# WALL INSULATION

Air sealing and insulation together work like a down-filled parka and windbreaker. Insulation is the parka, keeping the house warm, while air sealing is the windbreaker, not allowing any cold exterior air to into the house and retaining the body heat.

## MATERIAL

### Loose-fill insulation

CELLULOSE LOOSE FILL INSULATION

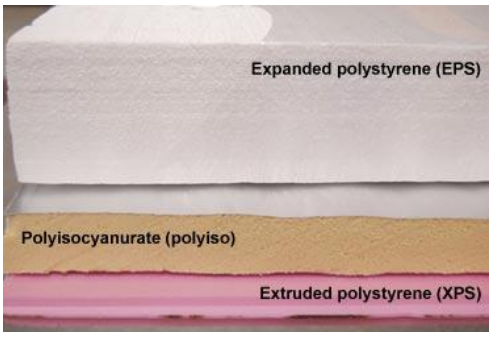
FIBERGLASS LOOSE FILL INSULATION

### Batts and rolls

FIBERGLASS BATT INSULATION

FIBERGLASS ROLL INSULATION

### Foam insulation




RIGID FOAM INSULATION

SPRAY FOAM INSULATION

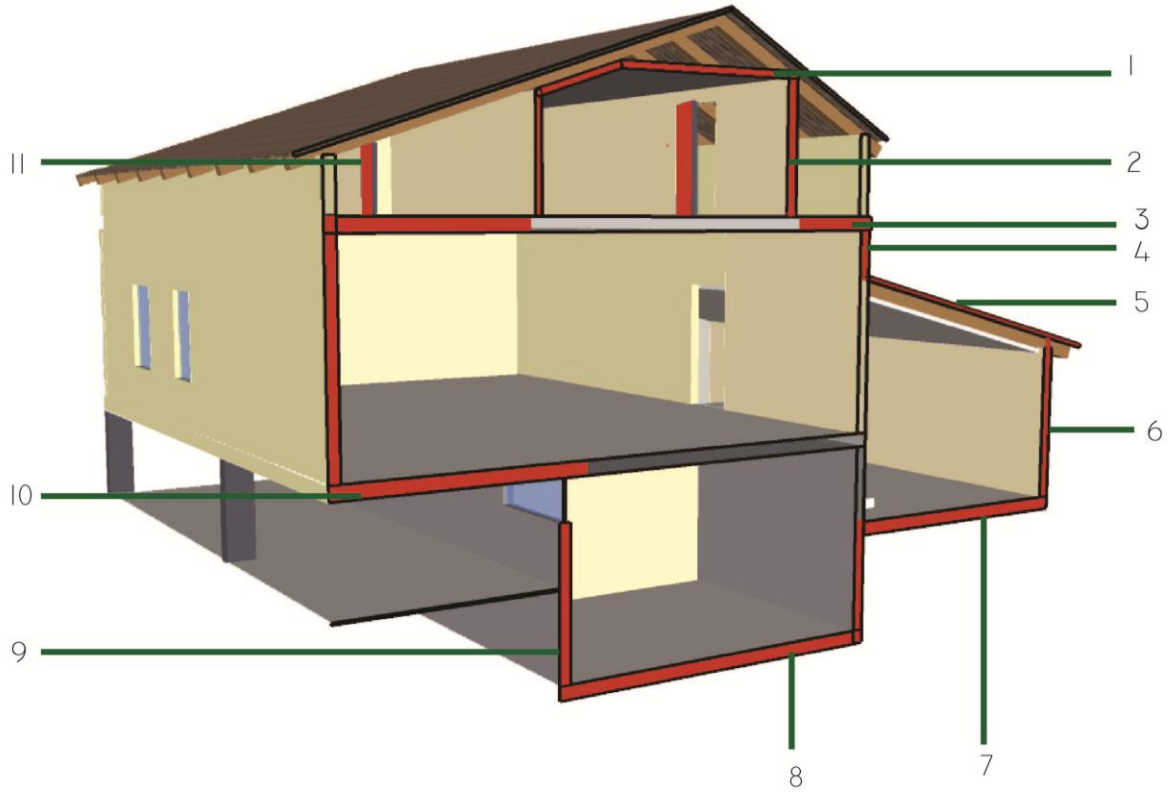
Image sources: http://www.drenergysaver.com http://www .northerninsultion.biz

**INSTALLATION (measurement of insulation efficiency)**

The efficiency of insulation is measured in terms of its resistance to heat flow: R-value. The higher the R-value per inch, the better the performance of the insulation is.

**Where do you need to insulate ?**

This image will tell you broadly what areas of the house need to be insulated for maximum energy efficiency.




WHERE YOU NEED TO INSULATE:

1. UNINSULATED ATTIC : BETWEEN THE CEILING AND UNINSULATED ATTIC SPACE TO SEAL THE LIVING SPACES BELOW
2. WALLS BETWEEN UNINSULTED ATTIC AND LIVING SPACES
3. UNINSULATED ATTIC FLOORS, TO SEAL OFF LIVING SPACES BELOW
4. ALL WALLS BETWEEN CONDITIONED INTERIOR AND UNCONDITIONED EXTERIOR SPACES
5. BETWEEN AND OVER ROOF JOISTS ABOVE A CONDITIONED SPACE
6. ALL EXTERIOR WALLS
7. ALL SLAB ON GRADE
8. BASEMENT FLOOR SLAB
9. FOUNDATION WALLS, ABOVE AND BELOW GROUND LEVEL
10. FLOOR SLABS DIRECTLY ABOVE UNCONDITIONED EXTERIOR SPACES
11. ATTIC ACCESS DOOR

**RECOMMENDED INSULATION FOR WALLS**

| New Walls<br>Recommended R-value (Wood frame) R-18 – R-20 | | | |
|---|---|---|---|
| | Type of Insulation | R-value per inch of thickness | Recommended depth for R-18 – R-20 (inches) |
| Blanket (batts and rolls) | Fiberglass | R-3.2 – R-3.8 | 5 - 6 |
| | Mineral Wool | R-3.7 | 5 |
| | Plastic Fibers | R-3.8 – R-4.3 | 5 |
| | Natural Fibers | R-2.5 – R-3.5 | 5 – 8 |
| Foam Board or Rigid Foam | Polystyrene | R-3.8 – R-5 | 4 – 5 |
| | Polyiso | R-5.6 – R-8 | 2.5 – 3.5 |
| | Polyurethane | R-7 – R-8 | |

| Existing Walls<br>Recommended R-value (Wood frame) R-18 – R-20 | | | |
|---|---|---|---|
| | Type of Insulation | R-value per inch of thickness | Recommended depth for R-18 – R-20 (inches) |
| Loose-fill | Cellulose | R-3.8 | 5 |
| | Fiberglass | R-3.4 | 6 |
| | Mineral (Rock or Slag) Wool | R-3.7 | 5.5 |
| Sprayed Foam and Foam-In-Place | Cementitious Phenolic | R-3.9 | 5 |
| | Polyisocyanurate | R-5.6 – R-8 | 2.5 – 3.5 |
| | Polyurethane | R-3.7 | 5 |

Data from IECC : International Energy Conservation Code
DOE Recommendations