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### Safety

- Correct PPE according to local standards should be worn at all times.
- It is recommended that gloves are worn when handling wire rope products.
- Steel products can have sharp edges, and care should be taken against injury of self or others during handling.
- NEVER CUT WIRE ROPE THAT IS UNDER TENSION. IT MAY SPRING BACK AND CAUSE SERIOUS INJURY. ALWAYS RELEASE THE TENSION AT THE RIGGING SCREWS OR THE TERMINAL FIRST.
- All installers of Brifen should follow all rules set down by local authorities and the site specific Safe Work Method Statements.

### Mark Out

- Establish location of the end anchor blocks, identify location of face of the anchor plate.
- Establish the fence alignment.
- Mark out the anchor locations at the required offsets.
Allowable Deviation in Measurement

- Standard spacing between the anchor face plate and the four posts of the terminal is 2.0 metres
- Spacing from the forth post of the terminal along the length of need is 3.2m unless otherwise stated in the design.
- The post spacing should not deviate more than ±50mm in location as measured from the starting anchor face.
- The post location must not deviate more than ±20mm from the fence alignment.

Refer drawing WR3042

Local Factors Influencing the Set out of a Fence

The nominal post spacing may need to be varied slightly during construction.

- Subsurface conditions may dictate that it is not possible to install a post at the correct location.
- This situation can be overcome by decreasing the post spacing over a short run of the WRSB to allow for a post to be installed on either side of the obstruction. This is preferable to exceeding the standard design install spacing.

- Any such incidents must be referred to the Engineer for advice. However the deflection performance of a fence is tolerant of the variation of single post spacing.

- In the event of a lengthy subsurface obstruction consider using surface mounted posts on a poured concrete plinth designed by a qualified engineer.

Constructing Anchor Foundations

- Before any construction commences, be clear on the size of the terminal anchor block to be installed.

- The standard dimension for the concrete anchor foundation for the TL-3 tested 4 rope terminal is 900mm W x 900mm L x 1200mm D. This foundation size is designed for compacted road base. If other soil conditions exist, seek advice from Hill and Smith, or consult a structural engineer.

- In Western Australia the standard dimension for the concrete anchor foundation for the TL-3 tested 4 rope anchor is 1300mm W x 1300mm L x 1800mm D. This foundation size is designed for a loose sand soil condition. If other soil conditions exist, please consult a structural engineer or contact Hill and Smith for advice.
Refer to Drawing WR3047A at the end of this manual.

Surface Mounted Terminal Plate

- In situations where it is not possible to construct an anchor block, it may be necessary to install a surface mounted anchor frame.
- It can be installed on to a concrete surface certified by an appropriate structural engineer and the anchor plate fastened using chemical anchors.
- The anchors should be a minimum M20 8.8 Zinc Plated with 170 mm embedment.
General Comments on Excavation

- The excavation shall have vertical sides.
- The minimum excavation should ensure that the poured concrete block meets the minimum required dimension for the existing soil type.
- If all spoil cannot be removed it should be compacted into the bottom of the excavation, ensuring the required depth is still achieved.
- Where the specified anchor or foundation size cannot be attained due to local conditions a qualified structural engineer should be consulted.
- Where the fence line requires that the anchor and/or post foundations are located in fill batters the supervising engineer must be consulted.

Concrete Quality

- All concrete shall be minimum grade N25 Concrete to AS 3600, unless the specification standards or the contract requirements are for a higher grade of concrete.
- No additional reinforcement other than the anchor frame or the post foundation ring is required unless specifically required by the supervising local authority.
- All concrete shall be poured to produce a dense mass substantially free from voids, vibrate if required.
- All surfaces shall be free from voids, honeycombing or other defects.
- Adjacent ground shall be shaped to prevent ponding of surface water.
- The Brifen Wire Rope barrier system should not be tensioned until the concrete has achieved minimum N25 rating.
- Concrete suppliers or a structural engineer should be consulted to determine concrete rating.

Finishing of Concrete Anchor

When finishing the BRIFEN concrete end anchor, attention should be directed to the following issues:

- The recess at the rear of the anchor has a one-way fall away from the centre of the fence. The recess facilitates the entry of the wire ropes into the anchor. The fall ensures water is dissipated away from the bearing place.
To ensure that water does not pool at the anchor face, ensure the surface of the concrete falls away from the exposed anchor face. The concrete should be kept clear of the anchor frame face.

Constructing Post Foundations

Before any construction commences, be clear what post foundations are required.

