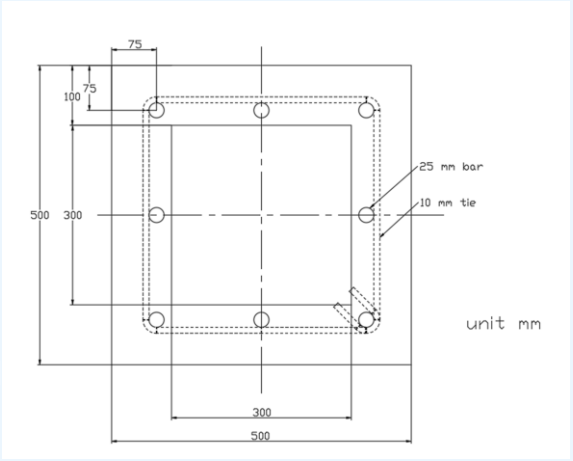
# Cavity Column CC-500.S

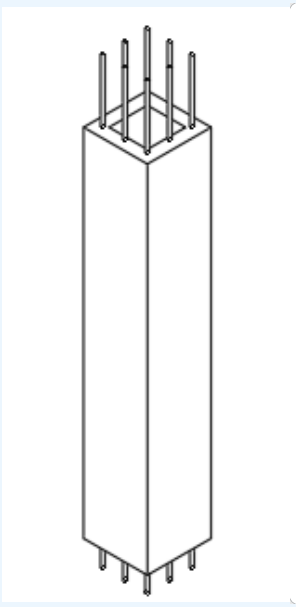
3rd Bureau Construction

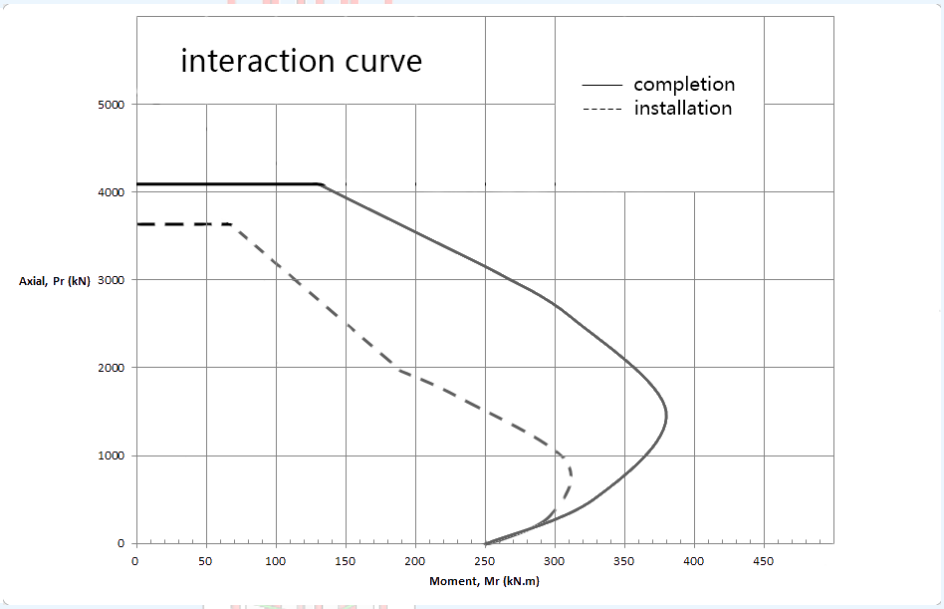
- 500 x 500 mm cross-section satisfy 90% less than 10 stories building
- Less than 2 ton self-weight no requirement to crane
- No need for formwork and complex reinforcement reducing the requirements on workers
- The column reaches the same strength as the cast-in-place construction, and the joints reach more than 83% of the cast-in-place construction.
- 120 m installation per day
- Provides an instant working support for other trades
- Storage in factory waiting for transport
- Continuous installation minimizing down time on site
- Proper co-ordination and quick installation allows for a fast-paced construction site

