

## LACING TOOL

### Pneumatic Lacing Tool for Wire Mesh Products

<b>Equipment Number</b>			
<b>Customer</b>			
<b>Dispatch/Receipt</b>	Date Out    /    /	Date In    /    /	
<b>Store Location</b>			
<b>Expected Return Date</b>			

Item Number	Number of items	Item name	Checked OUT	Checked IN	Comments
1	1	Lacing Tool			
2	1	Case			
3	1	Documentation (8 pages)			

This equipment has received an in-service inspection and was found to have no obvious defects.

**CHECKED OUT BY**

**CHECKED IN BY**

Name:

Name:

Signature:

Signature:

**Comments:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Dear Customer**

On receipt of this equipment, please check all equipment has been received, ensure your site staff read and understand the operating, maintenance and safety information, and use the equipment in a safe manner.

- You are responsible for the safe operation of the equipment and the safety of your staff.
- Standard Occupational, Health and Safety guidelines should be followed as per normal site operations. Site safety and safe work practices are your responsibility.
- At the conclusion of the use of the equipment, please clean the equipment, repack it for transportation and return to Geofabrics.
- Please advise if there are any missing parts. All equipment usage must be in accordance with Geofabrics' Hire Agreement. You will be charged for any damaged or missing components.

**LACING TOOL – OPERATING AND SAFETY INSTRUCTIONS**

**WARNING!**

- Any alterations to this hire equipment may prove dangerous to the operator and will be in breach of the Equipment Hire Agreement.
- Service must only be performed by an authorised Geofabrics service organisation or representative.
- Please contact Geofabrics (0800 60 60 20) for return of this equipment or servicing if it is found to be faulty.
- All hire related documentation, operating and safety instructions are available on our website ([www.geofabrics.co.nz](http://www.geofabrics.co.nz)).



Figure 1

The Geofabrics Pneumatic Lacing Tool has been developed for use with Gabions, Reno mattresses, Terramesh and double twist wire mesh. They offer an alternative to standard hand lacing methods.

**Pre-operational considerations**

- Before operating the Lacing Tool, it is important that you read and understand the maintenance and safety precautions outlined below and in the Equipment Hire Agreement document (Use and Maintenance).
- Contact Geofabrics (0800 60 60 20) if you do not understand any of the instructions in this document.
- To operate the Lacing Tool, operators must be in good physical and mental condition. Do not operate if on medication or under the influence of alcohol or drugs. Seek medical advice if unsure.
- As the installation of Geofabrics products is considered a construction activity, the contractor using the hire equipment must prepare and implement a site safety plan that incorporates the safe work methods for high risk work involving the Lacing Tool.

## Safety Precautions and Working Techniques

- **Never** operate or work in the vicinity of a tool in use, i.e. loading or operating, without hearing protection and eye protection that provides protection against flying particles both from the **front** and **side**. Eye protection is required to guard against flying fasteners and debris, which could cause severe eye injury. The employer and/or user must ensure that proper eye protection is worn. Eye protection equipment must conform to the requirements of the relevant NZ Safety Standards and provide frontal and side protection.

**Warning** Eye protection equipment must provide both frontal and side protection.



- **Never** assume the tool is empty. Check the magazine.
- **Never** engage in horseplay with the tool. **It is not a toy.**
- **Never** point the tool at anyone or yourself, even if you think it is empty or disconnected.
- **Never** operate the tool unless it is in contact with the work piece.
- **Never** tamper with, disable or remove the safety device.
- **Never** leave the work area for any extended period of time without disconnecting the tool from the air line.
- **Never** attempt to clear a jam without disconnecting the tool from the air line and removing the remaining fasteners from the tool.
- **Never** allow the air pressure to exceed the maximum marked on the tool. Check the air pressure gauge at least twice daily, do not operate with bottled air or bolted gases.
- **Never** operate a dirty tool. Clean the tool at least daily and lubricate if required.
- **Never** carry the tool with the trigger depressed.
- **Never** clamp the trigger in a locked operating position.
- **Never** load the tool with either the trigger or the safety depressed.
- **Never** use parts or fasteners other than those specifically recommended by Geofabrics for use in the tool.
- For detailed information on the tool installation, maintenance and loading instructions, refer to the tool manual.

**Warning** Keep fingers clear of all moving parts of the tool (particularly jaw components).

- Always use appropriate personal protective equipment such as riggers gloves, high visibility clothing (shirt or tabard), hard hats, steel capped safety boots, safety eye wear with side protectors, etc.
- Always use fastener rings that are recommended by Geofabrics, as there are standard strength and coating requirements, to meet specifications.
- Keep your Lacing Tool clean and dry. Always use clean, dry air and never exceed the recommended air pressure noted below.
- Use of this tool at minimum air pressure required for the work at hand, will greatly extend the life of the Lacing Tool.
- Do not use the Lacing Tool for any application other than its intended purpose.
- Do not abuse the Lacing Tool in any way which may result in personal injury and/or damage to the equipment. Treat the tool with respect and it will perform safely and reliably for you.
- Exercise caution not to drop the Lacing Tool.
- Check the condition of the Lacing Tool before each use for any damage. If the behaviour of the Lacing Tool changes, check it immediately and return it to Geofabrics for service if necessary.
- Never modify the equipment in any way.

