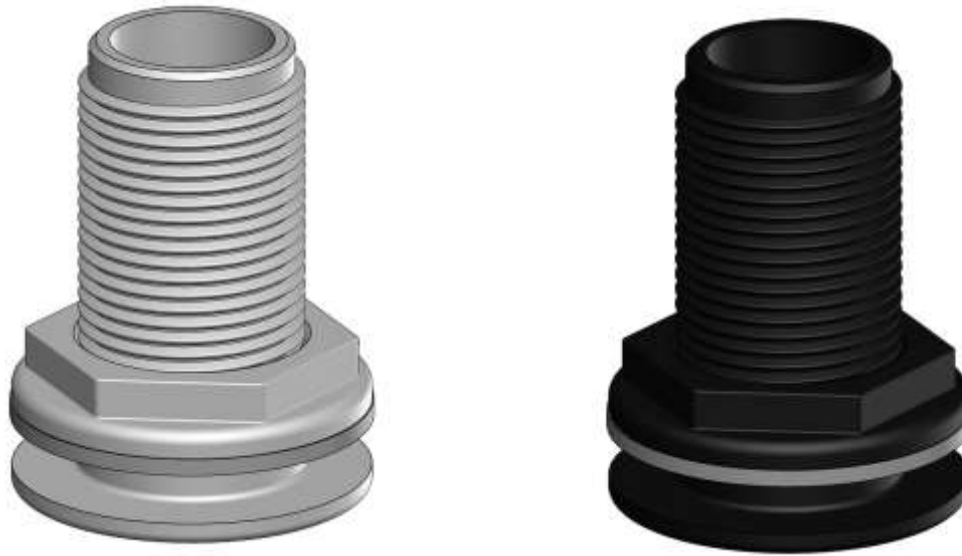


Domed Skin Fittings (Thru Hulls)



Designed and made in New Zealand, TruDesign Skin Fittings (Thru Hulls) are precision moulded from glass-reinforced Nylon composite.

- Certified to ISO 9093-2 by the International Marine Certification Institute (IMCI, Belgium).
- Comply with ABYC H-27 standards when used in conjunction with the TRUDESIGN™ ABYC collar.
- Certified by **Bureau Veritas** to ISO 9093-2.

TruDesign Skin Fittings (Thru Hulls) eliminate all corrosion and bonding problems associated with electrolysis giving peace of mind with respect to the safety of your vessel.

Features:

- Compatible with all hull types – Can be used on aluminium, steel, wood, composite & GRP hulls.
- Chemical resistant – Unaffected by diesel, petrol, chemicals, and antifouling paints.
- U.V resistant – Will not degrade or discolour from the sun's ultraviolet rays.
- Paintable – Paintable with all types of antifoul including Coppercoat™
- Fits TruDesign Ball Valves and other parallel BSP or NPS threads – Universal compatibility to TruDesign brand fittings and other marine hardware.
- Large operating range – Suitable for all marine conditions from -40°C to +110°C
- Meets ABYC H-27 Standard when installed in combination with TruDesign Valves & Load Bearing Collars.



Part Numbers BSP

Part # Black	Part # White	Description
		SKIN FITTINGS BSP - DOMED
90424	90425	Skin Fitting Domed ½" BSP PKG
91107	91108	Skin Fitting Domed ½" BSP Tagged
90431	90432	Skin Fitting Domed ¾" BSP PKG
91114	91115	Skin Fitting Domed ¾" BSP Tagged
90422	90423	Skin Fitting Domed 1" BSP PKG
91105	91106	Skin Fitting Domed 1" BSP Tagged
90420	90421	Skin Fitting Domed 1 ¼" BSP PKG
91103	91104	Skin Fitting Domed 1 ¼" BSP Tagged
90418	90419	Skin Fitting Domed 1 ½" BSP PKG
91101	91102	Skin Fitting Domed 1 ½" BSP Tagged
90428	90429	Skin Fitting Domed 2" BSP PKG
91111	91112	Skin Fitting Domed 2" BSP Tagged
91160	91170	Skin Fitting Domed 3" BSP Tagged