# Specification sheet

| Properties | symbol | Metric |
|---|---|---|
| Cross-section Area | $A_X$ | $160000mm^2$ |
| Unit Weight | W | 416.92 kg/m |
| Resistance factor for steel | $\phi_s$ | 0.85 |
| Yield stress for steel | $f_s$ | 400MPa |
| Resistance factor for concrete | $\phi_c$ | 0.65 |
| Yield stress for concrete | $f_c$ | 25MPa |
| Tie size | $d_t$ | 10 mm |
| Tie spacing | $s_t$ | 300 mm |

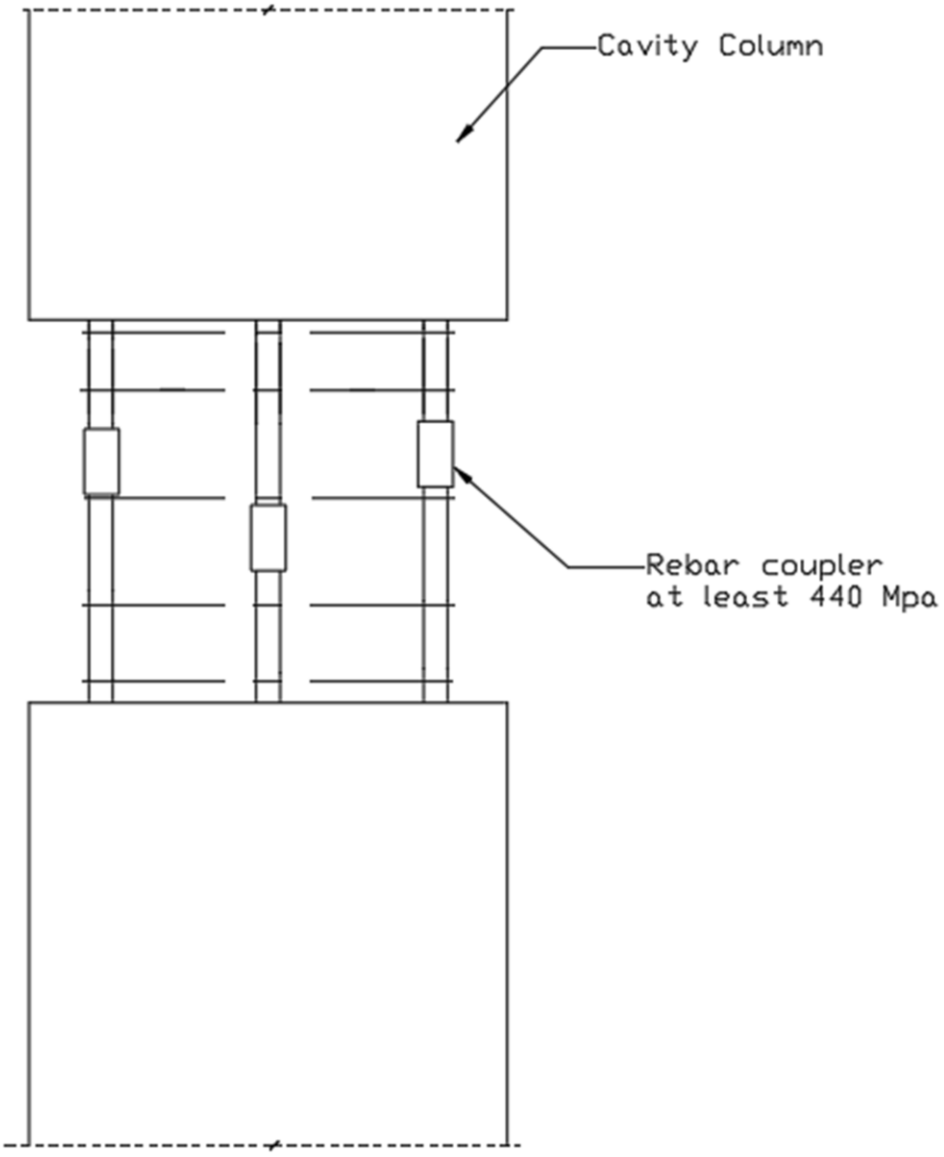





- Custom sized and reinforced columns available.
- Special-shaped columns welcome consultation.
- Steel bar ends thread rolled already.
- Custom bar ends treatment available.
- Consult us for additional information.

