8500 Tactile ground surface indicators

REVISION 12/02/16

8500.1 Introduction
This supplementary specification applies to the supply and installation of Tactile Ground Surface Indicators (TGSIs) on footpaths, medians, at road grade refuges, and ramped pedestrian crossings.

This supplementary specification covers TGSI installation to both existing surfaces (retrofitting of TGSI), and new works.

8500.2 Definitions
Discrete TGSI – individual hazard or directional indicators (pads, studs or bars for example) affixed into or atop of existing or new surfaces; most suited for retrofit situations and suited to new works.

Integrated TGSI – individual hazard or directional indicators (masonry pavers for example) recessed and set into new pavements; suited for integration within new works only.

8500.3 Referenced Documents
This supplementary specification shall be read in conjunction with the following:

- MRS01 “Introduction to Specifications”;
- MRTS01 “Introduction to Technical Specifications”;
- MRS45 “Road Surface Delineation”;
- MRTS45 “Road Surface Delineation”;
- AS/NZS1428 Suite “Design for access and mobility”;
- AS/NZS 1428.4.1:2009 “Design for access and mobility, Part 4.1: Means to assist the orientation of people with vision impairment – Tactile ground surface indicators”;
- AS 4586:2013 “Slip resistance classifications for new pedestrian surface materials”;
- TMR’s “Compliant Products Register for Tactile Ground Surface Indicators (TGSI)”;
- the project Drawings.

8500.4 Description of Works
The following work items are covered by this supplementary specification:

<table>
<thead>
<tr>
<th>Task Item No.</th>
<th>Description</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>8500.01</td>
<td>Supply and installation of hazard tactile surface ground indicators, polymer compound tactile pad (yellow) to concrete and asphalt surfaces</td>
<td>m²</td>
</tr>
<tr>
<td>8500.02</td>
<td>Supply and installation of directional tactile surface ground indicators, polymer compound tactile pad (yellow) to concrete</td>
<td>m²</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Unit</td>
</tr>
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<tr>
<td>8500.03</td>
<td>Supply and installation of hazard tactile surface ground indicators, yellow polymer studs (stem and cap), to asphalt surfaces within the central business district</td>
<td>m2</td>
</tr>
<tr>
<td>8500.04</td>
<td>Supply and installation of directional tactile surface ground indicators, yellow polymer ribs, to asphalt surfaces within the central business district</td>
<td>m2</td>
</tr>
<tr>
<td>8500.05</td>
<td>Supply and installation of hazard tactile surface ground indicators, stainless steel studs (stem and cap) with black polymer or carborundum cap inserts, to grey concrete surfaces within the central business district</td>
<td>m2</td>
</tr>
<tr>
<td>8500.06</td>
<td>Supply and installation of directional tactile surface ground indicators, full stainless steel ribs (without colour insert), to grey concrete surfaces (including building stairs and ramps) within the central business district</td>
<td>m2</td>
</tr>
<tr>
<td>8500.07</td>
<td>Supply and installation of hazard tactile surface ground indicators, full stainless steel studs (without colour insert), to grey concrete surfaces at building stairs and ramps, within the central business district</td>
<td>m2</td>
</tr>
<tr>
<td>8500.08</td>
<td>Supply and installation of hazard / directional tactile surface ground indicators, [type], [colour], [application/location]</td>
<td>m2</td>
</tr>
<tr>
<td></td>
<td><strong>Integrated TGSI (new works only)</strong></td>
<td></td>
</tr>
<tr>
<td>8500.09</td>
<td>Supply and installation of hazard integrated tactile surface ground indicators, [type], [colour], [application/location], (for new work only)</td>
<td>m2</td>
</tr>
<tr>
<td>8500.10</td>
<td>Supply and installation of directional integrated tactile surface ground indicators, [type], [colour], [application/location], (for new work only)</td>
<td>m2</td>
</tr>
</tbody>
</table>

### 8500.5 Work Operations

Work operations incorporated in this item will include:

- a) Work operations listed in Clause 2.1.5 of MRS01 “Introduction to Specifications”;
- b) Supply of all materials;
- c) Preparation of surface (if using ‘stick down’ type TGSIs);
- d) Provide recessed depressions for indicators in new concrete or asphalt surfaces (if using “paver” type TGSIs) (concrete and asphalt work paid for in other items);
- e) Provide drill holes in new and existing concrete and asphalt surfaces for discrete stud (hazard type) and bars (directional type); and
- f) Installation of Tactile Ground Surface Indicators (TGSIs) as per manufacturer’s recommendations and as to meet warranty conditions;

### 8500.6 Materials
Products are to be sourced from suppliers included in Transport and Main Roads’ “Compliant Products Register for Tactile Ground Surface Indicators (TGSI)”.

