

53038-001 User Manual – Dual Lane Evacuation Training Descent Slides

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Tulmar Safety Systems Inc. – 2026

Revision History

This revision history serves as a record of the changes made to this manual. The record includes the revision letter, the date of the revision, the page(s) affected, and a brief description of the change.

Rev. #	Date	Written/Revised By	Pages Affected	Description Summary
A	2019-04-04	Benoit Desrochers	All	Original release
B	2026-06-04	Vicky-Eve Lovvorn / Vanessa Saumier	All	Changed Layout
C	2026-06-08	Vicky-Eve Lovvorn / Omkar Parab	All	Changed Layout, updates to terminology and replaceable surface

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1.0 OVERVIEW DUAL LANE EVACUATION TRAINING DESCENT SLIDES

Tulmar Safety Systems' evacuation descent training slides simulate emergency land evacuations from an aircraft. They are mounted to an elevated platform and allow your cabin crew to practice jumping and sliding to safety in a controlled dry-land environment. They are designed to simulate an OEM evacuation slide by replicating the user experience essential for training and which meets the requirements of the various civil aviation regulatory authorities.

The dual lane descent training slides are available in nominal lengths between 4.1 m and .1 m to enable proper installation on most heights of trainer platforms. They are made with two independent tube structures (lower and upper) that are separable for replacement if needed. The sides of the upper tube structure also provide increased safety during descents.

The slides are constructed from robust materials suitable to meet the demanding needs of a training environment. The replaceable surface is made of the same low-conductivity material used for OEM evacuation slides, with an added layer to ensure a safe descent speed. The sliding surface is removable, designed for easy replacement to extend the slide's lifespan and enhance sustainability.

Tulmar's evacuation descent training slides are fitted with a custom-sized girt to accommodate each individual customer's trainer installation. The girt is also removable, designed for easy replacement if needed.

Several additional features are available to enhance the user's training experience or to accommodate installation. Some features are functional and can be used during physical exercises, while others are meant only to be demonstrative for show-and-tell purposes.



Figure 1: Installed Dual Lane Evacuation Training Descent Slide

2.0 FEATURES AND EQUIPMENT

2.1 STANDARD

All Tulmar dual lane evacuation training descent slides are derived from the same basic form, the only difference being variations in length in increments of 500mm (20 in). All slides have two independent tube structures, the lower tube structure with cross-tubes for structural stability and the upper tube structure with a permanently attached sub-floor (non-sliding) with a transition at the foot end to help rotate the evacuee out of the slide. The length of the slide is determined by considering the trainer floor height, the thickness of floor mats used at the facility and targets an optimum slide angle between 30° and 32°.

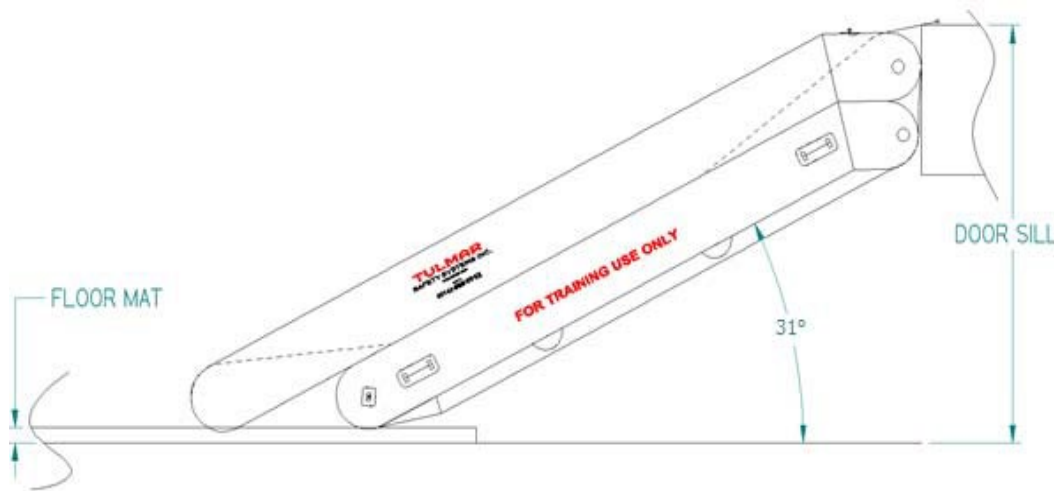


Figure 2: Side view for descent angle and floor mat

The standard features outlined below are included with the slide.

2.1.1 REPLACEABLE TUBE STRUCTURE

The dual lane slide tube structures can be individually replaced. They are independent of each other and are secured together with a hook & loop fastener sandwich along the full length of the tubes. The upper and lower chambers must always remain attached when training and must only be detached when a replacement tube structure is needed. Refer to section 6.7 for replacement procedure.

2.1.2 REPLACEABLE SURFACE

All evacuation training descent slides come equipped with a replaceable sliding surface made of durable material designed to ensure a safe descent speed. The replaceable surface is in two sections identified as the left and right lanes. Left and right are defined as the sides when looking down the slide. The replaceable surface is attached to the sub-floor by means of hook & loop fasteners. A combination replaceable surface, incorporating a deceleration pad, provides gradual deceleration at the foot end of the slide to reduce exit speed and aid rotation out of the slide. Flaps and shingles at the girt end overlap the replaceable surface to eliminate potential tripping hazards.

2.1.3 REPLACEABLE GIRT

The slide's two point girt is used to attach the slide to the trainer platform. It is custom designed to fit to a slide angle of $31^{\circ} \pm 1$, which in turn is a function of the measurements taken of the facility. It is important that the initial set up parameters be maintained. For instance, reducing the floor mat thickness will increase the angle of the slide, if this is desired; it may also add undue stress on the top panel of the girt. The owner should contact Tulmar Safety Systems if a major change in setup is required post installation. Most likely new girt can be configured for the modified installation without having to modify the slide. The girt is designed for the slide chamber to sit approximately 25mm to 50mm (1"-2") below the trainer floor, therefore it should not interfere with opening simulator doors.

The standard width of the girt is 762mm (30") but a narrower girt can be provided if necessary. At the design stage, the girt bar sleeve is designed to accommodate the customer's specific girt bar size (diameter). Tulmar strongly recommends a round girt bar to maximize service life of the girt, but the girt bar can also be square or rectangular shaped, provided it has rounded edges.