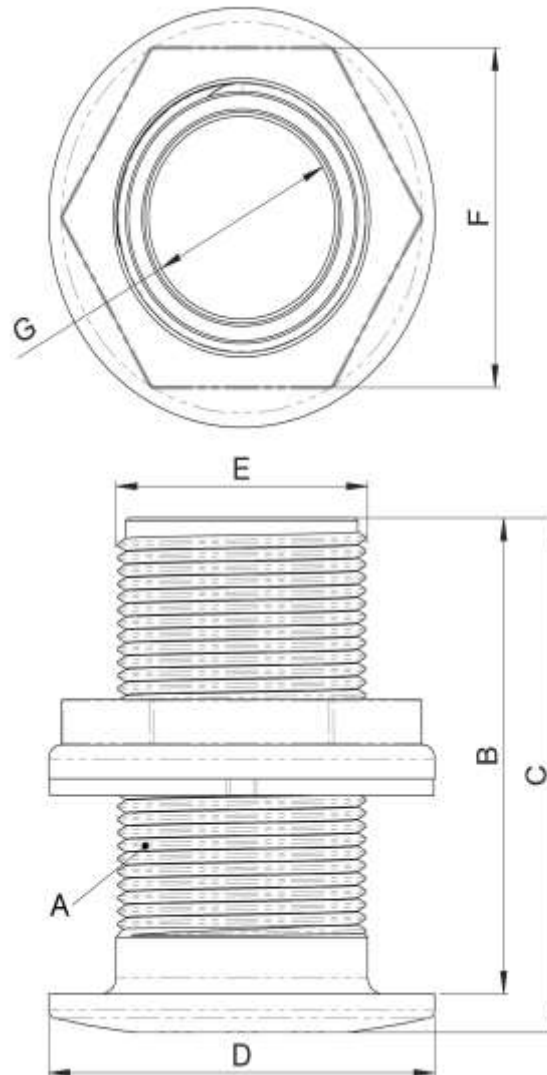
Part Numbers NPS

Part # Black	Part # White	THRU-HULL NPS FITTINGS
91225	91231	Thru-hull Domed ½" NPS Tagged
91226	91232	Thru-hull Domed ¾" NPS Tagged
91227	91233	Thru-hull Domed 1" NPS Tagged
91228	91234	Thru-hull Domed 1 ¼" NPS Tagged
91229	91235	Thru-hull Domed 1 ½" NPS Tagged
91230	91236	Thru-hull Domed 2" NPS Tagged

Dimensions:

All dimensions in millimetres (mm) All dimensions nominal.

A	B		C		D		E		F		G	
Thread Size	Thread Length		Overall Length		Head Diameter		Cutout Diameter		Hex Size AF		Minimum Internal ϕ	
1/2"	66mm	2 3/5"	72mm	2 6/7"	35mm	1 3/8"	22mm	6/7"	28mm	1 1/9"	12mm	1/2"
3/4"	66mm	2 3/5"	71mm	2 4/5"	41mm	1 3/5"	27mm	1"	34mm	1 1/3"	17mm	2/3"
1"	66mm	2 3/5"	71mm	2 4/5"	52mm	2"	34mm	1 1/3"	42mm	1 2/3"	23mm	1"
1 1/4"	86mm	3 2/5"	92mm	3 5/8"	65mm	2 5/9"	42mm	1 2/3"	52mm	2"	30mm	1 1/5"
1 1/2"	84mm	3 1/3"	91mm	3 4/7"	74mm	3"	48mm	1 8/9"	60mm	2 1/3"	36mm	1 2/5"
2"	90mm	3 1/2"	98mm	3 6/7"	93mm	3 2/3"	60mm	2 1/3"	75mm	3"	48mm	1 8/9"



Hull Thickness

Size	Maximum Hull Thickness allowing 70% thread engagement into Ball valve
1/2"	32 mm
3/4"	32 mm
1"	32 mm
1 1/4"	44 mm
1 1/2"	44 mm
2"	44 mm

Note; it is recommended for very thin hulls that a backing plate be added to make the "effective hull thickness" a minimum of 20mm.

Standards & Approvals:

TruDesign Skin Fittings (Thru Hulls) are certified by the International Marine Certification Institute (IMCI) and Bureau Veritas to meet; ISO 9093-2 Small craft. They also meet ABYC H-27 Standard when installed in combination with TRUDESIGN™ Ball Valves & Load Bearing Collars.

ISO 9093-2 Standard



In accordance with ISO 9093-2 standards, Skin Fittings (Thru Hulls) are subjected to a 155kg (341.7lb) load, applied to the threaded section for a minimum of 30 seconds, without any damage occurring. TruDesign Skin Fittings (Thru Hulls) meet this standard.

Note: 1/2" size Skin Fitting (Thru Hulls) are not approved to ISO 9093-2 or ABYC unless used with an ABYC collar.

ABYC H-27 Standard



TruDesign Skin Fittings (Thru Hulls), when assembled together with TruDesign Ball Valves and Load Bearing Collars, comply with ABYC H-27 standards. This allows the entire assembly to withstand a 500lb (226.8kg) load applied to the inboard end of the assembly (i.e. from the Ball Valve's Tail fitting) for a minimum of 30 seconds without any damage occurring.

Installation: Location & Drilling

- Ensure there is enough room on the inside of the boat to allow the Ball Valve to be screwed on without hitting the bulkhead or other part of the hull. Note; A “T” handle Ball Valve is available for smaller area locations
- Ensure the location will not cause the valve handle to be knocked open or closed.
- Mark the location and drill from the inside a pilot hole 3mm in diameter. Select a hole-saw 1 mm larger than the outside thread diameter of the Skin Fitting (Thru Hull). From the inside, use the pilot hole as a centre and drill through the hull with the selected hole-saw. A packer may be required to provide a stronger and flat surface for the nut and washer on the inside of the hull. For very thin hulls a backing plate needs to be added to make the “effective hull thickness” a minimum of 20mm.
- TruDesign Skin Fittings (Thru Hull) are suitable for installation in all types of hull construction; steel, aluminium, composite, fibreglass – cored and solid, wood, wooden sandwich and caulked solid wood hulls. Ensure fittings are always installed in the centre of individual planks.
- It is recommended to “dry fit” the Ball Valve Skin fitting assembly and then trim the skin fitting (with a hacksaw) to allow a 2mm to 5mm gap between Skin Fitting Nut and Ball Valve to minimise overhang.