## Connection



# Technical Stats

- Fire Protection

  According to the requirements for minimum fire-resistance rating of NBC 2020 (National Building Code) Table 2.2.1.4, for Group G Division 1 adjoining Group D and E need at least 1hour, adjoining G-2 and G-3 need minimum 2 hours fire resistance rating.

  For Group G Division 2 and 3 adjoining Group A and C need at least 1 hour, adjoining Group G and F-1 require minimum 2 hours fire resistance rating.

  1) Based on data of residential fires provided by the U.S. Fire Administration, when a flashover occurs, the peak temperature inside the house is 1,100°F ( 600°C ). Steel and concrete meet AISC and CSA requirements. The rebar core temperature still has 61% of the original strength after reaching 600°C, the concrete strength still has 78% and 69% of the design strength after 1 hour and 2 hours at the peak temperature of 500°C, and 67% and 56% of the design strength after 1 hour and 2 hours at the 600°C peak temperature.
  2) The rebars are at least 30mm away from any surface of column, which satisfy the requirement by CSA A23.1-04 Table 17, providing sufficient thermal insulation space for the structural steel.

- Structural Strength
  1) The design of column for axial load and flexure according to CSA A23.3
     - Plane sections remain plane (C1.10.1.12)
     - Stress –strain relationship (C1.10.1.17)
     - Concrete tensile strength is predicted according to C1.10.1.5
     - The maximum concrete strain is defined as 0.0035 according to C1.10.1.3
  2) The factored axial load resistance according to CSA A23.3 C1.10.10.4
     - For tied columns calculated by A23.3 Eq.10.9
  3) Reinforcement requirement base on CSA A23.1 and A23.3
     - Concrete cover satisfies CSA A23.1 C1.6.6.6.2.3.
     - Minimum and maximum longitudinal reinforcement ratio according to A23.3 C1.10.9.1 and C1.10.9.2.
     - Longitudinal bars layout according to CSA A23.3 C1.10.9.3, A23.1 C2.6.6.5.2 and A23.3 C1.7.4.1.3.
     - Tie size and arrangement according to A23.3 C1.7.6.5.1, C1.7.6.5.2 and C1.7.6.5.5.
     - Slenderness considered under CSA A23.3 C1.10.14 and C1.10.15.
  4) Hook and anchor length meet CSA23.3 reinforced concrete beams and slab anchorage requirement
     - Development lengths of straight reinforcing bars in tension in slab are much larger than CSA A23.3 C1.12.2.2 and C1.12.2.3 requirements.
     - Hooks dimensions standardized by CSA A23.1 C1.6.6.2.2, and hook development Length designed according to CSAA23.3 C1.12.5.1.
     - Tie anchorage designed under CSA A23.3 C1.7.1.2.

1. Price Included
   - Precast Cavity Column

2. Reference Material:
   a) CSA A23.3-19: Design of Concrete Structures.
   b) CSA A23.4-09: Precast Concrete Material & Construction.
   c) Precast Concrete Institute (PCI): Manual on Design of Connections for Precast.
   d) Precast Concrete Institute (PCI): Design Handbook – Precast & Pre-stressed Concrete.

3. Quality Assurance:
   - Conformity to PCI manual on design of connection for Precast Pre-stressed Concrete, PCI Design Handbook – Precast &Pre-stressed Concrete, CSA A23.4.

