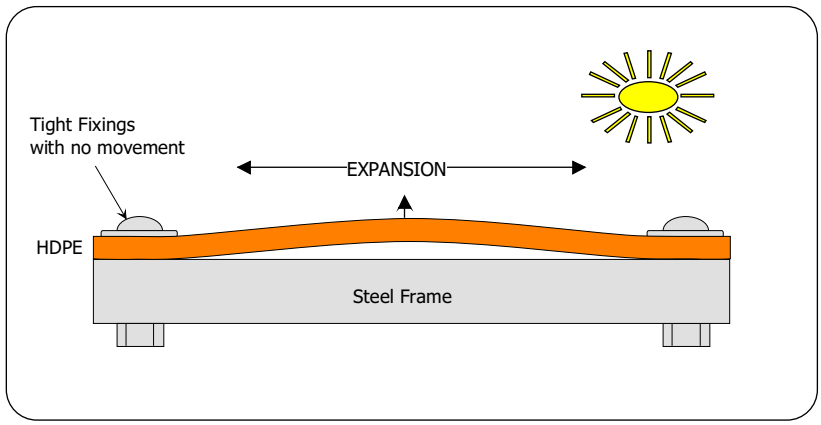
HDPE Expansion and Fixing Suggestions

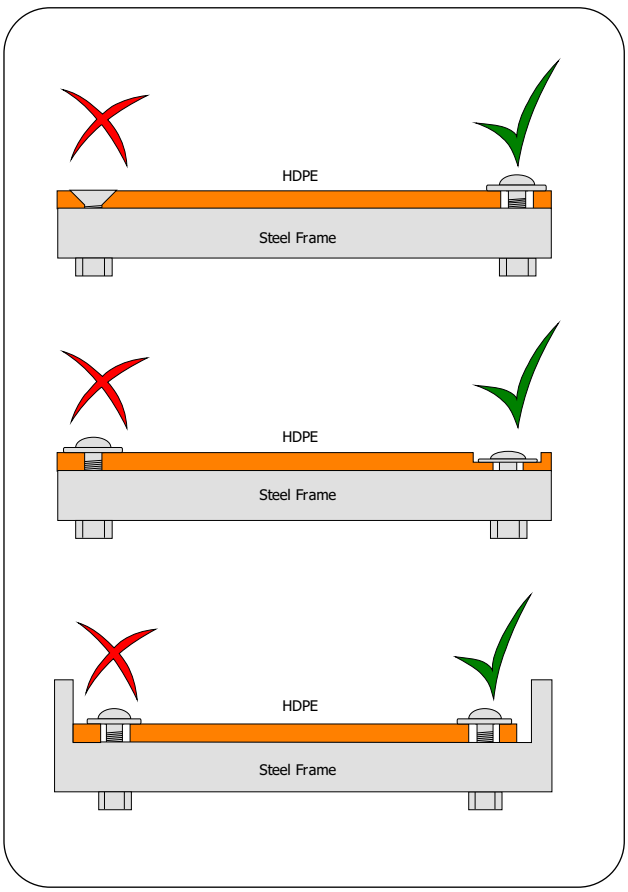
ALL materials expand and contract with temperature change. Some materials expand and contract more that other. Plastics, including HDPE (high density polyethylene) expand more than timber and metal, therefore it is important that when designing and building your products that you make allowances for this fact.

For example Densetec HDPE expands approximately 1.5mm per linear metre for every 10 degrees C, that means a 2.4m strip of this material can expand and contract 10.8mm between a temperature range of 0 and 30 degrees C.

In this example *(right)*, the HDPE expands more than the steel frame and because the fixings are tight with no allowance for expansion, there is only one thing the plastic can do - and that is buckle.

Please Note: It is possible for plastic sheet materials to still bend a small amount due to uneven temperatures on the back and the front surfaces of the sheet even when expansion has been allowed for.





ALLOW THE MATERIAL TO MOVE!

Countersunk bolts or fixings will not allow the plastic to expand unless the bolt is in a slotted hole where the actual bolt can move with the sheet as well (unlikely).