- The standard dimension for the concrete post foundation in cohesive soil is the 250mm dia. x 750mm deep.
- In Western Australia the standard dimension for the concrete post foundation is the 350mm dia. x 950mm deep.
- Place the reinforcing ring into the poured concrete, approximately 60 mm below the surface ensuring it is centered to allow the insertion of the post socket in the correct alignment.
- Insert the socket to the required level and then finish the concrete to a domed shape sloping away from the opening of the socket to prevent water pooling.

*Refer to Drawing WR3047A at the end of this manual for dimensions.*

Surface Mounted Posts

- A mortar bed of between 10mm and 30mm must be placed under a surface-mounted post unless it is attached to a steel base.
- All voids in anchorages, attachment systems and base plates should be filled with a non-setting passive filler to prevent the collection of water.
- Fasteners must meet a tensile load minimum of 30kN each.
Install and Weave Rope

- Ropes should be attached to the Anchor Plate as per drawing WR3042.
- Refer to image below for weave pattern.
- Always start with the lowest rope in the run and move up the post
- Refer to drawing WR3042 for rope heights on the terminal posts and drawing WR3022 for rope heights on the Length of Need post.
• Ropes should not commence the weave pattern between the anchor plate and the first post of the terminal.

Copies of all general arrangement drawings are available by contacting sales@hsroads.com.au or calling 1300 2 PROTECT

Representation of weave pattern used on Brifen TL4 WRSB

Tensioning the System

• Tension bays using Left and Right Hand Swages (WR1178LH and RH) and Turnbuckle (WR1176) should be installed at practical intervals to allow for tensioning of the system.

• When tensioning the rope mark the swage fittings at 30mm from the end of the thread as a guide because there should be a minimum of 30 mm of engagement of the swage in to the turn buckle.
Brifen WRSB and WRGT-FL are to be tensioned to 26kN for the average ambient daytime temperature (aadt) of the installation location. Temperature information is available from www.bom.gov.au. The tension should then be adjusted according to the table below to account for actual daytime temperature at the time of installation.

- The following table shows the tension variation with 5°C increments in temperature.
- Use a suitable thermometer to measure the ambient temperature at the time of tensioning and compare that to the AADT.
- Adjust the actual tension according to the Table below.

<table>
<thead>
<tr>
<th>Site Temperature</th>
<th>Standard Tension (kN) for AADT</th>
<th>Allowable Minimum Tension (kN)</th>
<th>Allowable Maximum Tension (kN)</th>
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<tr>
<td>-15°C</td>
<td>34.25</td>
<td>34.25</td>
<td>42.78</td>
</tr>
<tr>
<td>-10°C</td>
<td>31.50</td>
<td>31.50</td>
<td>39.39</td>
</tr>
<tr>
<td>-5°C</td>
<td>28.75</td>
<td>28.75</td>
<td>35.88</td>
</tr>
<tr>
<td>AADT</td>
<td>26.00</td>
<td>26.00</td>
<td>32.60</td>
</tr>
<tr>
<td>+5°C</td>
<td>23.25</td>
<td>23.25</td>
<td>29.10</td>
</tr>
<tr>
<td>+10°C</td>
<td>20.50</td>
<td>20.5</td>
<td>24.60</td>
</tr>
<tr>
<td>+15°C</td>
<td>17.75</td>
<td>17.75</td>
<td>21.30</td>
</tr>
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Table 1: Tension of WRSB determined by Average Annual Daily Temperature

Load Testing the Installed Post Foundations.

- Carrying out a load test or ‘pull-test’ is recommended to ensure that the foundations for the posts are suitable.
- A load test is the application of 10kN of lateral force to a post in a cured foundation at a height of 600 mm above ground level.
- The outcome is deemed successful if the foundation moves less than 3mm
- Refer to the sequence following for guidance.

A digital load gauge is shackled to the post and to a chain block. A concreter’s truck provides the resistance.
1. **Prepare the reference point.**
   *For example a string line is set across the post foundation at a known distance from the edge of the plastic socket insert into the post foundation.*

2. **Load the Post to 1000kg (10kN)**

3. **Check for any change in the distance between the outer edge of the socket and the control line.**

4. **If there is movement greater than 3 mm check adjacent posts**

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**CONTACT US**

Hill and Smith Pty Ltd (HSRoads)
Unit 1/242 New Cleveland Rd, Tingalpa, QLD. 4173

PO Box 9406 Wynnum Plaza Post Office, Wynnum West, QLD. 4178

sales@hsroads.com.au

1300 2 PROTECT
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Steelgal NZ Limited
8 Trugood Drive, East Tamaki, Auckland 2013
p: +64 9 272 4665
e: sales@steelgal.co.nz
w: www.steelgal.co.nz