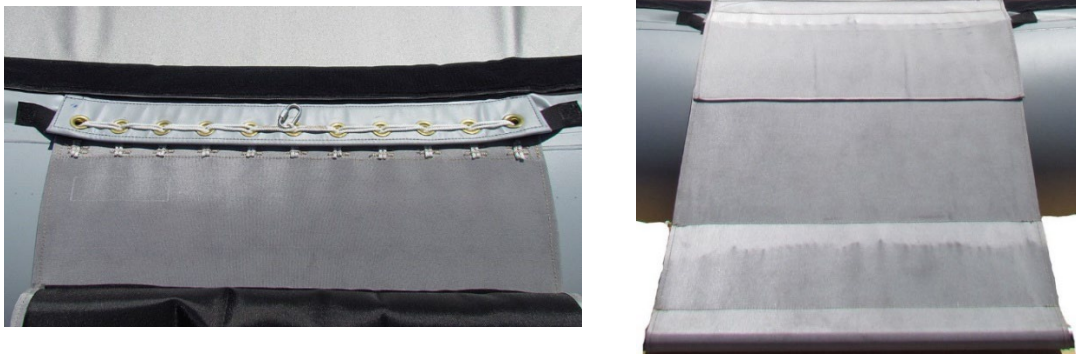


Figure 3: View of the standard detachable girt

2.1.4 D-RINGS

D-rings are placed at each corner of the slide. These are used to loosely tether the training slide and add stability during training.





Figure 4: D-Rings on top and bottom corners

2.1.5 TRANSPORT HANDLES

Transport handles are installed at the foot and girt end of the lower tube structure for ease of manipulation and transportation.

When moving the slide, avoid dragging them. If it is necessary to move or handle a deflated slide, do so on a tarpaulin or mat to mitigate abrasion of the slide chambers.



Figure 5: Transport handles

2.1.6 CHAFING PATCHES (ONLY ON SLIDES PURCHASED BEFORE 2019)

Training slides constructed of neoprene (rubber) are more prone to grip onto other surfaces, increasing frictional wear at contact points. To prevent premature wear on this type of slide, chafing patches are added at the girt and foot ends.

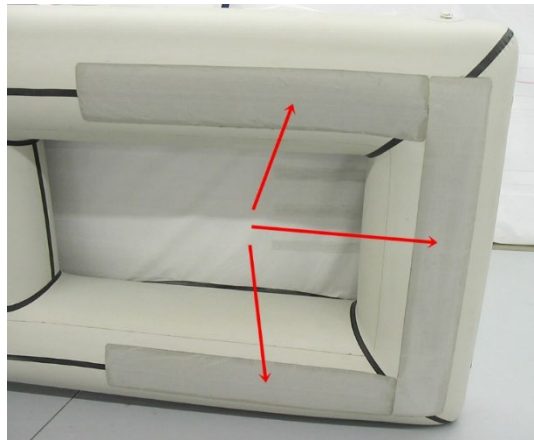


Figure 6: Chafing patches on legacy slides

2.1.7 PORTS

The basic dual-lane training slide comes with a minimum of three ports: one inflate/deflate valve (top-up valve), one pressure relief valve, and one maintenance plug. The same base flange is used for all three ports, making them interchangeable. Additional ports, plugs and valves can be added to slides at the point of order.

Top-up Valve:

This valve serves as a connection for inflating, deflating, or pressure monitoring. An adapter is also provided to enable connection between shop air supply (1/4" NPT) and the valve.

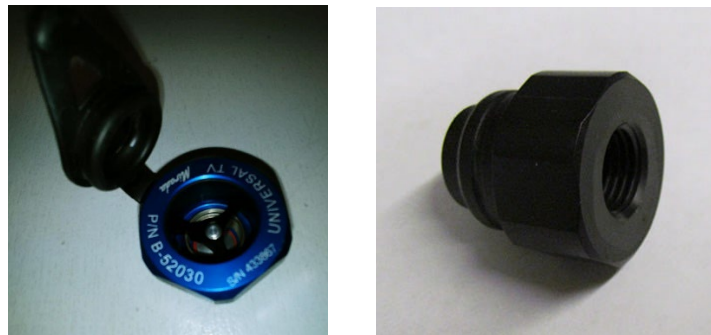


Figure 7: Top-up valve (left) and Top-up valve adapter (right)

Pressure Relief Valve:

Overpressure protection; opens automatically to prevent the slide from being inflated above 3.5 PSI.

Maintenance port:

A removable plug allows connection of other devices such as a permanently attached air supply or a pressure gauge. The universal flange thread is 1-1/16-12UN.



Figure 8: Pressure relief valve (left) and Maintenance plug (right)

2.1.8 SOCKET TOOL

A socket tool is used to remove and install the valves and plug shown in 2.1.6. and is provided with each slide.



Figure 9: Socket tool

2.1.9 STENCILLING

The warning “FOR TRAINING USE ONLY” is stencilled on each side of the slide in 76mm (3”) high red text.

2.1.10 SLIDE IDENTIFICATION

The serial number is stencilled on the side of the slide, as per figure below.

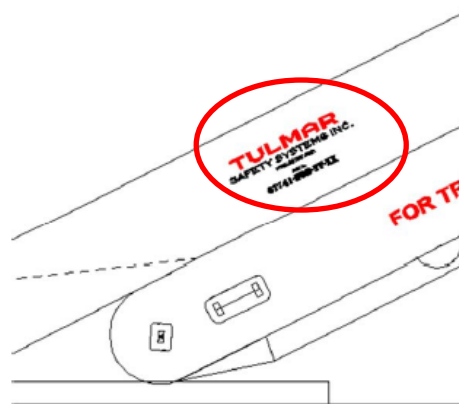


Figure 10: Slide identification location

2.1 OPTIONAL EQUIPMENT

Tulmar dual lane evacuation training descent slides can be purchased with additional features and

accessories. These optional features are outlined below.

2.1.1 ADDITIONAL REPLACEABLE SURFACE

The replaceable surface can be sold as a replaceable or purchased as a spare. For a replacement, you can find information of the surface's part number in the table on the last page of this document, or on the underside of the surface itself.

2.1.2 REPLACEABLE GIRT

The replaceable girt can be sold as a replaceable or purchased as a spare. For a replacement, you can find information of the girt's part number on the underside of the top lacing panel of the girt.