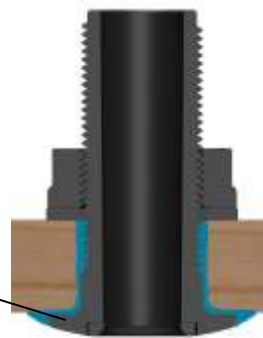


Recommended Hull Adhesive Sealants & Glues:

First clean all surfaces to be bonded with a general-purpose cleaner.

- 3M™ Marine Adhesive Sealant Fast Cure 5200. A one-part polyurethane adhesive/sealant. Starts to cure (tack-free) in approximately 2 hours, after which hoses can be attached. Full cure takes 24 hours – refer to manufacturer’s product literature.
- SIKAFLEX® 291i Marine Sealant. A one-part polyurethane adhesive/sealant. Starts to cure (tack-free) in approx. 2 hours, after which hoses can be attached. Full cure takes 24 hours – refer to manufacturer’s product literature.
- Bostik® 920 Marine Sealant. A one-part urethane adhesive/sealant. Starts to cure (tack-free) in approx. 2 hours, after which hoses can be attached. Full cure takes 1.5 – 3 days – refer to manufacturer’s product literature.
- West System® (or similar) two-pot epoxy that mixes to a paste. Tip – adding filler to the West System® will increase the viscosity and help minimise “running” of the epoxy. Visit <http://www.westsystem.com/ss/filler-selection-guide/> for more details.

Epoxy or Marine adhesive sealant area shown in blue



Fitting & sealing:

Smear the adhesive or glue on the underside of the Skin Fitting (Thru Hull) flange and a small way up the thread, but no further than the thickness of the hull. It is important not to have any adhesive on the exposed thread area as this could prevent the Nut or Ball Valve from turning.

Insert the Skin Fitting (Thru Hull) through the hull from the outside. Note The TRUDESIGN™ Skin Fitting Installation Tool enables our skin fittings to be installed by one person saving time and money. See separate information sheet on our web site.

If necessary, place two strips of masking tape over the flange and attach to the hull to temporarily hold in place. Go inside the hull to fit the Nut. Note it is good practice to have a backing plate to spread the load especially if there is excessive curvature in the hull or the hull is very thin.

Hold the thread down near the washer and screw on the Nut. Once the nut is screwed down far enough that you can hold the fitting above the nut do so and continue to screw the nut down onto the washer ensuring it is only finger tight.

On the outside of the hull clean off any excess adhesive. Tip – use an angled tool or putty knife to ‘blend’ adhesive around the Skin Fitting (Thru Hull) flange and the hull so it is easier to clean when sanding and antifouling in the future.

After recommended curing times, tighten the Nut to no more than 15 ft.lb. There is no need to over-tighten the Nut, especially if epoxy has been used, as the Skin Fitting (Thru Hull) is now an integral part of the hull.



TruDesign Skin Fitting Installation Tool – makes fitting a one person operation.

THREAD SEALING: Ball Valve to Skin Fitting (Thru Hull)

- All the sealants mentioned above under “Hull Adhesives” can be used for thread sealing. These adhesive sealants allow the Ball valve to be “set in position” to suit handle operation with no risk of turning when in use. If in the unlikely event the Ball Valve has to be removed this will require significant force.
- 3M™ Marine Adhesive Sealant Fast Cure 4200 is approximately half the strength (once cured) of 3M 5200 which allows for eventual disassembly of the ball valve from skin fitting.
- LOCTITE® 5331 A one-part acetoxo silicone sealant. Starts to cure (tack-free) in approx. 10 minutes, after which hoses can be attached. Full cure is achieved within 12 hours (at min. 40% atmospheric humidity) – refer to product literature. Creates a permanent seal for threaded connections.
- PTFE (Teflon) Thread Tape is a traditional thread sealing method which provides a good seal when applied correctly. However, in some cases if the position or tightness of the Ball Valve is incorrect, it will need to be unscrewed and more tape applied, slowing the assembly process. Additionally, the fittings can sometimes be turned by hand after being installed.
- LOCTITE® 55 Pipe Sealing Cord is a coated multi-filament cord designed as a faster method than Teflon tape to seal threaded fittings. The main advantage is that a component, for example a Ball Valve, could be screwed down then screwed back a turn to suit positioning whilst still maintaining a tight seal. This eliminates the need to remove the entire Ball Valve and apply more tape as with traditional Teflon tape.

TruDesign Skin Fittings (Thru Hulls) are printed and marked with the following information.



TruDesign branding. You can identify from inside the hull that genuine fittings are installed

Engraved 'B' for BSP thread, or 'N' for NPS thread



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