# Concrete beam shear check

Design code: ACI 318-19

## Materials

|  |  |  |  |
| --- | --- | --- | --- |
| Materials | Variable | Value | Unit |
| Section Label |  | V-10x16 |  |
| Concrete strength | fc | 27.58 | MPa |
| Steel reinforcement yield strength | fy | 413.69 | MPa |
| Concrete density | γc | 155.0 | kg/m³ |
| Normalweight concrete | λ | 1 |  |
| Safety factor for shear | Øv | 0.75 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Geometry | Variable | Value | Unit |
| Section height | h | 40.64 | cm |
| Section width | b | 25.4 | cm |
| Clear cover | cc | 3.81 | cm |
| Longitudinal tension rebar | As | 5.46 | cm² |

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| --- | --- | --- | --- |
| Design forces | Variable | Value | Unit |
| Axial, positive compression | Nu | 0.0 | kN |
| Shear | Vu | 167.82 | kN |

## Limit checks

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Check | Unit | Value | Min. | Max. | Ok? |
| Stirrup spacing along length | cm | 15.0 |  | 17.14 | ✔️ |
| Stirrup spacing along width | cm | 16.51 |  | 34.29 | ✔️ |
| Minimum shear reinforcement | cm²/m | 10.47 | 2.12 |  | ✔️ |

## Design checks

|  |  |  |  |
| --- | --- | --- | --- |
| Shear reinforcement strength | Variable | Value | Unit |
| Number of stirrups | ns | 1.0 |  |
| Stirrup diameter | db | 10.0 | mm |
| Stirrup spacing | s | 15.0 | cm |
| Effective height | d | 34.56 | cm |
| Minimum shear reinforcing | Av,min | 2.12 | cm²/m |
| Required shear reinforcing | Av,req | 10.42 | cm²/m |
| Shear reinforcing | Av | 10.47 | cm²/m |
| Shear steel strength | ØVs | 112.29 | kN |

|  |  |  |  |
| --- | --- | --- | --- |
| Concrete strength | Variable | Value | Unit |
| Effective shear area | Acv | 870.97 | cm² |
| Longitudinal reinforcement ratio | ρw | 0.00247 |  |
| Size modification factor | λs | 0.923 |  |
| Axial stress | σNu | 0 | MPa |
| Concrete effective shear stress | kc | 0.87 | MPa |
| Concrete strength | ØVc | 56.97 | kN |
| Maximum shear strength | ØVmax | 284.85 | kN |
| Total shear strength | ØVn | 169.26 | kN |
| Max shear check |  | ✔️ |  |
| Demand Capacity Ratio | DCR | 0.99 | ✔️ |