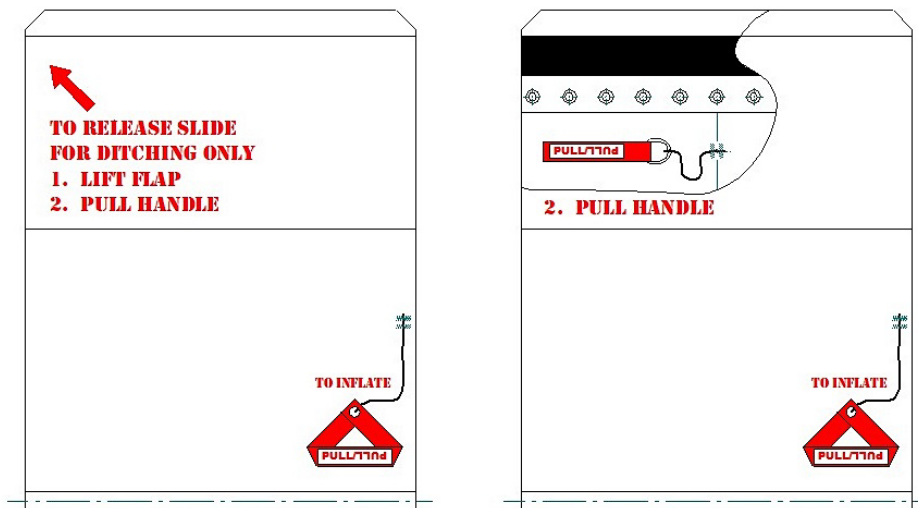


Figure 11: Replaceable Girt

2.1.3 ADDITIONAL TRANSPORT HANDLES

The basic slide includes four transport handles, two at the foot end and two at the top end of the slide. Optionally, two more transport handles can be added to the middle of slide when ordering the slide. These additional handles may be desirable on a longer dual lane slide if it is displaced often.

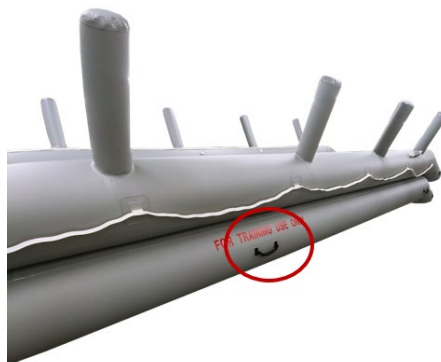


Figure 12: Extra transport handles location

2.1.4 LIFELINES

Lifelines can be installed on each side of the slide. The lifelines are demonstrative in the case of evacuation training. They are designed and constructed to cover about 80% of the slide length and meet the strength requirements of TSO C-69c 4.30.

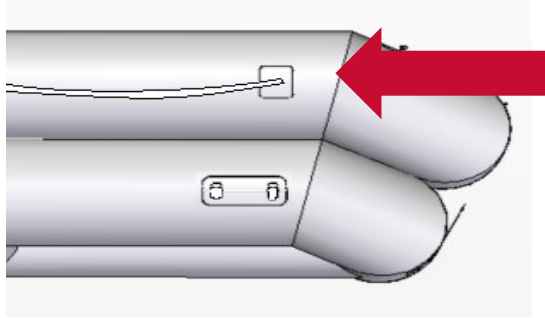


Figure 12: Lifeline location

2.1.5 RE-ENTRY LINE

The re-entry line is a strap installed on the slide that enables crew members to climb back on board the aircraft if necessary. Tulmar's re-entry line is a functional option for use in training exercises. It is attached to the girt end of the slide and is routed along the right side of the slide (looking down). When not in use, the re-entry line is secured to the side rail with Velcro® patches, away from the slide path.

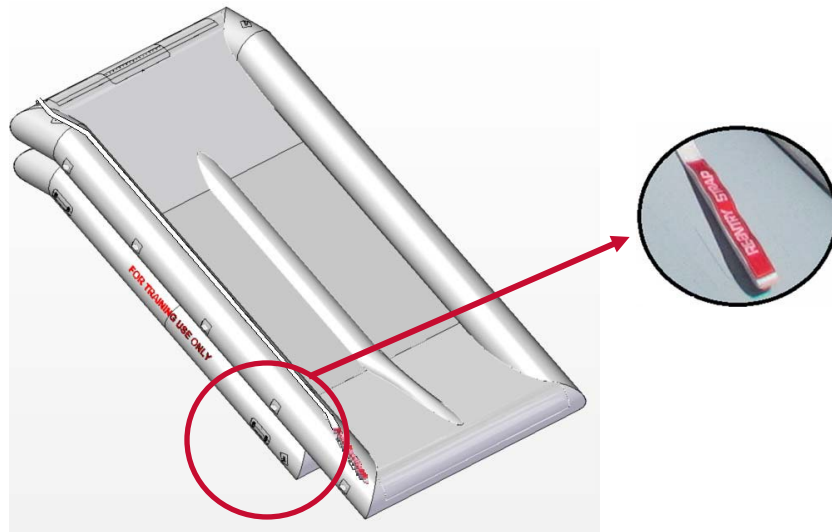


Figure 14: Lifeline location

2.1.6 ADDITIONAL PORTS

Additional ports can be added at the foot end of the slide during construction. This allows access to chamber inflation pressure from ground level. Two ports are provided; one on each side. These two

ports can be paired with a top-up valve, a maintenance plug, or a pressure relief valve.

Tulmar also offers a pressure gauge option which includes a 0-5 PSI gauge (1/4" NPT). The adapter plug can also be used for permanent and regulated air supply.



Figure 15: Pressure gauge tool

2.1.7 ASPIRATOR FLANGE (ASPIRATOR NOT SUPPLIED BY TULMAR)

An aspirator adapter flange is another option offered. The standard flange is made to fit a 4.5" OD aspirator. The training facility may wish to install a plug or "dummy" aspirator for demonstrative rather than functional training. The flange is mounted on the girt end chamber.



Figure 16: Aspirator flange

2.1.8 CANOPY STUBS

Canopy stubs are optional and available for the dual-lane slide. Their purpose is to provide support for a canopy and to secure accessories like the side net and sea-lights.



Figure 13: Canopy stubs

2.1.9 SIDE NETS

A side net kit option is offered for the dual-lane slide. The net is attached to the canopy stub with hook-and-loop fasteners, making it removable and replaceable. This net must not be used as a primary safety device.

The net's part number is on a tag at the top-right end of the net. Use this number to order a replacement.

NOTE: The nets must not be used as the primary safety device.

