } 28.05556\text{kN}\cdot\text{m} = \left(\frac{(25 \cdot (0.6 - 1)) + 12}{12 \cdot 0.6} \right) \cdot 101\text{kN}\cdot\text{m}$$



3) Number of Shear Connectors

[Open Calculator !\[\]\(4729e517bc6a7cd81c8025b9646574fb_img.jpg\)](#)

$$fx \quad N = N_1 \cdot \frac{\left(\left(\frac{M \cdot \beta}{M_{\max}} \right) - 1 \right)}{\beta - 1}$$

$$ex \quad 24.65347 = 12 \cdot \frac{\left(\left(\frac{30kN \cdot m \cdot 0.6}{101kN \cdot m} \right) - 1 \right)}{0.6 - 1}$$

4) Number of Shear Connectors required between Maximum and Zero Moment

[Open Calculator !\[\]\(e474458956c9a37fbf9586ddb60a7fa1_img.jpg\)](#)

$$fx \quad N_1 = \frac{N \cdot (\beta - 1)}{\left(\frac{M \cdot \beta}{M_{\max}} \right) - 1}$$

$$ex \quad 12.16867 = \frac{25 \cdot (0.6 - 1)}{\left(\frac{30kN \cdot m \cdot 0.6}{101kN \cdot m} \right) - 1}$$

5) Total Number of Connectors Resisting Total Horizontal Shear

[Open Calculator !\[\]\(4fe57c3593bf1b21d272ae7ac8dfaf77_img.jpg\)](#)

$$fx \quad N = \frac{V_h}{q}$$

$$ex \quad 24042.86 = \frac{4207.5kN}{175N}$$



Shear on Connectors

6) Actual Area of Effective Concrete Flange given Total Horizontal Shear

$$\text{fx } A_c = \frac{2 \cdot V_h}{0.85 \cdot f_c}$$

[Open Calculator !\[\]\(23d9fc146e83b5c3013cfa32c784f8d5_img.jpg\)](#)

$$\text{ex } 200000\text{mm}^2 = \frac{2 \cdot 4207.5\text{kN}}{0.85 \cdot 49.5\text{MPa}}$$

7) Area of Longitudinal Reinforcement at Support within Effective Area given Total Horizontal Shear

$$\text{fx } A_{sr} = \frac{2 \cdot V_h}{F_{yr}}$$

[Open Calculator !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)

$$\text{ex } 56100\text{mm}^2 = \frac{2 \cdot 4207.5\text{kN}}{150\text{MPa}}$$

8) Area of Steel Beam given Total Horizontal Shear to be Resisted by Shear Connectors

$$\text{fx } A_s = \frac{2 \cdot V_h}{F_y}$$

[Open Calculator !\[\]\(626ce8ac21792b9405bfddfea8e0c96a_img.jpg\)](#)

$$\text{ex } 33660\text{mm}^2 = \frac{2 \cdot 4207.5\text{kN}}{250\text{MPa}}$$



9) Specified Compressive Strength of Concrete given Total Horizontal Shear

$$f_x \quad f_c = \frac{2 \cdot V_h}{0.85 \cdot A_c}$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$ex \quad 49.5MPa = \frac{2 \cdot 4207.5kN}{0.85 \cdot 200000mm^2}$$

10) Specified Minimum Yield Stress of Longitudinal Reinforcement given Total Horizontal Shear

$$f_x \quad F_{yr} = \frac{2 \cdot V_h}{A_{sr}}$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$ex \quad 150MPa = \frac{2 \cdot 4207.5kN}{56100mm^2}$$

11) Total Horizontal Shear

$$f_x \quad V_h = \frac{0.85 \cdot f_c \cdot A_c}{2}$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

$$ex \quad 4207.5kN = \frac{0.85 \cdot 49.5MPa \cdot 200000mm^2}{2}$$



12) Total Horizontal Shear between Interior Support and Point of Contraflexure

$$\text{fx } V_h = \frac{A_{sr} \cdot F_{yr}}{2}$$

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

$$\text{ex } 4207.5\text{kN} = \frac{56100\text{mm}^2 \cdot 150\text{MPa}}{2}$$

13) Total Horizontal Shear to be Resisted by Shear Connectors

$$\text{fx } V_h = \frac{A_s \cdot F_y}{2}$$

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5_img.jpg\)](#)

$$\text{ex } 4207.5\text{kN} = \frac{33660\text{mm}^2 \cdot 250\text{MPa}}{2}$$

14) Yield Strength of Steel given Total Horizontal Shear to be Resisted by Shear Connectors

$$\text{fx } F_y = \frac{2 \cdot V_h}{A_s}$$

[Open Calculator !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)

$$\text{ex } 250\text{MPa} = \frac{2 \cdot 4207.5\text{kN}}{33660\text{mm}^2}$$








Variables Used

- A_c Actual Area of Effective Concrete Flange (Square Millimeter)
- A_s Area of Steel Beam (Square Millimeter)
- A_{sr} Area of Longitudinal Reinforcement (Square Millimeter)
- f_c 28-Day Compressive Strength of Concrete (Megapascal)
- F_y Yield Stress of Steel (Megapascal)
- F_{yr} Specified Minimum Yield Stress (Megapascal)
- M Moment at Concentrated Load (Kilonewton Meter)
- M_{max} Maximum Moment in Span (Kilonewton Meter)
- N Number of Shear Connectors
- N_1 No. of Shear Connectors Required
- q Allowable Shear for One Connector (Newton)
- V_h Total Horizontal Shear (Kilonewton)
- β Beta



Constants, Functions, Measurements used

- **Measurement: Area** in Square Millimeter (mm^2)
Area Unit Conversion 
- **Measurement: Force** in Kilonewton (kN), Newton (N)
Force Unit Conversion 
- **Measurement: Torque** in Kilonewton Meter ($\text{kN}\cdot\text{m}$)
Torque Unit Conversion 
- **Measurement: Moment of Force** in Kilonewton Meter ($\text{kN}\cdot\text{m}$)
Moment of Force Unit Conversion 
- **Measurement: Stress** in Megapascal (MPa)
Stress Unit Conversion 



Check other formula lists

- **Allowable-Stress Design Formulas** 
- **Base and Bearing Plates Formulas** 
- **Bearing, Stresses, Plate Girders & Ponding Considerations Formulas** 
- **Cold Formed or Light Weighted Steel Structures Formulas** 
- **Composite Construction in Buildings Formulas** 
- **Design of Stiffeners under Loads Formulas** 
- **Economical Structural Steel Formulas** 
- **Number of Connectors Required for Building Construction Formulas** 
- **Webs under Concentrated Loads Formulas** 

Feel free to SHARE this document with your friends!

PDF Available in

[English](#) [Spanish](#) [French](#) [German](#) [Russian](#) [Italian](#) [Portuguese](#) [Polish](#) [Dutch](#)

3/28/2024 | 9:03:56 AM UTC

[Please leave your feedback here...](#)

