The ultimate **high strength** structural blind fastening system.

**ONESIDE™**

**STRUCTURAL FASTENER**

**AJAX FASTENERS**
ONESIDE™ provides true structural strength for joints where access is limited to only one side of the joint, unlike other blind fastening products available.

ONESIDE™ Applications

- Engineered construction industry using high-performance hollow structural members
- Earthquake and cyclone tolerant structures
- Steel Structures requiring large damping
- Bridges using box girders and other hollow sections
- Hollow communication towers
- Process and manufacturing equipment
- Rolling stock and railway infrastructure applications
- Steel / Concrete composite construction
- Retrofitting structural fixtures on hollow or one-sided access structures
- Tanks, pressure vessels
- Ship building
- Automotive and heavy automotive
- Mining and mineral processing equipment
- Weight reduction on large transport vehicles, trailers
- Heavy cranes and lifting equipment

ONESIDE™ has been used successfully in the following applications

- Westgate Bridge, Melbourne, Australia, strengthening project
- Telecommunication tower strengthening throughout Australia, USA and in the Middle East
- Airplane hanger construction, where large spans and weight was a significant factor
- Railway industry, in timber bridge rehabilitation with hollow structural members, and fastening of decking to existing hollow steel structures without the use of scaffolding
- Railway Industry ONESIDE™ is being trialled for open bridge transom-sleeper installations to open bridge steel super structure
AJAX FASTENERS is Australia’s largest fastener manufacturer, trading for over 100 years.

ONESIDE™ was invented and developed by a team of engineers working within the research and development arm of Ajax Fasteners, to satisfy a need identified for a structural blind bolting system that meets current structural engineering standards.

ONESIDE™ provides full structural strength of the bolt, in both shear and tension. It provides far superior clamping strengths. In many instances the clamping forces achieved are 3+ times greater than any competitor product. When the joining members are strong enough the full structural strength of the bolt as per current structural bolting standards can be achieved.

Features
- Develops full structural properties of the bolt provided the joining member does not fail
- Develops full shear capacity of the hole and full tension capacity of the bolt
- Sizes M16, M20, M24
- Complies with ASTM A325M and other international standards
- Simple installation method using a manual tool
- Ability to re-adjust, re-tighten and re-use in accordance with ASTM A325M and other international standards

Benefits
- Reduced onsite labour requirements compared to welding
- No skilled labour is required, compared to welding
- Ability to develop full structural capacity hence the ability to use a smaller number of bolts in a hollow member application
- High damping added to the structure
- Simple and small installation system
- Elegant, simple, robust and economical system
- Suitable for earthquake and other dynamic applications

Surface finishes available
- Hot dipped galvanised (standard)
- Mechanical galvanising
- Electroplated
- Thermal oxide (blackened)
- Magni (Zinc Rich)

ONESIDE™, can also be supplied in specialised finishes to meet architectural requirements.

Design Methodology
ONESIDE™ connections can be designed as either “Snug Fit” S-Type, or “Friction” F-Type. Documents specifying Design Methods are available from AJAX, or accredited suppliers. All design connections should be certified by a qualified structural engineer prior to installation. The design method chosen for the connection should not only incorporate the required clamping and structural forces, but also consider the use of specific equipment to achieve the required torque and correct clamping forces.

ONESIDE™ is capable of reaching clamping loads in excess of 147kN proof load for standard M20 8.8 bolts. To achieve such clamping loads the installer may need to apply torques in excess of 450Nm. Careful consideration needs to be taken into account in unusual access applications that the installer can achieve such torques.

In applications outside of structural bolting, such as high load/high dynamic load or high temperature installations, AJAX ONESIDE™ can be installed using the following options:
- ONESIDE™ single helix spring washers
- ONESIDE™ double helix spring washers
- ONESIDE™ Structural nyloc nuts
- ONESIDE™ Coneloc structural nuts

AJAX Fasteners can also offer ONESIDE™ in different structural grades and length configurations to suit your desired application.
Key Components

1. HIGH STRENGTH BOLT — this has a circular head with a diameter equal to the bearing diameter of an equivalent structural bolt. It also has a spigot at the end enabling the positive engagement with the specialised ONESIDE tool. 8.8 is the standard grade, but custom manufacture in higher grades is possible.