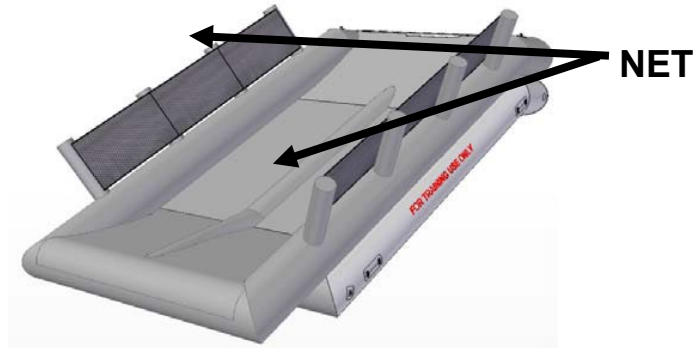


Figure 14: Nets placed between the canopy stubs

3.0 GENERAL OPERATION

This section details the regular tasks to be performed on the dual-lane evacuation training descent slide.

CAUTION: Always work in a clean area, smooth and free from sharp objects, splinters, abrasive and corrosive materials.

3.1 INFLATION

The slide shall be inflated prior to installation and certain maintenance or repair steps.

- Ensure there are no sharp foreign objects underneath or near the slide or at the site of inflation (floor, mats, etc.).
- Unpack the slide and roll it out to its full length.
- As mentioned in section 2.1.6, the top-up, maintenance and relief valves may be interchanged by unscrewing and re-tightening them using the socket wrench. It is critical that a Pressure Relief Valve be installed at least one port prior to inflation to avoid overpressure and potential damage.



- Inflate the slide by:
 - **Option 1:** inserting the top-up valve adapter in the top-up valve, then connecting shop air (compressor). Turn on the compressor to inflate.
 - **Option 2:** removing a top-up valve or maintenance plug and connecting a blower or specialized inflation system directly to the port.
 - **Option 3:** activating a connected aspirator.

IMPORTANT: The air source must be free from moisture.

- Inflate the slide to approximately 3.0 PSI (operating pressure). If the slide is over pressurized, the pressure relief valve will open once the pressure exceeds its operating level and will close again once regulated. You will hear the valve hiss when this occurs.
- For a permanent installation, it is preferable to attach compressed air regulated at optimal PSI (see the table below) to the slide using a monitor port (1/4" NPT).
- Do not inflate the slide beyond Recommended PSI +1.

IMPORTANT: If your slide was purchased before 2019 (you will see black seams along the slide), operating pressure is 2.0 PSI. Do not inflate the slide beyond 3.0 PSI.

Recommended inflation pressure		
Slide serial number	Slide length (m)	Recommended Pressure (PSI)
67741-001-YY-XX	4.1	2.1
67741-002-YY-XX	4.6	2.1
67741-003-YY-XX	5.1	2.1
67741-004-YY-XX	5.6	2.1
67741-005-YY-XX	6.1	2.1
67741-006-YY-XX	6.6	2.6
67741-007-YY-XX	7.1	2.6
67741-008-YY-XX	7.6	2.6
67741-009-YY-XX	8.1	2.6
67741-010-YY-XX	8.6	2.6
67741-011-YY-XX	9.1	3.1
67741-012-YY-XX	9.6	3.1
67741-013-YY-XX	10.1	3.1

67741-014-YY-XX	10.6	3.1
67741-015-YY-XX	11.1	3.1

3.2 INSTALLATION GUIDELINES

It is safest to have several people assist with installing the slide because its weight and size can be awkward to handle. Additional safety measures, such as lift support or additional people, are recommended for longer slides.

3.2.1 TRANSPORTATION

The slides shall be inflated or partially inflated prior to installation. The installers may find it easier to lift a partially or fully inflated slide as there is less dead weight when the foot end of the slide is resting on the ground.

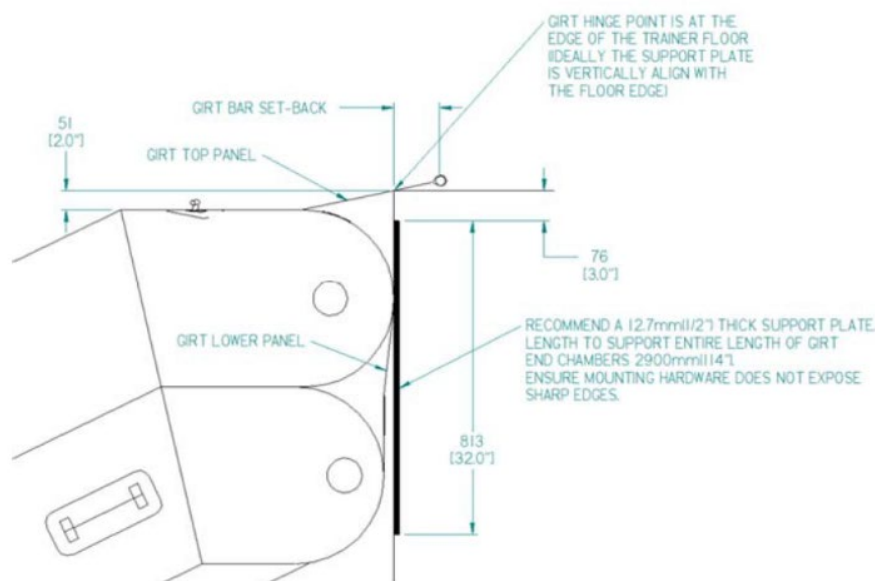
Lace a rope or strap in between the girt panels to help lift that end of the slide up to the platform.

Warning: Ensure there is sufficient space at the end of the slide for trainees to exit safely. There should be no objects or structures near the base of the slide at the installation site that could result in a tripping hazard to the trainees.

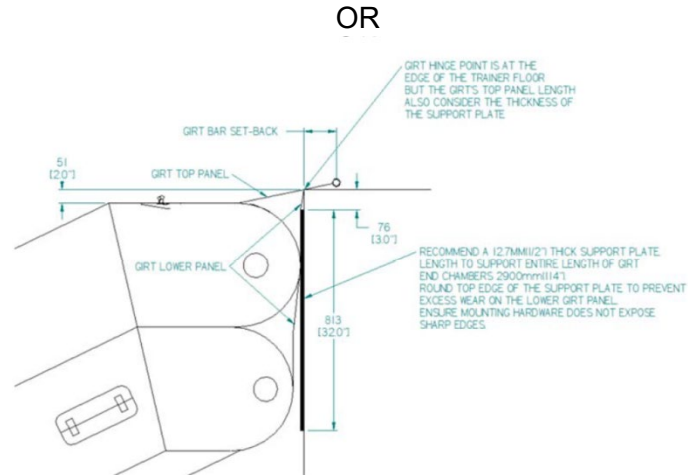
3.2.2 SITE PREPARATION

The slide will require a **vertical** backboard or support plate to rest the slide on. Placement of the support plate is detailed below.

