

**DXAIR INDOOR POOL DESIGN GUIDELINES  
INSULATION AND R-VALUE ARE IMPORTANT.**



**Insulation plays an important role in your indoor swimming pool.**

In colder climates, blown in, blown on, spray foam, cellulose, etc. – any insulation that is air tight is recommended. Keep in mind, when warm meets cold, you will have condensation. Materials vary enormously in their ability to conduct heat. Those that do not conduct it well are called insulators.

R-VALUE is the term used to indicate a material's resistance to heat or the ability to insulate. The higher the R-Value, the better the insulator. Most insulation materials work by trapping pockets of air, which is an excellent insulator. Fiberglass does this by creating air pockets between spun glass fibers, and foam insulation contains air bubbles. We generally don't recommend fiberglass insulation for a variety of reasons. Please call us to go over the various insulation methods.

Similarly, double pane windows work by trapping air between the panes. Among insulating materials, R-Values can vary widely. This is the reason it is important to purchase insulation by the R-Value AND NOT BY THE INCH. R-Values of different materials can be compared while thickness cannot. For instance, two materials rated R-11 have precisely the same insulating ability while two inches of each may not. Take fiberglass and brick as an example. To achieve R-30 with fiberglass batts requires 8.5 inches, while it would take 60 inches of brick!

This chart shows how many inches of a certain type of insulation takes to achieve a specified R-Value.

<b>Material-Insulation</b>	<b>R-Value Per Inch</b>
Vermiculite	2.3
Cellulose	3.1-7.7
Glass Fiber Batts	3.2-3.6
Rock Wool Batts	3.5
Polystyrene	3.6-5.0
Urethane Foam	5.5-6.0

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In the following chart, you'll see that R-30 requires 14.5 inches of vermiculite, nearly 8.5 inches of fiberglass batt, or only 5 inches of urethane foam. Such comparisons are helpful in selecting insulation types because the type you can may be limited to the space available.

Note that foil backed fiberglass does not provide a vapor barrier for an indoor pool room.

R-VALUES	11	13	19	22	30
<b>Loose Fill</b>					
<b>Fiberglass</b>	5.0"	5.5"	8.5"	8.5"	13.0"
<b>Rock Wood</b>	3.5"	4.0"	6.0"	6.0"	9.0"
<b>Cellulose</b>	3.0"	3.5"	5.5"	5.5"	8.5"
<b>Fiberglass Batts</b>	3.5"	4.0"	7.0"	7.0"	8.5"
<b>Polystyrene</b>	3.0"	3.5"	3.5"	5.5"	7.5"
<b>Urethane</b>	2.0"	2.0"	2.0"	3.5"	5.0"
<b>Fiberglass</b>	3.0"	3.5"	3.5"	5.5"	7.5"

This information was obtained at [www.fpl.com](http://www.fpl.com)

**INSULATION MATERIALS SUMMARY:**

**BATT INSULATION:** Glass Fiber Batts are manufactured from glass which is spun into long fibers, then woven and coated with a binding agent. Batts are light weight, fit standard joist and stud spaces and if installed carefully, will not slump or settle. They DO NOT, however, readily fit into irregular spaces and can leave "insulation voids" around obstructions (nails, electrical wires, trusses, etc.). During installation, glass fibers can cause eye, skin and respiratory irritation, and all safety recommendations should be carefully followed. Air movement around the insulation can significantly degrade the R-Value. This type of insulation should not be covered with heavier insulation or other materials which may compress. Note: Glass Fiber Bat is not air tight insulation.

**CELLULOSE FIBER:** Click her to go to [www.NuWool.com](http://www.NuWool.com) ) Cellulose fiber is made from finely shredded newsprint which is chemically treated to resist fire and fungal growth. Due to the small size of the particles, cellulose can "flow" around obstructions (nails, electrical wires, trusses, etc.) to give a uniform fill. Blown in cellulose has an average R-Value of 3.6 per inch. Blown cellulose can be installed in vertical wall cavities using a variety of specially designed reinforced interior sheeting products. Poured cellulose has an average R-Value of 3.4 per inch. The advantages of cellulose are that it will fill irregular horizontal spaces, can be installed with rented equipment or hand poured, the chemical additives provide fire, corrosion, vermin and fungal growth resistance, and small amounts of moisture have little effect on the materials. Cellulose is air tight.



**EXPANDED POLYSTYRENE** : Expanded polystyrene is produced by expanding polystyrene beads which are then bonded together to form rigid boards. “Bead Board” as it is often called is manufactured in two densities. The high density board is more moisture resistant and can be used on exterior of a foundation providing the surrounding soil is dry and sandy. If the insulation is to be used in the interior of a house, it needs to be covered with a fire-resistant material, such as drywall. Low density board can only be used above grade.

**EXTRUDED POLYSTYRENE** : Is a closed cell foam plastic board, which is manufactured in two densities. Both the low and high density board are suitable for below grade applications, however the high density board should be used where the material will be exposed to relatively high pressures, such as below a concrete slab or built-up roofing. Polystyrene will “break-down” if left exposed to sunlight for prolonged periods and must also be protected from solvents. If used in the interior of a home, it needs to be covered with a fire resistant material, such as drywall.

**POLYURETHANE AND POLYISOCYANURATE** : These are a closed cell board, the cells contain refrigerant gases instead of air. The boards are usually double faced with foil, or sometimes can be bonded with an interior or exterior finishing material. The boards must be protected from prolonged exposure to water and sunlight, and if used in interior, must be covered with a fire resistant material, such as drywall.

**POLYURETHANE FOAM**: Is closed cell foam which is usually pale yellow in color, and can be used for a variety of spray applications. The material is mixed on site for large applications. The foam will act as an air barrier, **BUT NOT A VAPOR BARRIER**, and should be protected from prolonged exposure to sunlight. When the foam is used on the interior of a building, it should be covered with a fire resistant material, such as drywall.

**SPRAYED IN PLACE INSULATIONS** (i.e. cellulose): Most of these insulations are resistant to air flow. Sprayed in place are loose fill products which are blown in to wall cavities. During the blow in stage, the insulation is mixed with an adhesive, usually water based, which binds the insulation together to form a seamless batt. This type of insulation, when properly installed, resists settling and shifting and allows the cavity to be completely filled, leaving no air gaps, thereby greatly reducing air leakage. The 3 most common types of insulation installed this way are cellulose, glass fiber blowing wool and mineral or rock wool.

**INSULATED CONCRETE BLOCK**: Starts with a higher R-Value. For example only (not a recommendation), ICF’s system uses four inches of ASTM C578 polystyrene foam insulation, combined with a five inch concrete wall. These are rated above R-17 at 75 Degrees mean test temperature. Air infiltration is minimal due to the continuous air barriers provided by the foam insulation and the concrete. There are no convection currents within wall cavities. When using concrete block, a vapor barrier or water proof paint is generally recommended for your indoor pool room to protect the surface and prevent moisture from migrating.

There are many new products on the market today for insulation and varying R-Values and building materials. Check with an insulation professional to determine the best product for your enclosure.