Polystyrene Beehives – Key Facts

Polystyrene beehives have been used on Continental Europe for several decades, however, until recently they were only available in Langstroth sizes which limited their popularity in the UK. In recent years, they have become available in British National dimensions, including 14x12 brood boxes and as such, their use has become more widespread in this country. Poly hives were initially used in colder regions such as Scandinavia where the significantly increased insulation of the polystyrene compared to cold damp wooden beehives offered enormous benefits in keeping colonies healthy throughout the winter.

Benefits of Polystyrene Beehives

As these hives grew in popularity and their use more widespread, it became apparent that the poly hives provided a number of other significant advantages over keeping bees in wooden hives. Colonies in poly hives, in general, start to build up 2-3 weeks earlier than those in wooden hives, and will start flying earlier in the day. Thus, the poly hive colonies are better able to take advantage of the nectar flow, which should result in a significantly increased honey crop. Some reports have suggested that similar colonies in poly hives can produce as much as 25% more honey than those in wooden hives.

Poly hives also have significant advantages for breeding and production of new colonies. The earlier build up means there is a longer season in which to make splits and raise new queens. The insulation provided by the polystyrene means that there are no cold outside frames, as you would have in a wooden hive, therefore the queen in a poly hive will often lay brood across all the frames in the brood box, giving the potential to produce more nucs from each hive.

The insulation provided by the polystyrene keeps the internal hive temperature far more constant than with wood. It shields the bees from the worst of the heat during the summer, so the bees spend less time and energy keeping the hive cool, and more time collecting honey. It also keeps them warmer throughout the winter so a colony will need less food to see it safely through the winter.

Polystyrene is particularly suited to beekeeping in Britain, in our cold wet winters, wooden beehives become damp and the wood saturated, which further reduces the already poor insulation of the wood, leaving the bees to contend with both cold and damp. In a dry, warm, poly hive the situation is quite different. The insulation keeps the bees warm whatever the weather, rain simply runs off the outside, and any moisture inside the hive condenses on the walls and runs out of the open mesh floor, keeping the colony warm, dry, and above all, healthy.

Unlike wooden hives poly hives require no preservation, and they do not suffer from rot or woodworm, the treatments for which can have detrimental effects on the health of the bees. Older or second hand wooden equipment may have been previously preserved, using chemical treatments, such as Creosote, which have now been removed from sale due to their deleterious health effects.

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Cleaning and Sterilising

Polystyrene beehives can be easily cleaned and very effectively and sterilised. Full details can be found in the FERA publication: “National Bee Unit FAQ 32 Plastic Hives disinfection and disposal”.

Initially any excess wax or propolis is carefully scraped off the polystyrene. The whole hive is then soaked in washing soda solution (1kg to 5 litres of water) with a dash of washing up liquid, and scrubbed to clean it. As washing soda is caustic, appropriate gloves and PPE should be used. If only a limited number of components are being cleaned a shallow tray can be used to soak each side in turn, alternatively larger water tanks are cheaply available which can submerge a whole beehive at a time.

Once cleaned, the beehive can be very effectively sterilised with hypochlorite such as found in household bleach. The strength of the hypochlorite should be 0.5%, household bleach is normally 3% so a mixture of 1 parts bleach to 6 parts water should be used, however, check the label and adjust the ratio if required. As the polystyrene is waterproof and inert these can be washed off leaving no residues and the beehive, clean, sterile and ready for use. Conversely, a wooden hive needs to be scorched to a depth of 3mm, which is extremely difficult and time consuming to achieve, particularly in the corners and joints where spores can remain deep within the dovetails.

Painting and Repair

Poly hives do not need to be painted, they will last for many years if they are used without painting. However, in time the polystyrene will discolour to an off white/yellow and if coloured polystyrene is used the colour will bleach with sunlight. Therefore, for cosmetic reasons many people choose to paint their polystyrene beehives. The painting can be anything from “garden shades” of green or brown so that they blend into the background making them less obvious or for the more artistically inclined they can be brightly decorated, or each lift painted a different bright colour to make them standout.

To paint poly hives any exterior water based paint can be used, the majority of people use masonry paint. The only point to note is that any solvent based products should be avoided as they will damage the polystyrene.

Poly hives are easy to repair should this be required to keep them looking at their best. As polystyrene does not shrink or swell any solvent free filler can be used, these are freely available from most builders merchants. Once the filler is dry it can then be sanded off and over painted as required.

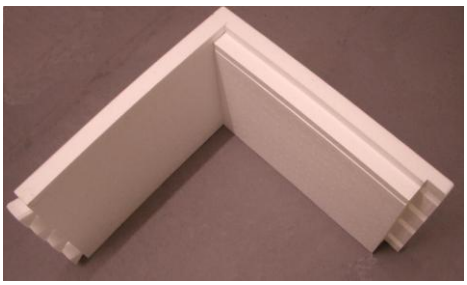
British National Beehives

Poly hives were originally only produced in Langstroth sizes; however, recently they have become available in British National sizes. In general, they are fully compatible with wooden British National beehives and other beekeeping equipment. To maintain adequate strength and robustness the walls of polystyrene beehives have to be slightly thicker than those of wooden beehives, which has the added advantage of increasing the insulation provided by these hives. However, it has led to some differences in design between manufacturers, and some poly hives are more easily compatible with existing equipment.

Some are broadly similar with flat top and bottom faces of each lift, and are only slightly larger externally to accommodate the thicker walls. This means that wooden components can easily be mixed with these poly hives only having a slight lip where the sections meet (see photo). However, other designs have top bee space, fewer frames per box than a standard British National beehive, have interlocking lugs between the polystyrene boxes, which need to be removed, and require specifically modified queen excluders.

High-Density Polystyrene

The high-density polystyrene used to manufacture beehives is around 10 times more dense than that used for packaging and up to 20 times more dense than insulation polystyrene. This makes the beehive material much harder, smoother and more durable than any expanded polystyrene that the majority of people have encountered. At 100 grammes per litre, it is approximately twice the density of the polystyrene used in the manufacture of motorcycle helmets.



The high-density material means that the parts of the beehive are heavier than expected, only slightly lighter than wooden hives, with some designs the walls are 64mm/2.5” thick and roof has 100mm/4” of insulation, which means that it alone weighs 3.5kg. Contrary to popular belief, they are no more likely to blow over in the wind than a wooden beehive, although as with all hives the roof should be securely strapped or weighted in place.

Assembly

The assembly of poly hives is far easier than wooden beehives, the majority of the hive is ready assembled when delivered, as they are moulded as complete units. For most poly hives the roof and floor come pre-assembled and where the brood box and supers may come flat packed they only require gluing then pushing the dovetail joints and frame runners together. Meaning that a hive can be fully assembled minutes rather than hours.

Varroa Treatment

Varroa treatment can be carried out in a poly hive as it would be in a wooden hive. The polystyrene is inert and will not be affected by oxalic acid, miticides or similar products. Care should be taken when using any product which contains solvents, either man made or natural oils, as these will affect the polystyrene if they are in direct contact with the surface. These products usually require the solvent impregnated pad to be placed on top of the frames, and not in contact with the hive walls, in which case it should not present any problems.