If the support plate is installed beyond the edge of the trainer floor, additional stress will be placed on the girt's top panel, accelerating wear and increasing the risk of tearing or abrasions.



Support plate vertically aligned with the edge of the trainer floor



Support plate installed beyond the edge of the floor trainer

Figure 19: Support plate installation diagrams (2 options)

3.2.3 INSTALLATION

Lift the girt end of the slide up to the trainer platform. A rope or strap attached through the girt panels to hold the girt end will make this an easier task. While holding the girt close to the cabin crew trainer or trainer platform, attach the slide girt trainer using a standard girt bar, or equivalent, by weaving through the girt. Set the girt bar back to the training platform. Ensure the girt bar is safely secured.

Any floor mat or gym pad that listed at the time of the slide's design and manufacturing must be placed underneath the foot end of the slide. Dimensions must be as per described at the point of order and as per the final approved form. The training facility shall contact Tulmar if any major change in set-up is required.

It is recommended to loosely tether the slide to the trainer and the floor using the D-rings at each corner of the slide. This will add stability to the slide during training. Ensure the attachments to the D-rings allow for full mobility of the slide during all training scenarios, without placing undue stress on the D-ring patches. For this reason, bungee cords, or shock cords are recommended to tether the slide.



Figure 20: Tether location on a corner D-Ring

When an evacuation training descent slide is installed on a motion training simulator and the simulator is put into motion with the slide fully inflated, there may be a bit of chatter noise caused by the slide rubbing against the floor mat. This can be remedied by applying some *Armor All Original Protectant®* onto a cloth and rubbing it onto the contact area between the slide and mat. <http://www.armorall.com/products/protectants/original-protectant> .

Be careful not to apply Armor All® to the floor mat, as this could create a hazardous exit for the evacuees.

For increased safety, a net can be installed under the slide, extending on each side. The net shall not be tethered directly to the slide. No part of the net shall be over the slide or its accessories.

3.2.4 ADJUSTING THE DESCENT SPEED

If you would like to adjust the desired descent speed, it can be increased by applying a small amount of Armor All Original Protectant® to the replaceable surface.

It is recommended that the **Armor All®** be applied onto a clean cloth and then conservatively wiped onto the sliding surface to avoid making the sliding surface too slippery. **Armor All®** can make the slide very slippery and fast, so you will want to apply small amounts at a time. Test the sliding speed after each coat to know when you have enough.

To slow down the sliding speed, first, wash any **Armor All®** off the sliding surface with soap and clean fresh water. Rinse with clean water and let dry. Try the sliding speed.

3.2.5 SUPPORT PAD

Your evacuation slide may be supplied with TSS 67723-002 Support Pad, or these may be ordered separately as an optional accessory.

The support pads are intended to help prevent evacuees from stopping at the foot end of the slide during training. They provide an alternative solution for customers who require additional support in managing evacuee flow at the slide exit area.

3.3 TOPPING UP

If the slide was installed partially inflated, or the users begin to note softening of the structure, top-up the air in the slide. Ensure a pressure relief valve is installed on one of the slide's ports.

Locate the top-up valve and connect the top-up adapter by pressing it in the main groove. Connect to a blower or shop air (compressor) and refill. Inflate until you hear the pressure relief valve hissing. Remove the air source and close the valve cap.

3.4 DEFLATION

For partial deflation, either insert an unattached adapter, as shown in paragraph 2.1.6 into the top-up valve or hold the valve open to let air out of the slide.

To deflate the slide completely, use the socket tool (paragraph 2.1.7) to remove the top-up valve and / or a maintenance plug. Hold the valve or plug firmly during removal, as the internal pressure in the slide will expel it.

Once the air has been almost completely removed, use a vacuum to remove the remaining air. Re-install

all valves and plugs that have been removed.

3.5 PACKING

Packing the slide is generally done prior to long-term storage or transport and shipping. Before packing the slide, ensure deflation is complete and that the slide is free of any debris or foreign object. Do not pack loose accessories inside the slide.

Pack the slide as follows:

Remove the girt bar from the slide prior to packing the slide to avoid risk of damaging the slide with sharp edges or corners.

Once the slide is fully deflated, lay it flat on a clean floor.

Ensure the slide is completely dry.



Fold in the two sides of the slide along its length.



When folding in the sides of the slide, ensure the flanges and valves lie flat. This will help when folding the slide and avoid possible pinching later when the slide is folded in a more compact shape.



Fold the slide in half along its length.



Starting from the foot end of the slide, make a 1st fold about 26" deep. Continue folding the slide upon itself, all the way to the girt end.



Flatten and square up the folded slide to fit into a container.

4.0 CARE AND MAINTENANCE

This section details the care and maintenance to be performed on the single-lane evacuation training descent slide during and after use.

NOTE: Always use fresh water for rinsing and cleaning.

4.1 CARE DURING USAGE/TRAINING SESSIONS

- Avoid performing evacuation training exercises with shoes, boots, clothes, or sharp objects or snap buttons that could cause damage to the sliding surface. Clean cotton coveralls are recommended.
- Verify the slide is inflated to a minimum of 2.0 PSI prior to each training session.
- In a dry training environment, the training area should be kept clean to optimize service life of the training slide. Dust, sand, and debris on the training area floor can stick to the slide and cause premature wear.

4.2 CLEANING

When soiled, remove the sliding surface and clean the slide and sliding surface using a mild soap (non-detergent) mixed with clean fresh water. Thoroughly rinse the slide with clean fresh water after washing.

Leave the sliding surface off and allow the slide to dry completely. A circulating fan can be used to assist with air drying. Do not use forced air or dry with heat.

Re-install the sliding surface once the slide and sliding surface have dried.

5.0 SERVICE INSPECTION

A service inspection should be conducted at least once a year or if there is doubt of the slide's integrity (such as the slide showing signs of losing air). Service inspection includes a visual inspection, a leakage test, and a pressure relief valve test. The leakage test will uncover any porosity in the cloth or loss of integrity in the inflation chamber seams. A pressure relief valve test may be performed at any time if the operation of the relief valve is questionable.

CAUTION: Ensure the work area is clean, smooth, and free of sharp objects, splinters, and abrasive or corrosive materials.