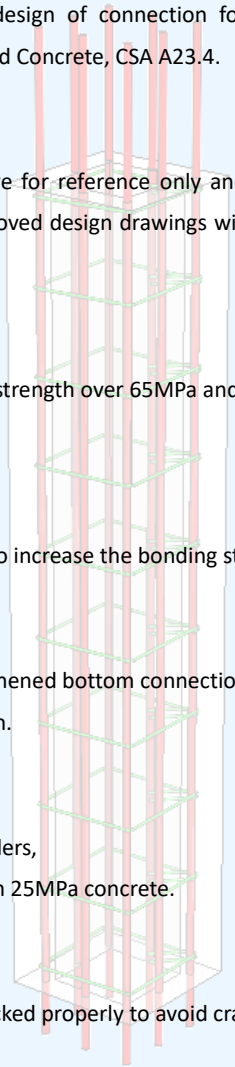


4. Designs:
   - The connection design details are for reference only and can be installed according to the design of professional engineers. The approved design drawings with PENG seal or signature should be reviewed and recorded.

5. Accessories:
   a) Structural adhesive compressive strength over 65MPa and tensile strength over 30MPa (optional)
   b) Hanger Frame ( optional)

6. Finishes:
   a) Adopt green cutting technology to increase the bonding strength on connection surface

7. Installation Step :
   a) Place Structural adhesive or roughened bottom connection area.
   b) Lifting and placing precast column.
   c) Place joints ties.
   d) Connect by rebar couplers.
   e) Place upper reinforcement of girders,
   f) Secondary pouring with minimum 25MPa concrete.



# Warning

- CC-500.S Cavity Columns shall be stacked properly to avoid cracking and collapse.
- CC-500.S Cavity Columns has no lifting loops and must be packed up with wire rope or sling chokers.
- CC-500.S Cavity Columns must be used with cast-in-place layers and rebar coupler connection.
- Never load CC-500.S Cavity Columns with building materials, construction equipment and upper floor support exceeding design capacity.
- Cast-in-place layers must be kept from freezing while curing. Maintain a minimum of 5˚ for 24 hours.

# Warranty Policy

This document sets forth the warranty policy of the 3rd Bureau Construction from which you purchase your CC-500.S Cavity Column.

This policy is applicable only to 3rd Bureau Construction CC-500.S described in the agreement extended to the Purchaser along with the correlated invoice.

This warranty policy is subject to the provisions as set forth herein and is subject to the terms and conditions as attached to this document ('Warranty Terms and Conditions').



This warranty policy only applies if referred to in a sales agreement between the 3rd Bureau Construction and the Purchaser and it will replace the standard warranty clause provided in the 3rd Bureau Construction general terms and conditions of sale.

Warranty period

This product does not accept returns for non-quality issues.
This product comes with 5 years of free structural warranty including free replacement if well stored for more than 2 years from the date of production.
The warranty period starts on the date the products are produced.
By default, Purchaser receives above mentioned 'standard warranty'.
On request, an 'extended warranty' or 'customized project warranty' can be agreed upon after evaluation of the specific.
Application conditions
Purchaser shall not rely upon any other information or documentation.
Within the warranty period, the 3rd Bureau Construction will repair any defective slabs or replace fixture with equal working model in the same conditions or better if applicable.

Summary Warranty Terms and Conditions (non-exhaustive)

This warranty policy is valid only for products sold in Canada only.
Products have been purchased directly from 3rd Bureau Construction Inc.
Proof of purchase is available for inspection by 3rd Bureau Construction Inc.
Products have been properly installed and operated in accordance with the manufacturer's instructions.
A 3rd Bureau Construction Inc. representative will have access to the defective Products.
If the Products or other parts become suspect, the representative shall have the right to invite other representatives of manufacturers or suppliers to evaluate the structure.
Labor costs for installation of the Products are not covered under this warranty.