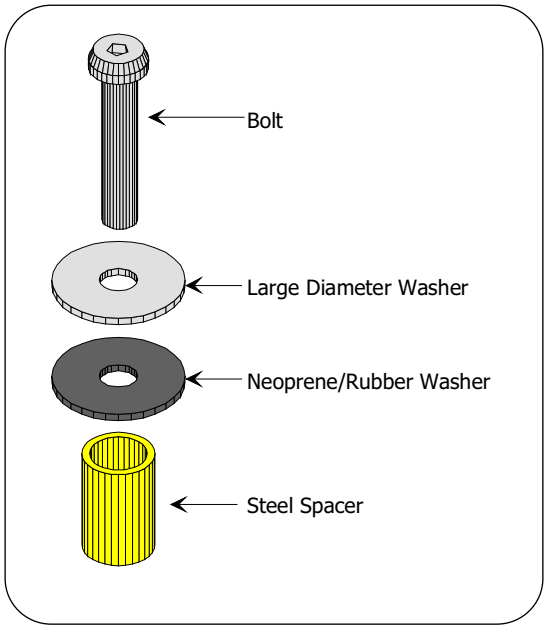
Bolts with washers are good for allowing some movement, but not if too tight.

Do not drill holes for fixing that are the same diameter as the fixing itself. Always drill oversized holes to allow for expansion.

If a flush fixing is required, a counterbore can be machined in to the HDPE allowing the bolt head and the washer to sit below the outer surface of the panel.

If there are physical constraints around the sides of panels always allow for an expansion gap around that edge or at that point.

HDPE Fixing Idea for Large Panels



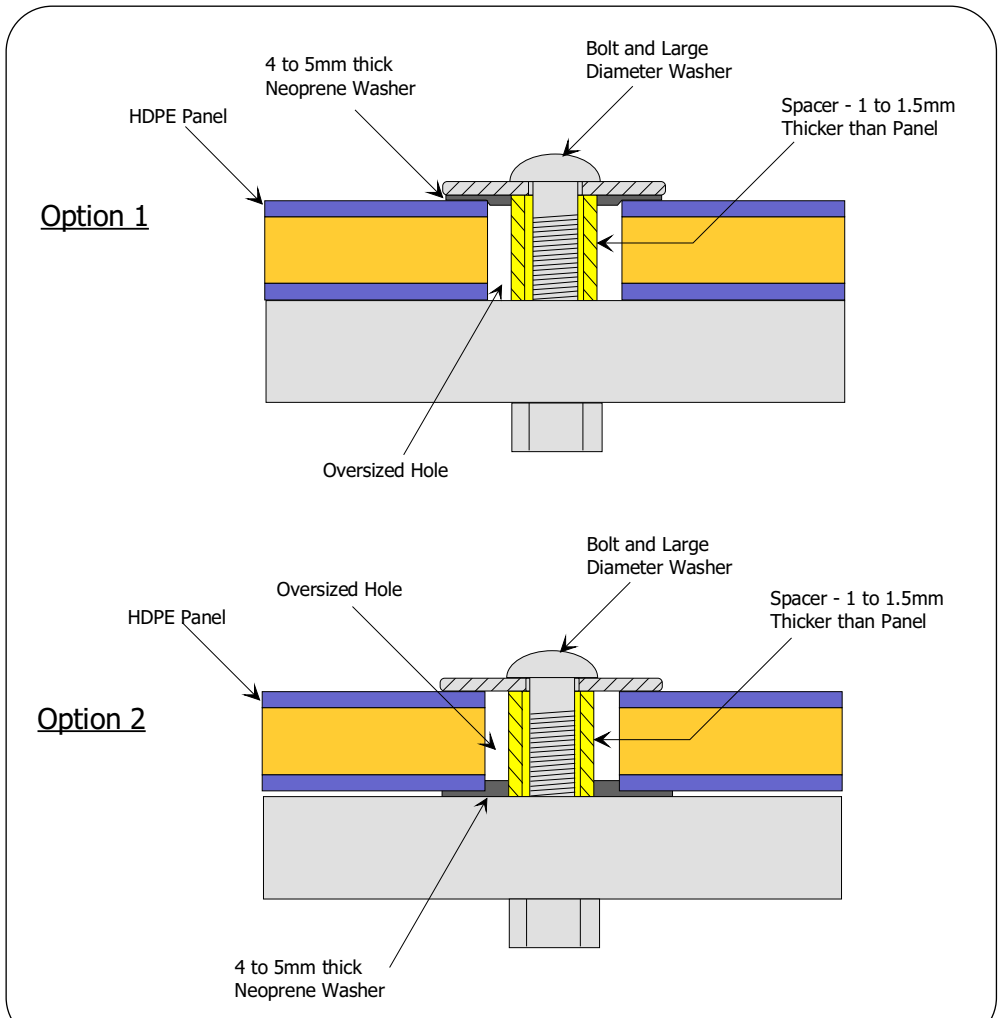
The principal with this fixing idea is basically the same whether you are using bolts or screws to fix your HDPE panels to either metal or timber frames or posts.