Test conditions:

- Temperature $20 \pm 3^{\circ}\text{C}$ ($68 \pm 5^{\circ}\text{F}$);
- Barometric pressure 101.6 ± 6.8 kPa (28 to 32 inches mercury);
- Relative humidity of 80 % or less;
- Not in direct sunlight;
- Free from drafts;

Equipment and materials required for testing:

- Calibrated pressure gauge, scale increments not larger than 0.01 PSI (0.07 kPa);
- Thermometer, scale increments not larger than 1°C (1.8°F)

- Barometer, scale increments not larger than 0.34 kPA (0.1" Hg)
- Air supply (shop air), free of dust, oil and moisture
- Work horses or table to lift the slide off cold surfaces such as a concrete floor

Equipment needed to troubleshoot:

- Soapy water (using mild soap, non-detergent)
- Paint brush
- Spray bottle

5.1 VISUAL INSPECTION

A visual inspection is the first step in the service inspection. This can also be used to assess whether the slide should receive an additional service inspection between yearly periods. Inspect the slide as follows:

- Inspect the inflation chambers for tears, holes, abrasion, pigment peeling.
- Inspect all seams for peeled edges or loose seam tape.



Figure 21: Example of a peeled edge

- Inspect the replaceable surface and sub-floor for tears, holes, abrasion, and loose stitching.
- Inspect all anchor patches (re-entry line, lifeline) and d-ring patches for peel.
- Inspect webbing for tears, loose stitching, etc.

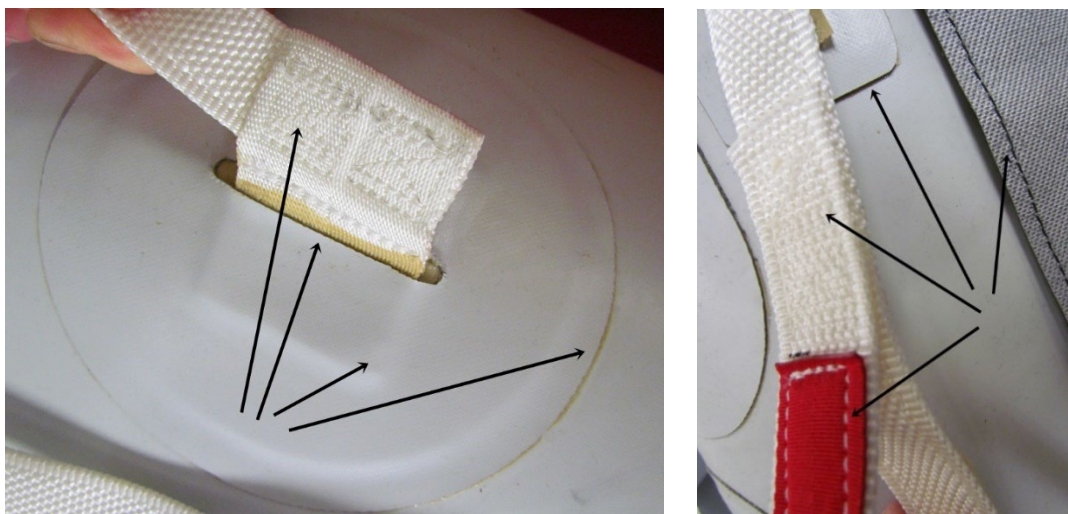


Figure 15: Patch inspection zones

- Inspect slide hardware, damage to the valves, O-rings, flanges, caps and fittings.
- Inspect girt components, lacing strip, Velcro®.



Figure 23: Samples of hardware and components to inspect

Any defect or damage found shall be fixed in accordance with Section 6.0, *Repair Procedures* or by sending the slide to Tulmar for repairs. To send a slide, reach out to mro@tulmar.com.

5.2 AIR RETENTION TEST

This test measures loss of air pressure (therefore air leakage) from the inflatable chamber over a period of 6 hours. Since changes in temperature and barometric pressure affect the pressure in the chamber, they are factored into the test. The test starts at 3.0 PSI, and after 6 hours the “corrected” measured pressure needs to be 2.75 PSI or greater to pass.

NOTE: The slide should be supported to prevent the chamber temperature from being affected by a cold surface, such as a concrete floor.

- Inflate the slide chamber to 3.0 PSI.
- Let it stabilize for 30 minutes and then re-adjust the air chamber pressure to 3.0 PSI.
- Let stabilize for another 30 minutes (1 hour total). This gives the slide enough time to adjust to the pressure and allows the air to reach the room's ambient temperature.
- Re-adjust the air chamber pressure to 3.0 PSI and record the room temperature T1, the barometric pressure P1amb, the start time and the date. The 6-hour test begins now.
- Allow the slide to stand undisturbed for 6 hours.
- After 6 hours, record the slide chamber pressure Ptube, the room temperature T2, the barometric pressure P2amb, and the end time.
- Calculate and record the “corrected” chamber pressure value, Pcorrected, to compensate for variations in ambient conditions. Use one of the formulas below, depending upon which barometric pressure and temperature units were recorded. The result of either calculation will be in PSI.

Ptube is in PSI, T1 and T2 in °C, P1amb and P2amb inches mercury (Hg)

$$P_{\text{corrected}} = P_{\text{tube}} + (0.06 \times (T1 - T2)) + (0.491 \times (P2_{\text{amb}} - P1_{\text{amb}}))$$

- If Pcorrected has fallen below 2.75 PSI, re-inflate the slide until the pressure relief valve opens

and then closes. Check all valves, the pressure monitor port, the aspirator, and the aspirator port for leakage by applying soapy water with a paintbrush. Check for leaks in the inflatable chamber by spraying the chamber and seams with the soapy water solution.

- Note the location of any substantial leaks and repair as per the guideline in section 6.0. If the leak originates from a valve, replace the valve. If the leak is from a glued flange, the slide should be returned to Tulmar for repair.

5.3 PRESSURE RELIEF VALVE TEST

Prior to testing the pressure relief valve, a mild non-detergent soap can be applied to the valve surface to aid in detecting its opening. Bubbles will appear on the valve surface indicating excess pressure is being vented.

1. Inflate the slide and record the valve opening pressure. The relief valve should open when there is overpressure.
2. When the pressure relief valve opens, shut off the air supply and continue to observe the relief valve until air stops venting or bubbles cease to form, indicating closure of the valve.
3. Record the pressure at the time of closure. The relief valve should close at 3.5 PSI.

If a relief valve fails to open or close at the specified pressure or within the specified pressure interval, remove and replace the relief valve. A non-functioning relief valve could lead to slide damage or increased air consumption.

Warning: Do not inflate the slide beyond 3.0 PSI.

6.0 REPAIR PROCEDURES

6.1 REPAIRS ALLOWANCE

Repairs to evacuation training slides typically involve patching the damaged area with cloth patches.

