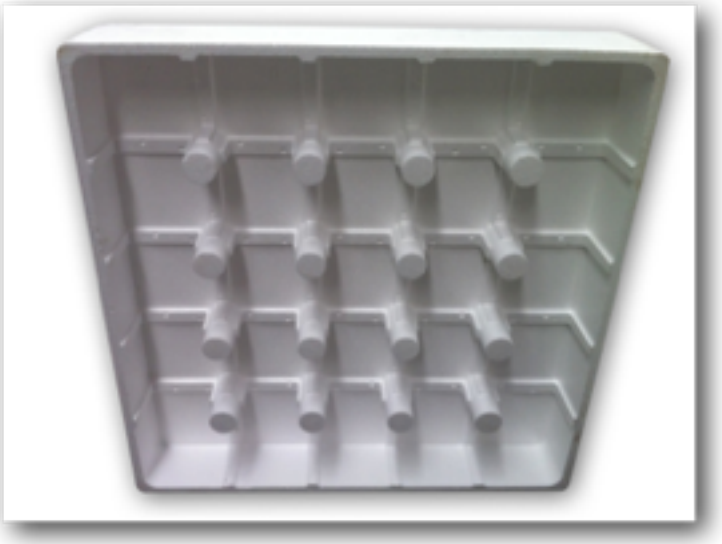
ENGINEER'S GUIDE



ADVANTAGES

- *Available across Eastern Seaboard*
- *Product not affected by water*
- *Provides thermal insulation*
- *Predictable mechanical behavior*
- *Polyvoid slab designed to AS 3600*
- *Flexible design parameters*
- *Wide range design alternative*
- *Requires minimal site preparation*
- *Fix slab costs*
- *Not affected by homeowner works*
- *Not affected by trees and gardens*

PolyVoid (Compressible Void Former)

Cohesive soils change in volume to varying degrees in response to changes in their moisture content. They increase in volume upon wetting and decrease in volume if they are allowed to dry out. Clay soils, therefore change in volume with the seasons, the change being manifested in seasonal vertical and horizontal movement of the soil.

Generally, potentially expansive soils will only swell and shrink if the prevailing climatic conditions lead to significant seasonal wetting and drying. The greatest seasonal heaves will, therefore occur under semi-arid (South Australia) climatic conditions where pronounced short wet and long dry periods lead to major moisture changes in the clay.

The swelling of the clay that occurs at the edge or centre of the slab is dependent on the initial moisture of the clay. Further this swelling increases gradually and occurs in the short term over several months and in the long term over several years.

The Polyvoid is an Expanded polystyrene (EPS) produced designed to compress at a prescribed load as a result of its unique geometry, design and material composition. Polyvoid is strong enough to act as formwork until the concrete slab hardens and becomes self supporting. It deforms under load and user its characteristic properties to initiate an orchestrated 'collapse', allowing the swelling clay to rise without

exerting undue stress to the slab. Initially the soils swell only to be resisted primarily by the self weight of the slab, the geometry of polyvoid interacts with the swelling clay to activate both vertical and sideway deformations of the leg members. These deformations continue until the point of mechanical capitulation of the PolyVoid thereby protecting the slab from the swelling clay. Even after compression, a small additional amount of deformation can continue to occur. this is regarded as an inbuilt safety factor.

PolyVoid (225) has a collapse load of 6.73kPa with a corresponding average deformation of 117mm. It is designed to commence creep deformations at a sustained load of greater than 3.7kPa and then compress under this stress over time.

Design Criteria

Select the appropriate depth of PolyVoid based on the geotechnical characteristics of the soil. PolyVoids are manufactured at 225mm and 300mm deep by 1090x1090mm with a maximum **mm and **mm respective total deformation at collapse.

Two possible design approaches are presented here, for both approaches let's assume a slab thickness of 140mm thick and a pier spacing of 3000mm centres for a single storey brick veneer construction with a Ys of 80mm.

Select Polyvoid, in this case 225mm as it has max deformation of 117mm.

1) Elastic Design

This design method doesn't rely on the creep characteristics of the Polyvoid. Simply put once the clay swells and overcomes the self weight of the slab the excess swelling from the soil needs to be resisted by the slab which is tied to foundation via some type of pile be it screwed, bored or driven. Such a slab is designed to span between the piles and not to rely on any intermediate support from the underlying ground.

Self weight of slab:

-> 0.14x24=3.36 kPa

Collapse load of polyvoid (225):

-> 6.73 kPa

Hence the upward pressure exerted on the slab is (for simplicity in this example any added dead and live load is neglected):

-> 6.73-3.36=3.37 kPa upward

The slab is designed as a suspended in accordance with AS3600 combining the normal dead and live loads and including the above upwards load. The analysis will indicate that the piers that support this slab need to be tied in and designed for tension.

2) Elastic Creep Design

Here we rely on the creep characteristics of the Polyvoid.

Creep deformations occur at 3.7 kPa.

This is approximately the self weight of the slab hence the upward and downward loads are balanced resulting in no significant upward force on the slab.

The slab is designed as a suspended in accordance with AS3600 combining the normal dead and live loads resulting in no tension in the piers

As a final observation the slabs are fully suspended with soil swell having little impact and as a result AS 2870 would generally be not be applicable.