The essential details are a spacer that allows you to fully tighten the fixing, while leaving a small expansion space that is then taken up by a compressible material e.g. neoprene rubber.

The result is that fixings can be fully tightened and the panel will still be able to move and expand. The neoprene washer should prevent the panel from rattling and appearing to be loose and will itself expand and contract with the HDPE panel.

Assembly is easier when placing the neoprene washer under the fixing washer *(left)*, however neoprene washers or spacers can be installed between the HDPE panel and the fixing frame supports if desired.

We recommend that you test your fixing methods thoroughly before going in to production. If you would like prices for spacers, washers and neoprene washers please contact our office.



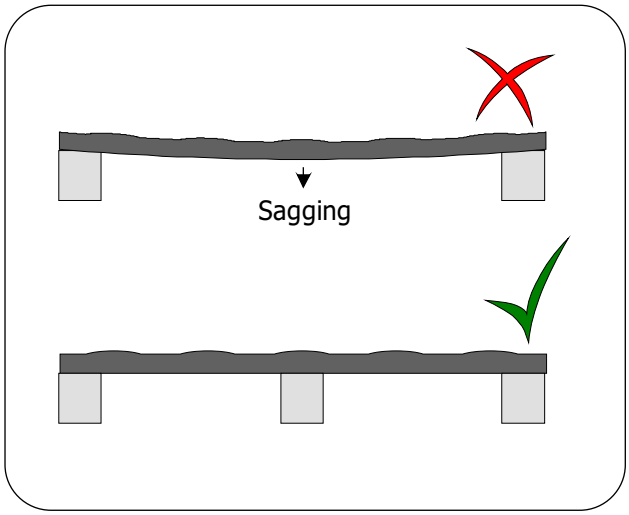
Support for HDPE Panels

HORIZONTAL HDPE PANEL SUPPORT

HDPE is not as structurally rigid as Timber or Ply Flooring sheets at a similar thickness.

When designing equipment it will be necessary to provide enough support under HDPE decking panels to prevent them from sagging. The maximum span of these supports will depend on the type and thickness of the material being used, we suggest that you test your ideas thoroughly before production.

If you are replacing an existing timber decking panel, it is very likely that you will need to provide additional support.