When there is a lot of damage in a single location, then the slide shall be replaced. A lot of damage is defined as:

- Any tear or wear that is too large to patch;
- Any slide panel with more than 25% of its surface holding damage;
- Any tear, abrasion or wear that would need a patch that intersects with another existing patch (i.e. a patch cannot be applied over another patch).

Do not repair any accessories, components, girths or replaceable surfaces. If you see damage in any of these, replace them instead.

6.2 REPAIR ASSESSMENT (LEGACY SLIDES – PRE-2017)

The area of damage is estimated by the size of the patch required to repair it. Removal of coating that does not affect the base fabric is treated as an abrasion and can be adequately repaired with tape, or a small patch. If the base cloth is damaged, it is treated as a hole.

Deteriorated and/or porous fabric is treated as a hole. Coated fabric that has been contaminated with a substance which has deteriorated the coating and/or base fabric is treated as a hole. The affected area shall be cut out, cutting 25mm (1") larger than the damaged area.

The cut must have rounded corners to avoid creating stress points that can tear further. If contamination exists, the remainder of the slide shall be checked for additional contamination. Replacement of panels should not be attempted. For part or whole panel replacement, the slide must be returned to Tulmar Safety Systems.

6.3 REPAIR ENVIRONMENT & EQUIPMENT

Repairs are to be carried out in a room with the following characteristics:

- Temperature 20 °C +/-5 °C;
- Barometric pressure between 94.8 and 108.4 kPa (28 to 32 inches of mercury);
- Relative humidity is less than 80 %;
- Free from direct sunlight;
- Free from drafts;
- An area with a clean, smooth surface, such as a table with a melamine top;
- An area free from projections and having a clean, dry floor;
- Ventilation for eliminating VOC fumes.

It is imperative that tools used for repairs are always clean and free from abrasives. Service personnel should wear rubber- or felt-soled footwear to avoid creating static electricity.

Tulmar repair kits are supplied with the slide; however, they include repair patches only and do not include all equipment required to complete a repair. The following additional materials and tools are required to perform slide repairs and must be supplied separately by the customer.

Required equipment for repairing slides purchased after 2019

- TULMAR repair Kit 5513-1758-001
 - Includes patches only; adhesive/glue is not included
- Self-curing Vinyl Adhesive / Cement HH-66 or equivalent (recommended)
- Scissors
- MEK, Toluene or isopropyl alcohol as a degreasing solvent
- Paintbrush used for adhesive application, if not included with adhesive
- Hand roller

Required equipment for repairing slides purchased before 2019 (legacy slides)

- TULMAR repair Kit 5513-1406
 - Includes patches and #80 grit emery cloth; adhesive/glue is not included
- 2-part self-curing neoprene adhesive (recommended)
- Scissors
- MEK, Toluene or isopropyl alcohol as a degreasing solvent
- Paintbrush used for adhesive application
- Hand roller

6.4 MATERIALS

Repairs must be made with the same materials as the section being repaired. Use the materials/patches provided in the appropriate repair kit listed in section 6.3.

Adhesives are not included in the repair kits. Follow the adhesive manufacturer's recommendations for application of the adhesive. The pot life of mixed adhesives must be complied with.

Emery cloth, #80-grit, is used for surface preparation prior to applying the adhesive (legacy slides only).

6.5 SURFACE PREPARATION

Refer to the instruction leaflet included in the appropriate Tulmar repair kit.

Legacy slides only: For the neoprene slide, light sanding is necessary to rough up the surface of the cloth being bonded. Sanding helps the adhesive bond better with the cloth. Good sanding is indicated by the loss of shine on the cloth's surface and by a greater drag when you slide a finger across the sanded area. Sanding is not to expose the base fabric of the cloth.

Both surfaces to be bonded are to be sanded (patch and slide chamber). Sanding should run parallel to the seam or to the edges of the cloth. The emery cloth must be checked periodically to ensure it is not worn or filled with sanding debris.

For both legacy and current slides, the repair patch and the chamber area to be repaired must be thoroughly cleaned using MEK, Toluene or isopropyl alcohol. Clean the surfaces to be joined with a pad wet (not dripping) with the solvent. Make sure there is no sanding dust left on the cloth after cleaning. A clean cloth indicates a properly cleaned surface. Let dry completely.

6.6 REPAIR PATCHING

- Use the training slide repair kit pre-cut patches. The pre-cut patches can also be trimmed into a different shape or size.
- The patch is to extend 25mm (1") beyond the damaged area on all sides. The corners of the patch are to be rounded and not square. For example, if there were a slit 6mm ($\frac{1}{4}$ ") long, the patch would be 57mm ($2\frac{1}{4}$ ") long by 51mm (2") wide, with rounded corners.

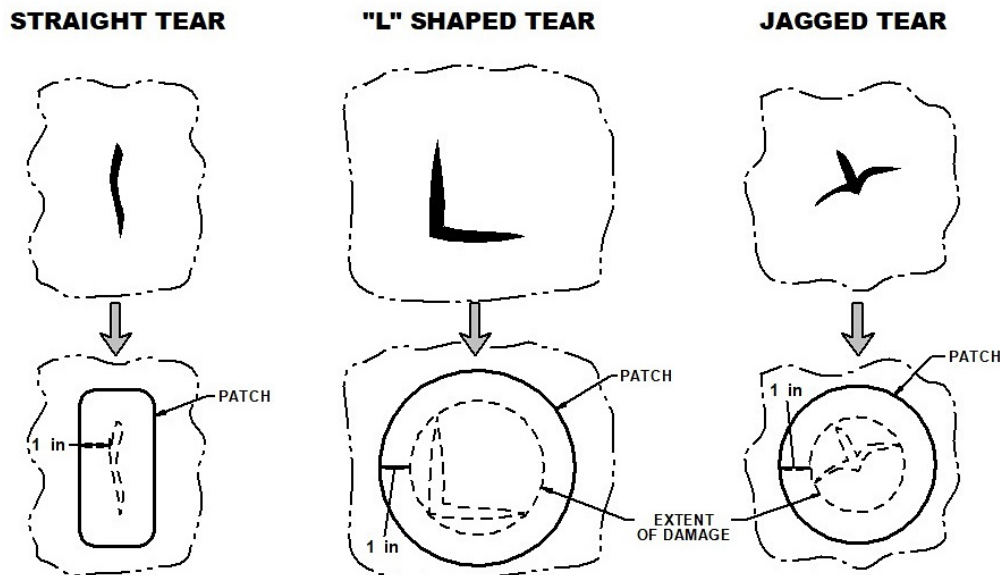


Figure 24: Diagram for patch type and tear type associations

- Use the patch centered over the area to lightly mark the location of the patch.
- Prepare both the patch and chamber surfaces per section 6.5 above.