#### **Lubrication**

- The Lacing Tool is designed for long, trouble-free service with little or no air line lubrication. If an in-line lubricator is used, it should be set at the minimum rate of flow.
- Excess oil in the tool will attract dirt and the adhesive material used in collating the fasteners, thus preventing smooth operation. If lubrication is utilised, always use a good grade of 5W non-detergent oil, or oil specifically manufactured for air tools.

#### **Filter and Regulator**

- The air line should always contain a filter and regulator unit to provide the tool with a constant flow of clean, dry air. If moisture and contaminants are allowed to enter the tool, the tool's serviceable life will be decreased.
- The regulator should be set at between 100 and 105 psi (690 – 720kPa)

**Warning** Never operate this tool beyond 115 psi (795kPa)

#### **Site Conditions**

- The Lacing Tool is designed for the application of double twist wire mesh products to suitable construction site areas. The Lacing Tool should not be operated in conditions which will endanger the operator or other site personnel.

## TROUBLE SHOOTING

In the case of a tool malfunction:

- Disconnect from airline immediately and remove all fasteners from magazine.
- Never re-connect airline until the tool is thoroughly repaired and inspected.
- Never set aside a malfunctioning tool without tagging the air inlet or tuning it over to the man responsible for its repair.

### Tool Jams

- The most common reason for jamming problems in the Lacing Tool is operator error. Because of the tool's long stroke, the trigger must be pulled completely to the rear to ensure positive functioning of the valve. If the tool is "short cycled", the feed mechanism will return forward prematurely in an attempt to pick up a second ring. This will most likely cause a jam each time.
- Remove remaining rings from magazine. **Point tool away from yourself and others** and cycle tool slowly. This should force jammed ring(s) out of jaw mechanism.
- If the procedure above does not clear the tool, **disconnect the air supply** and lay the tool on a clean flat surface, remove set screw from rear of magazine at feeder arm bracket. Remove jaw bolts and nuts, and pull magazine and pusher assembly from tool, jammed rings are now exposed and may be removed from the Lacing Tool. Reassemble in reverse order.

### Feeding Problems

- If rings do not feed smoothly down the magazine, check pusher spring for proper tension. When properly adjusted, the pusher and spring should not extend more than 50mm past the end of the magazine. If the magazine is covered with dirt from field use, clean the magazine and apply a light coat of oil.
- When rings feed properly on the magazine but do not feed into the jaws without spitting out the sides of the tool, or if the rings sit in the jaw grooves on an angle, check jaws to insure freedom of movement. With the jaws void of rings, the vertical movement should be approximately 350mm. The nuts on the jaw bolts should be snug, but never, over tightened. On occasion, a 010" shim may be required under the magazine. This will enable the feeder blade to slide freely against the magazine shoe.
- After considerable use or several jams, the fingers on the pusher may show signs of spreading. This may cause the pusher to "hang up" on the magazine, with little or no pressure behind the rings. The last few rings in the strip fingers can be squeezed back into proper position or the pusher should be replaced.

**Warning**    **Never use loose rings in the lacing tool**

### **Ring does not Close Completely**

- Check the air pressure. Line pressure at the tool should be between 100 and 105 psi (690–720kPa). The tool should never be operated at pressures exceeding 115 psi (795kPa). An airline of 10mm or larger should be used with the Lacing Tool. Air lines in excess of 30m in length can cause air volume deficiencies at the tool which will prevent normal operation.
- Check for foreign debris in the jaw area. This is especially true in the area between the side plates and rollers. Remove particles of rock, excess sand or broken pieces of rings.
- The jaws may be worn from extended use with high tensile fasteners. Check the “land” between the receiving grooves of the jaws, if the land is worn excessively; replace the jaw(s).
- When the tool is used in construction applications, light oil should be applied on a regular basis to the jaw bushings and rollers, Un-lubricated and/or corroded jaw bushings may cause the tool to function poorly.

### **Tool Leaks Air or is Sluggish**

- If tool is leaking air in the throttle area, refer “Throttle Valve Adjustment” below.
- In the event the rear throttle valve screw is turned in too far, the tool will operate slowly or in a sluggish manner. This screw controls the amount of rear exhaust. When properly adjusted, two or three threads should be exposed once the nut and washer are in place.
- Should the tool leak air in both the triggered and rest positions, a damaged piston “O” ring may be the cause. Once the piston “O” ring has been replaced, tilt the front of the tool to one side to allow the piston and “O” ring to pass the notch on the cylinder liner. If this procedure is not followed the “O” ring may be damaged during reassembly.

## LACING TOOL COMPONENTS

To ensure no parts are lost, all components should be stored and transported as a set, in such a way as not to cause damage to the equipment.