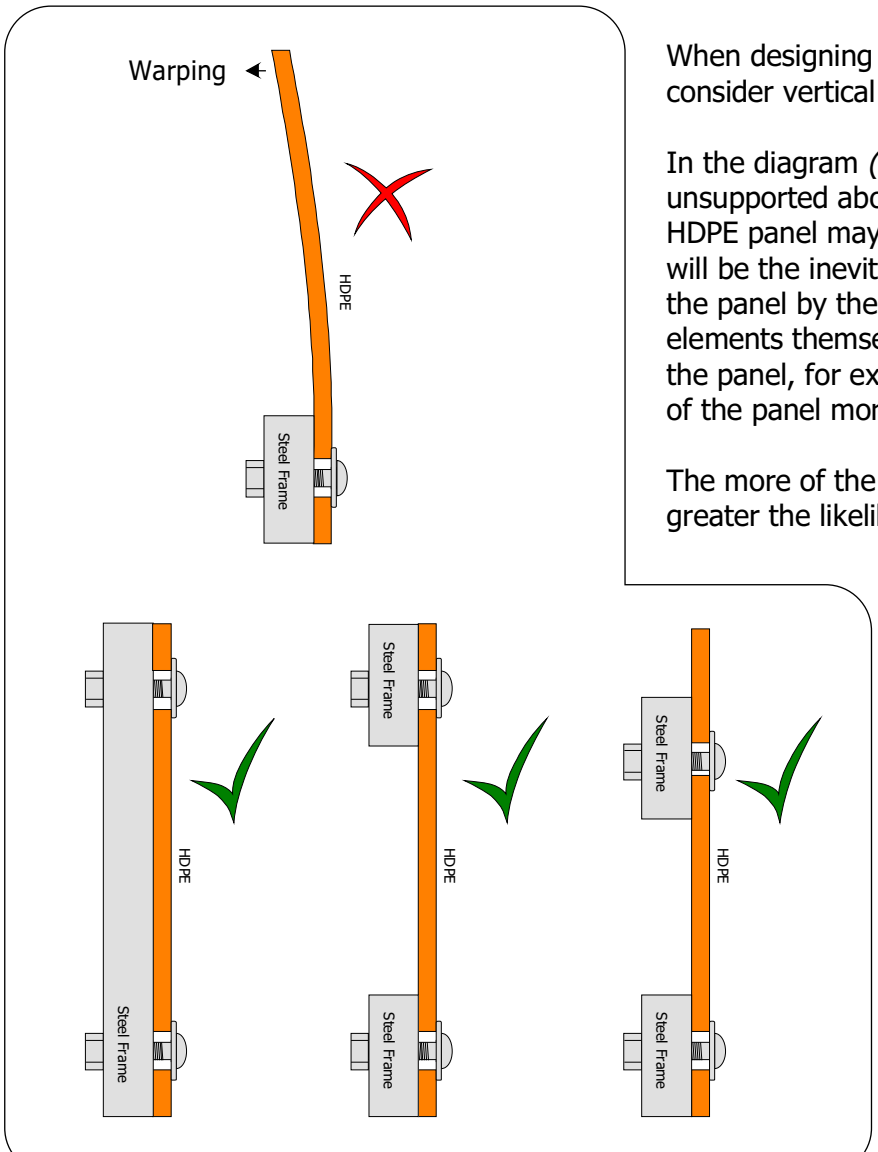


VERTICAL HDPE PANEL SUPPORT

When designing your products you also need to consider vertical panel support for HDPE.

In the diagram *(left)* the HDPE panel is unsupported above the steel frame. Although the HDPE panel may have no apparent load on it, there will be the inevitable stresses and strains put on the panel by the equipment users and the weather elements themselves playing their part in warping the panel, for example the sun heating up one side of the panel more than the other.

The more of the panel that is left unsupported the greater the likelihood that it will warp.



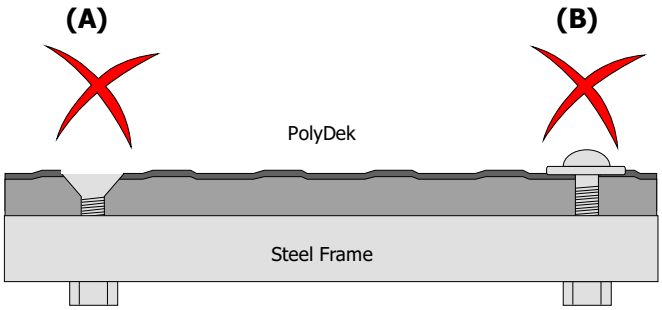
DISCLAIMER

The information contained within this document is to assist designers, engineers and manufacturers when using HDPE sheet materials in their products.

Fahr industries accepts no responsibility or liability for any claims or suggestions contained within this document.

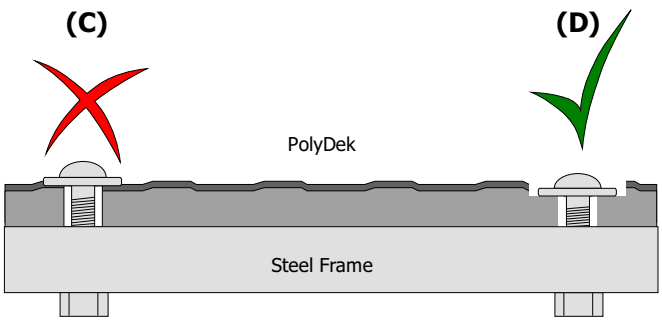
It is strongly recommended that thorough testing is carried out on new product ideas before production.

IMPORTANT Additional Suggestions for Fixing PolyDek



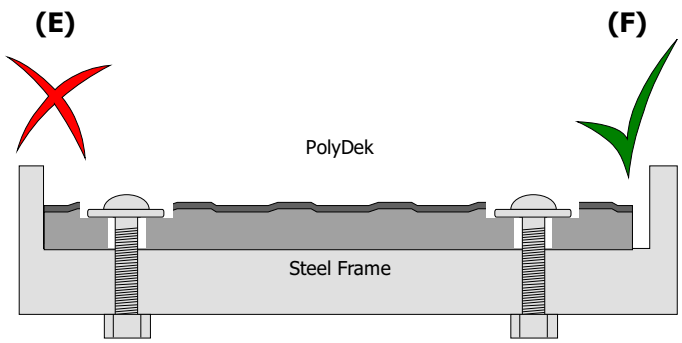
(A) DO NOT use countersink fixings

(B) DO NOT surface fix on top of the rubber and make sure the fixing holes are larger than the fixings to allow for movement



(C) Even with an oversized hole for fixing DO NOT surface fix on top of the rubber

(D) This is the CORRECT method of fixing by drilling a counterbore hole deeper than the rubber layer and into the polyethylene layer along with an oversized fixing hole so the PolyDek can move under the fixing.
DO NOT over tighten any of the fixings.



(E) MAKE SURE you allow for expansion of the PolyDeck around the perimeters of the panel

(F) This is the ideal fixing method for this situation