Notwithstanding the compliant products register, all TGSIs shall conform to AS1428.4.1 requirements for slip rating, colour luminance contrast and tactile indicator dimensions, and the material requirements specified elsewhere in this supplementary specification.

Minimum allowable slip resistance rating of R11 is required of all TGSI products.

Where TGSIs have been nominated as ‘yellow’, they shall be safety yellow in colour (Golden Yellow Y14 or Sunflower Y15 – AS2700) unless noted otherwise on the drawings.

All polymer compound products are to be UV stabilised.

8500.6.1 Discrete Tactile Ground Surface Indicators
Discrete TGSIs shall be either a synthetic polymer, polyresin, polymer composite, or full stainless steel product.

In addition to the requirements of AS1428.4.1, ‘stick down’ pad type TGSI shall have the following properties:

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Cork &amp; Synthetic Rubber Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>300 x 600 mm</td>
</tr>
<tr>
<td>Thickness</td>
<td>2.5mm (base)</td>
</tr>
<tr>
<td>Profile Height</td>
<td>5.0mm</td>
</tr>
<tr>
<td>Total Thickness</td>
<td>7.5mm</td>
</tr>
<tr>
<td>Edges</td>
<td>Straight edges on all sides</td>
</tr>
<tr>
<td>Slip Resistance</td>
<td>Hazard : Wet 0.71, Dry, 0.80</td>
</tr>
<tr>
<td></td>
<td>Directional : Wet 0.52, Dry 0.85</td>
</tr>
<tr>
<td></td>
<td>Oil Wet Ramp Test : R11</td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>Resists common acids, alkalis, oils and grease</td>
</tr>
<tr>
<td>Fire Rating</td>
<td>Will not readily support combustion</td>
</tr>
</tbody>
</table>

Black and yellow colour contrast inserts to stainless steel hazard ‘stud’ type TGSI shall be coloured polymer or carborundum.

Composite stainless steel (cap) and polymer (stem/spigot and colour insert) type unit products shall not be used.

Stainless steel ‘stud’ and ‘bar’ TGSIs shall be 316 marine grade. Minimum stem/spigot depth to be 10-12mm embedment into surface substrate.
Polymeric studs are to have a minimum stem/spigot embedment depth of 20-25mm and to be installed as per the manufacturer’s recommendations.

8500.6.2 Integrated Tactile Ground Surface Indicators
Integrated TGSIs shall be either a concrete or natural stone masonry paver product. Ceramic tiles shall not be used. Integrated TGSIs shall only be installed in pedestrian paths, raised medians, and ramps.

Integrated TGSIs shall not be installed in at grade road refuge situations on asphalt surfaces.

TGSIs in pedestrian only environments shall have a minimum depth of 40mm and a minimum product compression strength of 48mPa. Depth and compression strength of products used where vehicular traffic is likely shall be as shown on the drawings, or where not shown, to the advice of MRC Manager Technical Services.

Where integrated TGSIs have been nominated, they shall be supplied with documentation that they conform to AS1428.4.1:2009, including conformance with luminance contrast requirements.

8500.6.3 Adhesion Agent and Grout
The adhesion agents and grouts for discrete and integrated TGSI products shall be as per the manufacturer’s recommended products. Application rates/thicknesses to be in accordance with the manufacturer’s instructions.

Surface bonding agents for ‘stick down’ type polymeric composite pads shall be as per manufacturer’s recommended products. Where not specified, adhesion agents shall be a single pack moisture curing polyurethane based adhesive (Fortis AD512 or approved equivalent).