2. HARDBENED SPLIT STEP-WASHER — hinged on the backing tape, this washer enables insertion into the hole with the tool, taking to the other side of the joint. Split washer expands at the installation and sits snugly on the hole with the help of the positive step on the inside of the washer.

3. HARDBENED SLEEVE (OPTIONAL) — the sleeve fills the oversized hole necessary for the installation while facilitating easy centering of the bolt. This product is optional and is non-standard, and is only used where shear capacity of the bolt is not sufficient. The sleeve increases the total shear capacity of the joint. Sleeves need to be selected to suit the joint thickness / grip length (W).

4. HARDBENED SOLID STEP-WASHER — this washer completes the initial steps of the assembly, providing secure placement of all components, and provides greater bearing surface to evenly spread the clamp load over a larger than standard area, reducing the possibility of crushing in applications other than steel.

5. HARDBENED SPRING WASHER (OPTIONAL) — this washer acts as a visual indicator and as an anti-loosening device that shows the bolt has been tightened. This will also act as a secondary device preventing rotation of the bolt while installing the nut. However, this is not a device to assure bolt tension as this washer becomes flat at a fraction of the full bolt tension. It is recommended to continue tightening after flattening the spring washer.

6. HARDBENED STRUCTURAL NUT — tightening of this nut completes the assembly.

The Tool

The tool is an essential part of the ONESIDE system. The lightweight, hardened steel tool holds the components in such a way that they can be positioned for assembly. It has an ergonomic handle (A), positive locking feature for securing the bolt (B) and components (C) and a special hardened socket to assist tightening (D). When tightening, the spigot of the bolt should be held with the socket in the back of the tool (D) for the prevention of bolt rotation if that becomes an issue.

Note that the front end of the tool (B) shall never be used to hold the bolt while tightening as the section (C) on the tool may break due to excessive stresses.
**ONESIDE™ Installation Procedure**

1. **Slide nut / solid washer / sleeve (optional)** and split washer onto the body of the tool. Place the bolt onto the installation tool by pulling the sleeve on the tool backwards to engage the bolt in the front end of the tool. Then, pull the sleeve forward to lock the bolt in place. (Fig 1).

2. **Fold the collapsible washer in the thin area of the installation tool (Fig 2).** Guide the bolt and the collapsible washer through the pre-drilled hole of the assembled joint.

3. **Rotate the installation tool 180°** to unfold the collapsible washer (Fig 3). Pull back the installation tool and locate the collapsible washer against the back of the joint.

4. **Slide the sleeve (optional), solid washer, spring washer (optional) and the nut on the bolt and finger-tighten the nut (Fig 4).**

5. **Remove the installation tool from the joint;** use a rattle gun or other means to tighten the nut to achieve the desired tension (Fig 5).

6. **If spinning of the bolt is observed during tightening,** position the Back Torque End of the installation tool onto the bolt to stop spinning while tightening the nut with a suitable spanner. (Fig 6). Once locked, apply the rattle gun again.

**IMPORTANT NOTE:** The thin area at the Insertion End of the tool is not designed for any tightening purposes. After the tightening of the nut, the torque end of the tool should be used for further tightening to lock the assembly in position.

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**Research & Development**

To meet the needs of an ever-changing world, AJAX FASTENERS is constantly investigating new applications and design variations for the ONESIDE™ product; whether it is a new application or fastening to modern composite materials being developed for the infrastructure industry. AJAX is always looking into the future and possible new products to meet these ever changing demands.

The Ajax Research and Development department is supported by an in-house NATA approved testing facility for mechanical testing of fasteners. This includes 1000kN hydraulic tensile testing machines, 3D modelling, finite element analysis, along with rapid prototype capability and manufacturing capability on the same site.

AJAX FASTENERS works in collaboration with respected Australian Universities and Steel Construction Institutes, specializing in both traditional and composite infrastructure materials.

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**Technical Support**

AJAX FASTENERS offers comprehensive technical support via our engineering Department. AJAX’s philosophy is to deliver the highest quality at every stage of the service; from product design to manufacturing and testing, through to installation and design guidance. A number of design and installation guideline documents are available. For more information contact:

[engineering@ajaxfast.com.au](mailto:engineering@ajaxfast.com.au)
[sales@ajaxfast.com.au](mailto:sales@ajaxfast.com.au) or authorized AJAX ONE SIDE™ agent/distributor

All technical information provided regarding AJAX ONESIDE™ must be approved in writing by the engineering department of AJAX FASTENERS Australia.
Critical Dimensions

ONESIDE™ is available in three diameters. Other diameters may be manufactured as per demand.

