

INSULATION CORE DIFFERENCES

I think it's important to understand the basic differences of PUR (Polyurethane) vs. PIR (Polyisocyanurate). Quite frankly, I would personally not consider an EPS foam for the following reasons:

EPS (Expanded Polystyrene Foam) is an inferior product to PUR/PIR such as:

- Low R-Value per inch compared to PUR/PIR
- EPS doesn't maintain its R-Value over time due to the foam chemistry
- EPS doesn't react well with moisture i.e., moisture absorption can cause loss of R-Value
- Has a lower density thus less strength compared to PUR/PIR
- EPS is fuel for fire as PUR/PIR are self-extinguishing/fire retardant
- PUR/PIR cannot be melted or reshaped, EPS can cause melting/reshaping
- EPS needs a Vapor Barrier, PUR/PIR serves its own Vapor Barrier
- EPS is highly susceptible to petroleum-based products, oils and solvents which can cause EPS to melt when brought into contact. PUR/PIR is resistant to petrochemicals and other common chemicals
- Check out this video:
 - <https://youtu.be/QvTT1zc1S4A>

PUR vs. PIR:

- PUR and PIR are close in chemical composition but vary in thermal performance i.e. higher R-Value per inch with PIR
- Their composition makes them different however there are many similarities such as:
 - Both are lightweight with low thermal conductivity driving energy efficiency of buildings by greatly reducing energy needs such as heating/cooling
 - Keep in mind that PUR and PIR are both derived from polyurethane which is simply a plastic material that when introduced to water creates a "rigid polyurethane" (PUR)
 - So, PIR was simply born from PUR's thermal stability with the benefit of offering flame resistance which in essence is what is known as PIR today
 - Bottomline, PUR is still a viable product today for the right application such as renovations i.e., can be injected into wall cavities creating an air-tight energy efficient barrier and it remains viable in an IMP application
 - Bottom-line, PUR provides great thermal performance and it's less expensive not to mention that PUR has a high-water resistance that doesn't hold moisture
- Now that we understand PUR's benefits, PIR simply builds upon PUR's technology such as:
 - PIR has a higher thermal performance/R-Value in a thinner IMP
 - PIR also has a low-moisture barrier like PUR
 - The biggest differentiation for PIR is its flame/smoke resistance as PIR slows the spread of flames, reducing the smoke emitted from a fire

I hope this helps. Please let me know if you have any questions.