The Flexible Polyethylene Foam for Engineering Construction

FlexOfom® is purposely developed for engineering construction based on polyethylene foam. FlexOfom® is a tough, flexible, durable, very light closed cell foam material with excellent shock-absorbing and heat resistant properties. In addition, it is water-expellant, weather-proof and highly resistant to many chemicals. Arising from its unusual combination of physical properties and characteristics, Engineers and Constructors find FlexOfom® meeting their requirements in performance, flexibility, durability and economic criteria for many of their engineering applications. It can be made flame retardant, if necessary, and can be thermoformed into different shapes.
Amongst the numerous engineering applications, FlexOfom® are widely used in:

1. **Building Foundations**
   Separation, seismic and pressure relief joints.

2. **Building Floors**
   Expansion, isolation/damping joints, accoustical concrete floors.

3. **Building Roof**
   Thermal insulation, closures and gaskets for profile panels, expansion joints.

4. **Building Walls**
   Sill plate gaskets, sealant backer.

5. **Concrete Pavement**
   Pressure relief, expansion and contraction joints.

6. **Concrete Curing**
   Reusable, insulative/impervious blanket

7. **Outdoor Liquid Storages**
   Flexible membrane protection, floating covers.

8. **Windows & Curtain Walls**
   Gaskets and sealants, glass cushions

9. **Light Weight Concrete**
   Panels, waterproofing.

FlexOfom®, being flexible, has numerous other applications in engineering, thermal insulation, automotive, packaging, garments, sport gears, toys and footwear.

**BUILDING FOUNDATIONS**

**Separation Joints**

A compressible material is placed between adjacent foundations subjected to vibration and/or impact forces, or between adjacent foundations dissimilar in mass and stiffness and movement. The compressible material minimises damage to the foundation when the adjacent foundations move towards each other. Restricting movement between dissimilar foundations may not be desirable or permitted by building codes.

In the illustration, a 50mm FlexOfom® provides compression relief, thermal insulation and impact/vibration damping between an exterior foundation wall and a room designed to confine explosive/impact forces.
BUILDING FOUNDATIONS

Pressure Relief Joints

Wall systems with grade beam support placed in expansive clay soils may be damaged when such soils exert pressure to the underside of the beam.

BUILDING FLOORS

Expansion Joints

Concrete is subjected to dimensional changes caused by variations in its temperature, or reaction with atmospheric carbon dioxide or by the loading imposed. These variations result in expansion and/or contraction movement that, if restrained, may cause damage to the concrete.

The restraint of expansion movement in floor slabs abutting another unit, such as a foundation wall, may result in the crushing or cracking of the slab ends, and the restraint of contraction movement may cause cracking within the slab.

A joint filled with compressible material FlexOfom® is a good device to take care of lateral movements. FlexOfom® will also prevent the ends of the floor slab hitting the abutting concrete unit, when the floor slab is subject to bending under load.
Vibration Damping Joints

The floor slab on which a vibrating mechanical equipment can avoid movement transferred to adjacent floor slabs by joints with compressible material, surrounding the separated or non-connected floor slab. Similarly, the movements from adjacent floor slabs will not be transferred through the joints with compressive **FlexOfom®** to the separated floor slab on which sits a mechanical equipment that is sensitive to the floor slab movements.

Impact Sound Damping (Acoustical Floor)

Generally, noise in multi-family buildings can be transferred by sound vibration through the atmosphere or mechanical energy through the building structure. **FlexOfom®** can be used to reduce noise transmitted throughout the building. Many floors are constructed to allow lateral movements at the joints. With the impact of falling objects, walking, moving furniture or some home appliances, mechanical energy is transmitted throughout the building structure via floors and walls. A layer of **FlexOfom®** sandwiched between concrete provides discontinuous construction that will effectively reduce the transmission of the impact noise to the building structure.
Thermal Insulation

In addition to thermal insulation and vapour barrier, FlexOfom® has numerous applications in metal cladding (roofing and walls) in a building, as shown above. FlexOfom® is ideal in metal cladding as it is compressible, water resistant, insulative and provides noise control. Being flexible, FlexOfom® is suitable for many metal cladding profiles. It not only prevents the rain and wind from entering the building at the cladding, FlexOfom® can be used to minimise other nuisances, such as birds and insects entering the building roof through small openings in the roof claddings.
BUILDING ROOF

Expansion Joints

The restraint of expansion forces in large roofing areas may result in damage to the roof, walls or both. Expansion joints are built in the roof to accommodate these movements. FlexOfom® provides a flexible, insulative and water resistant cover to bridge the joints and provides support for the roof waterproofing membrane.

BUILDING WALLS

Sill Plate Gasket

The air gap between the sill plate and the foundation can result in significant air infiltration and therefore increase energy cost in air-conditioned environment. The above gap can arise from uneven surfaces of building materials. A sill plate gasket fabricated from FlexOfom® effectively seals air gaps between sill plate and foundation walls. The weight of the building compresses the gasket such that all the air gaps of various depths are effectively sealed.
CONCRETE PAVEMENT

Pressure Relief Joints

Concrete pavements are subject to stresses arising from shrinkage, expansion and the combined effects of applied loads and warping. If restrained, these forces may result in concrete cracking and “blow-up”. In highway and street pavements, the hazard and costs associated with cracking and “blow-up” will increase significantly if a bridge is damaged as a result of pressure exerted by the approach slab.

Expansion Joints

In addition to wide expansion joints previously described for highway pavements, expansion joints are required between concrete pavements, bridge deck supports, building floor slabs, etc., and at intersecting pavements to allow for longitudinal expansion.

As joint filler for civil and building works, the FlexOfom® can accommodate expansion and contraction of the works. The foam does not absorb water during wet construction and does not degrade easily with time.

FlexOfom® and the bituminous layer are used to protect underground concrete works from chemical weathering.
EARTH WORKS

Buried Cable Protection

Cable buried in rocky soils may be damaged during construction or repairs, as a result of impact of sharp rocks on the cable during trenching, backfill or both. Good engineering practice and concern for systems operating costs require that the cable be placed in a rock-free environment. It is common to use sand to provide both cable bedding and backfill protection. Sand has been found to be a poor installation cost control. FlexOfom® Cushioning System, as shown in the sketch, has proved to be a desirable alternative.

Tunnel Cushioning

FlexOfom® is successfully used in soft ground tunnelling to provide pressure relief, separation and waterproofing between soils and precast concrete segmented tunnel liners. The advantage of FlexOfom® in this application is that the compressibility of FlexOfom® does not restrain the deflection of the liner required to reach a state of equilibrium.
OUTDOOR LIQUID STORAGE

Flexible Pond Liner Underlay

Some earth structures required to contain liquids, such as ponds, lagoons, ditches and liquid spill contaminant areas, are normally lined with a flexible impervious membrane to prevent the escape of liquids to the earth and to maintain the integrity of the earth structure. The high costs involved in an impervious material layer, such as over-excavating the earth structure and transporting and placing large volume of impervious material on slopes, and the possibility of rain eroding the slopes prior to the placing of impervious material layer, provides “in-place” economic benefit for a Cushioning System using FlexOfom®.

Floating Covers

Floating covers fabricated with flexible membranes and FlexOfom® buoyancy components have been used to control heat loss, liquid evaporation, odour emissions and liquid contamination in large open-top outdoor liquid containers, eg. ponds and lagoons.