- Apply adhesive as per manufacturer instructions.
- Apply the patch to the area; start by centering the patch over the area. Then apply pressure to the center of the patch using an object with a smooth, flat surface and rounded edges, or a hard-surface roller. Apply pressure, working from the center to the outer edges, to remove any bubbles between the two surfaces.



Figure 16: Patch application

- To maximize results, allow the adhesive to cure for the time recommended by the manufacturer. Do not use or train on the slide until the adhesive has fully cured.

6.7 ACCESSORY REPAIRS

Some of the components and/or accessories can be replaced as follows:

6.7.1 VALVES AND PLUGS

- Replace any hardware showing damage or rough edges.
- Replace valves showing damage, leakage issue or rough edges. Refer to the table at the end of the manual for the appropriate part number.

To replace a valve:

1. Remove it using the socket tool provided by turning counterclockwise. It is recommended to vent out the slide chamber and let the pressure drop prior to completely removing the valve.
2. Replace with a new valve, turning clockwise. Tighten with the socket tool, hand tight.
3. Check the valve for leaks after installation. If there is leaking, re-tighten the valve.

6.7.2 REPLACEABLE SURFACE REPLACEMENT

The sliding surface of the training slide has strips of Velcro® installed on the underside, around the perimeter of the sliding panel.

When the replaceable surface requires replacement due to wear or inadvertent damage, a replacement sliding surface should be ordered from Tulmar Safety Systems. The part number for the replaceable surface is located on the underside of the sliding surface, near the girt end.

After removing the used or damaged replaceable surface, install the replacement surface by laying it out over the sub-floor, aligning the Velcro® strips. Press firmly along the perimeter of the replaceable surface to firmly secure it.

6.7.3 GIRT REPLACEMENT

The two-point girt features two lacing strips, making it removable and replaceable.

When the slide girt requires replacement due to wear, order a replacement girt from Tulmar Safety Systems. The part number of the girt can be found on the underside of the top lacing strip panel. To install a new girt, follow the procedure below;

- Remove the girt bar from the slide girt and lower the slide to the ground. A rope or strap threaded through the girt panels to hold the girt end will make this task easier.
- Before undoing the lacing strip, observe how the cord loops are laced one into the next, towards the center loop.
- Starting with the upper lacing strip, remove the quick link. The lacing strip will come apart easily.
- Lace the new girt's upper panel onto the lacing strip on the slide. Reinstall the quick link. Compare the upper lacing strip attachment with the lower one to ensure the cords are looped in the same fashion.

Repeat steps 3 and 4 to attach the bottom portion of the girt.

The slide is now ready to be reinstalled on the trainer as per section 3.2.

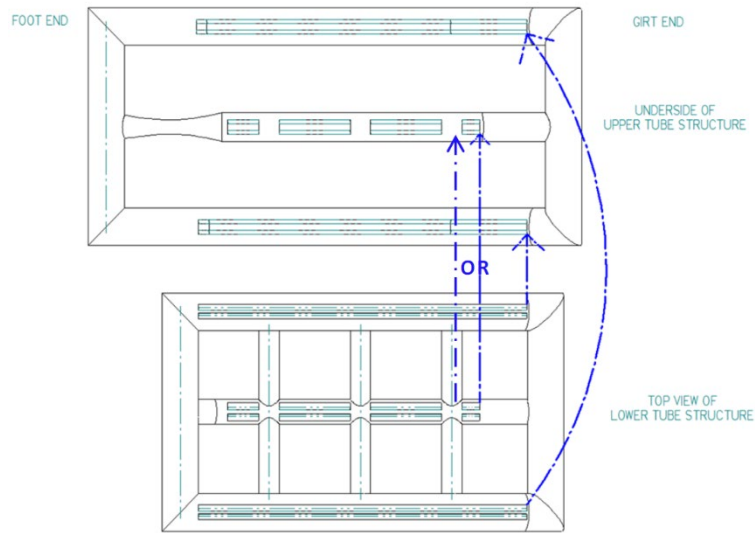
6.7.4 TUBE STRUCTURE REPLACEMENT

The upper and lower tube structures are attached using a hook-and-loop fastening system. This feature allows the replacement of either tube structure, independently, as required.

A replacement tube structure can be ordered from Tulmar Safety Systems. The part number can be determined by Tulmar Safety Systems by tracing back the serial number in paragraph 2.1.9. The slide's serial number will be used to identify the part number of the required tube structure and the accessories to be added to it.

To install a new tube structure, proceed as follows:

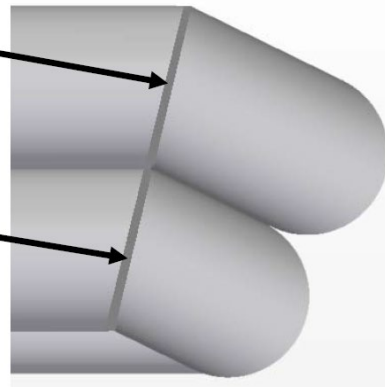
- Place the upper tube structure upside down and completely deflated.
- Deflate the lower tube structure and place upside down on top of the upper tube structure.
- Align the lower tube structure hook fasteners sandwiches to the upper chamber loop fasteners strip following the picture below.



- The seam tape at the girt end should be closely aligned, as shown in the image below.

Upper chamber seam

Lower chamber seam



- Mate the chambers together starting with the center tube, then the side tubes, always going from the girt end to the foot end of the slide.
- To mate the Hook & loop fasteners together, open the hook sandwich, mate with the loop strip and close the sandwich. Ensure there is a full 51mm (2") contact between the hook and loop fasteners.
- As much as possible, minimize the quantity of ripples when mating the hook & loop fasteners together.
- The slide is now ready to be re-installed on the trainer as per section 3.2.2.

7.0 PARTS LIST

The following table lists components available for current (post-2019) dual-lane evacuation training descent slides. If you are looking to replace a part not listed below, or for slides sold prior to 2019, please contact us using the information below.

Description	Tulmar Part No.
Replaceable sliding surface	67607-XXX OR as marked on the existing sliding surface (legacy slides)
Replaceable girt	As marked on the existing girt
Repair Kit, slides sold after 2017 (No adhesive included)	5513-1758-001
Repair Kit, slides sold before 2017 (No adhesive included)	5513-1406
Top-up valve	63408
Pressure relief valve	6348
Maintenance plug	6339
Top-up valve adapter	6314
Pressure gauge 0-5psi	6463-001
Socket Tool	6366

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