

## Glass, Kalwal, or Other “Glass Type” Structures with Metal Frames

These structures can incorporate glass ceilings, retractable ceiling/wall panels or can be all glass and frame with a variety of openings. These facilities are treated much differently than standard construction because:

- They lack the R-Value of regular insulated walls and ceilings (i.e. R19-R40); many have an lower R-Values or U-Values of 2-10
- Metal frames require “thermal breaks” (insulation)
- Require “sensible calculations” to design HVAC properly
- Higher heat or solar gain may have a higher cooling load due to lack of insulative quality
- Higher heat loss may have a higher heating load

Pool covers are recommended if feasible to help keep operating costs down by:

- Reduction of dehumidification run time when covered; hence dehumidifier does not run 20-24 hours a day due to evaporation; hence lower utility bills
- Maintain temperature and heat in the pool; hence less pool heating energy required
- Less chemicals are used as water and chemicals are not evaporating to the air
- Overall reduction of costs by 50-75% on utility bills

When working with manufactured enclosures, many clients are not aware that the operating costs will also be much higher (can be 40-75% more) than standard construction due to the higher heat gain and heat loss of these structures. Glass and other surfaces do not have the same insulation qualities that regular insulation offers. Single pane glass should never be used nor should metal or aluminum frames without thermal breaks (insulation) as it is impossible to keep these surfaces dry even with dehumidification and air flow.

And in some cases, companies may cover the dehumidification load with a certain unit size, say 10 ton for example, but the cooling load requires 20 tons or more. Therefore *sensible calculations* are required by an engineer, mechanical firm, builder, structure manufacturer, or other party to determine the final heating and cooling requirements. There are 3 components to designing this system: dehumidification (evaporation load), heating load, and cooling load.

## Ductwork

Ductwork, or your air delivery system, is CRITICAL, as well as installation in these facilities. It is imperative that the duct system is designed properly and sized for maximum air flow delivery to all “glass areas” to prevent condensation. Ceiling fans within the structure, BLOWING



UPWARD, will also assist in moving air flow and keeping surfaces dry. Ductwork can be installed underground or overhead, and recommended design is a continuous loop (peripheral loop) with all diffusers deflected at glass surfaces that are prone to condensation when the outdoor temperature is lower than the indoor temperature and surfaces reach dew point temperature. DXair will provide all shop drawings for mechanical contractors as to ductwork requirements for every system we build.

It is critical to maintain proper temperatures, humidity levels, and pool chemistry balance:

- Temperatures are generally designed as follows: 80-84 degree water temperature and the air temperature set two degrees above the chosen water temperature—and not to exceed 86° air temperature
- Relative humidity (RH) should be between 50-60%, not below 50% RH and not above 60% RH
- Chlorine levels, salt, bromine or other chemicals and pool balancing must be properly maintained at all times or your pool room becomes a highly corrosive environment that can damage frame work, equipment, lighting, and more within the enclosure

We cover manufactured enclosures in greater detail in our *Glass and Frame or Manufactured Enclosures* bulletin.