<table>
<thead>
<tr>
<th>Size</th>
<th>Required Hole Diameter Z (mm)</th>
<th>Minimum Pitch Length X (mm)</th>
<th>Distance to Flat Corner Y* (mm)</th>
<th>Minimum Thickness of Fixing W** (mm)</th>
<th>A/F Dimension of Nut (mm)</th>
<th>Bolt Lengths Available L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16</td>
<td>24.0/24.5</td>
<td>40.0</td>
<td>18.0</td>
<td>5.0</td>
<td>26.0/27.0</td>
<td>45</td>
</tr>
<tr>
<td>M20</td>
<td>30.0/31.0</td>
<td>50.0</td>
<td>24.0</td>
<td>5.0</td>
<td>33.0/34.0</td>
<td>65</td>
</tr>
<tr>
<td>M24 ***</td>
<td>35.0/36.0</td>
<td>60.0</td>
<td>28.0</td>
<td>10.0</td>
<td>40.0/41.0</td>
<td>85</td>
</tr>
</tbody>
</table>

* Minimum Edge Distance = Y + T + R (mm) where T is the thickness of the wall and R is the internal corner radius.
** Range of fixing thickness can be selected with different length bolts.
*** Some lengths and sizes are made to order.

The following table summarises the maximum load carrying capacities (causing the failure of the bolt) for the product. Shear data is given per shear plane based on ASTM A325M and International Structural standards.

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Ultimate Stress (MPa)</th>
<th>Yield Stress (MPa)</th>
<th>Proof Stress (MPa)</th>
<th>Hardness Range HRC</th>
<th>Shank Area (mm²)</th>
<th>Stress Area (mm²)</th>
<th>Core Shear Area (mm²)</th>
<th>Sleeve Shear Area (mm²)</th>
<th>Tightening Torque*** (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16x2.0</td>
<td>830</td>
<td>660</td>
<td>600</td>
<td>25-34</td>
<td>201</td>
<td>157</td>
<td>144</td>
<td>163</td>
<td>60</td>
</tr>
<tr>
<td>M20x2.5</td>
<td>830</td>
<td>660</td>
<td>600</td>
<td>25-34</td>
<td>314</td>
<td>245</td>
<td>225</td>
<td>280</td>
<td>84</td>
</tr>
<tr>
<td>M24x3.0</td>
<td>830</td>
<td>660</td>
<td>600</td>
<td>25-34</td>
<td>452</td>
<td>353</td>
<td>324</td>
<td>371</td>
<td>195</td>
</tr>
</tbody>
</table>

* Note that these values assume the breakage of the bolt achieved when the tube wall thickness is large. Otherwise, the failure will be due to tearing of the tube wall which is dependent on the strength and thickness of the tube wall among other parameters.

** Tightening torques are based on 65% proof load and a nut factor of 0.2. These are suggestions only. Engineer must specify the desired tightening specifications as per the design.

Design Scope Hollow Section (cavity) installation

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Bolt Length (L)</th>
<th>Range of Joint Thickness (W)</th>
<th>Minimum Cavity Length Required (Lc,min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16x2.0</td>
<td>45</td>
<td>5 - 10</td>
<td>140</td>
</tr>
<tr>
<td>M20x2.5</td>
<td>65</td>
<td>5 - 25</td>
<td>155</td>
</tr>
<tr>
<td>M24x3.0</td>
<td>85</td>
<td>10 - 35</td>
<td>215</td>
</tr>
</tbody>
</table>

The ONESIDE™ structural blind fastening system requires a minimum length of cavity space (Lc,min) available behind the joint. This is governed by the joint thickness / grip length (W) and the Bolt Length (L). Bolt length is measured from under head to the end of the thread as shown in the figure (spigot not included). The following table provides the available range of joint thickness / grip length (W) and the minimum cavity length required for each bolt size.

DISCLAIMER: AJAX FASTENERS ensures all details are correct at time of printing, all dimensions are dependent on AJAX FASTENERS tolerances. All technical information provided regarding AJAX ONESIDE™ must be approved in writing by the engineering department of AJAX FASTENERS Australia. AJAX FASTENERS reserve the right to make specification alterations without prior notice to ensure further quality and performance.