Figure 2



Figure 3



Figure 4

### Lacing Tool (Fig 2,3,4)

- Check the tool is clean and not damaged.

### Case (Fig 2)

- Check the case is not severely damaged.

#### Geofabrics New Zealand Ltd.

14 Goodman Place, P.O. BOX 12536, Penrose, Auckland, New Zealand  
Tel. (+64) 9 6346495 - Fax (+64) 9 6346492, FREEPHONE 0800 60 60 20  
E-mail: sales@geofabrics.co.nz - Web site: www.geofabrics.co.nz  
Quality System AS/NZS ISO 9001:2008

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### FASTENING SYSTEM GALMAC & STAINLESS STEEL RINGS

#### Pneumatic Lacing Tool

Maccaferri pneumatic lacing tools have been developed for use with gabions, Reno mattresses, Terramesh and double twist wire mesh. They offer an approved alternative to standard hand lacing methods as detailed in ASTM A975 - 97.

#### Operation

The Maccaferri tools are designed to operate with standard air compressors that meet the following requirements:

- Air compressor with regulator set at 100 to 105 psi (690 to 720 kPa). Never operate above 115 psi (795 kPa).
- Minimum delivery of 10 CFM and air tank capacity of at least 48 ltr
- Air line should contain a regulator with filter unit, have a diameter of 10mm and a maximum length of 30m

Excess oil attracts dirt and therefore the tool should be kept clean and dry during use. A wipe down and light spray with a good non-detergent oil after use should ensure the smooth operation of the tool.



Figure 1

#### Ring Fasteners

Lacing operations can be achieved by using the tool shown in Fig.1. Two types of rings are available to meet the strength and durability requirements of the wire mesh used:

##### 1. Galmac coated wire mesh Products

Zinc-5%Aluminium mischmetal alloy coated rings having the following specification can be used instead of Galmac lacing wire:

- diameter: 3.00 mm, [ASTM A975, Table 1](#)
- tensile strength: 1380-1660 MPa, [ASTM A764, Table 2, Class 1](#)
- coating thickness: 244g/m<sup>2</sup>, [ASTM A764, Table 7, Class 3](#)

##### 2. Galmac/PVC coated wire mesh Products

Stainless steel rings having the following specification can be used instead of Galmac/PVC lacing wire:

- diameter: 3.00 mm, [ASTM A975, Table 1](#)
- tensile strength: 1530-1745 MPa, [ASTM A313, Table 5](#)
- stainless steel grade, Type 302, [ASTM A313, Table 1](#)

#### Installation

To meet the minimum strength requirements of wire mesh connections as specified in ASTM A975 - 97 the rings shall be spaced 10-12cm apart as shown in figure 3.

The number of rings used is dependent on the mesh size and type of work. For continuity of the joints and to meet the wire mesh connection requirement the rings shall be used as shown in Table 1.

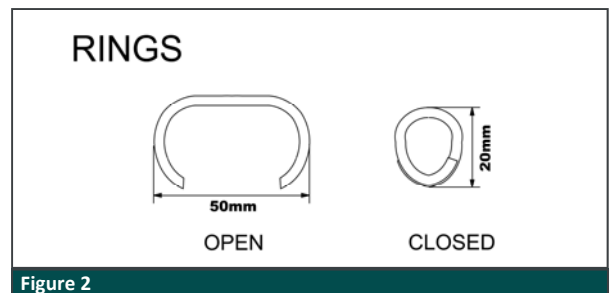


Figure 2

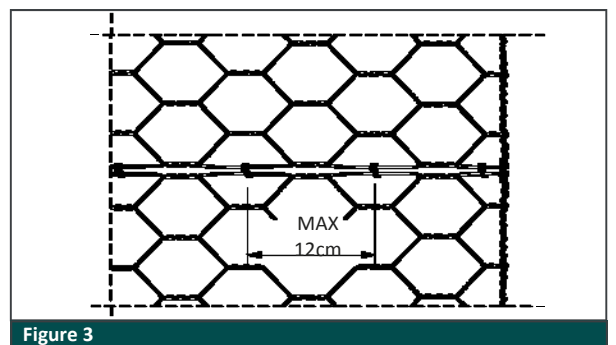


Figure 3

#### 1. Table of Suggested number of rings

Height m	GABIONS			RENO MATTRESSES		
	1.00 with diaphragms	1.00 without diaphragms	0.50 with diaphragms	0.17	0.23	0.30
Number of rings/m <sup>3</sup>	35—45	25—35	55—65			
Number of rings/m <sup>2</sup>				16—18	18—20	20—22

#### GEOFABRICS NZ LTD

14 Goodman Place, P.O. BOX 12536, Penrose, Auckland, New Zealand  
 Tel. (+64) 9 6346495 - Fax (+64) 9 6346492, FREEPHONE 0800 60 60 20  
 E-mail: sales@maccaferri.co.nz - Web site: www.maccaferri.co.nz  
 Quality System AS/NZS ISO 9001:2008

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