Where polymeric products include the manufacturer’s pre-applied ‘peel and stick on’ backing, products shall be applied and finished in accordance with the manufacturer’s requirements.

Polymeric studs in asphalt surfaces shall not typically require adhesive agents unless otherwise recommended by manufacturer.

8500.6.4 Sealing Agents
Perimeter sealants for ‘stick down’ polymer composite pads shall be a silicone based adhesive sealant (Selleys 3 in 1 Clear or approved equivalent).

8500.6.5 Warranties
Stainless steel TGSI products to have a minimum 10 year manufacturer’s warranty.

Polymeric TGSI products to have a minimum 5 year manufacturer’s warranty.

Suppliers are to provide copies of warranties with product deliveries. Warranties to be rated for external/outdoor applications. All products to be installed in accordance with warranty conditions.

8500.7 Construction
The Contractor shall confirm with the Superintendent at least 24 hours prior to pouring concrete whether provision shall be made for integrated ‘paver’ type TGSIs and to confirm their location. Where integrated ‘paver’ style TGSIs are used, the base of the TGSI shall be inserted into the concrete or asphalt such that the raised indicators are nominally 4mm above the surrounding surface, in accordance with AS1428.4.1. Integrated pavers shall be installed as per details on the Drawings.
8500.7.1 TGSI Setout
Spacing and arrangements of all TGSI to be in accordance with AS1428.4.1, and the project Drawings.

Spacing and arrangement of discrete ‘stud’ and ‘bar’ type TGSI shall be even and installed with the aid of appropriate grid templates for an even and regular finish in accordance with AS1428.4.1.

Typically ‘stick down’ type pads shall be square and hard butt jointed to adjacent pads with a maximum of 0.5mm between units.

8500.7.2 Curing, Preparation and Cleaning of Ground Surfaces
New concrete surfaces shall be allowed to cure for 7 days of warm, dry weather prior to installation of TGSI ‘stick down’ pad type indicators. Asphalt surfaces shall be allowed to cure for 14 dry days prior to installations.

Where ‘stick down’ pad type TGSI are used, surfaces shall be prepared and cleaned completely of dust, dirt and loose materials to provide debris free bonding surface. A combination of scraping, sweeping and vacuum cleaning shall be used depending on site contaminants. Chemical cleaning agents shall be used in more heavily contaminated sites in order to achieve a clean surface finish.

Surfaces must be completely dry prior to installation, with a minimum of 5 days intermission between surface wetting events.

8500.7.3 Installation
For discrete stainless steel ‘stud’ and ‘bar’ type TGSI, all stems are to be fixed into individual drill holes to surface material, using manufacturer’s recommended chemical adhesion product, or spigot anchor fixing system. In addition ‘bar’ type TGSI are to have recommended adhesion agent applied to cover entire base area of the bar to promote maximum contact with surface material.

Directional ‘bar’ and ‘stick down’ pad type TGSI shall be laid as flat as possible and not be bent over ramp hinge points or other sharp grade changes to mitigate risk of base failing to make contact with surface. Adjust setout as required to mitigate the need to bend individual units.

Bonding agents to ‘stick down’ pads must not be applied as isolated ‘beads’ or ‘snakes’ but shall be spread with appropriate spreader tools to achieve full required depth to full underside area of pad, inclusive of edges and corners to mitigate future lifting. Neatly and squarely butt join all pads to adjacent pads and tap down with a wooden block and hammer across entire surface area to ensure bonding to substrate. Particular care to be taken in ensuring firm contact between edges, corners and surface to mitigate water and dust ingress under pad. Allow 72 hours for bonding agents to achieve maximum optimum contact before opening to foot traffic.

8500.7.4 Finishing and Sealing
All surface residue of bonding agents squeezed out from under TGSIs shall be cleaned off following installation, and prior to setting to maintain clean surface appearance.

Following installation of polymeric pads, apply a bead of silicone based adhesive sealant around the full perimeter of the laid TGSI to prevent ingress of water and dirt under pad edges. Smooth off sealant around pad perimeter to create a clean rounded join between sides of pad and surface.

8500.8 Measurement and Payment
Work Operations under this Specification shall be claimed under the items listed in Clause 8500.3, as measured by the total number of square metres shown in the project Drawings.