



Maintaining a Moisture Balance in Homes in Humid Weather

In hot, humid climates it is important to maintain a healthy moisture balance in homes. A good goal is **75 °F and an RH of 50%**. Risks of mold and moisture problems start to accelerate when RH levels are greater than **60%**.

In a 2400 sf, two-story, slab-on-grade home, the difference between a healthy 50% RH and a risky 65% RH is only about an extra **6-8 pints** of water in the air.

To achieve a healthy moisture balance, it is important to know the range of **potential moisture sources** as well as the **potential moisture removal opportunities**.

Potential Moisture Sources (summer time for a typical 2400 sf home):

Potential Moisture Source	Potential Quantity per Day
1. Moisture created by occupants and their activities	+15 to 25 pints per day for an average family of 4, peaking at 50 pints for a heavy wash day
2. Moisture brought in by natural air leakage **	+30 to 50 pints per day in a tight home (<3ACH50) +50 – 90 pints per day in a loose home (>5ACH50)
3. Moisture brought in by mechanical ventilation **	+50 to 70 pints per day at 60 CFM of ventilation +100 to 120 pints per day at 120 CFM ventilation
4. Moisture brought in through vapor diffusion through the building enclosure **	+20 to 35 pints per day for typical wood frame construction
5. Moisture contained in new building materials	+10 to 20 pints per day , but highly variable depending on time of year of construction. Only of impact in the first year of after construction

** NOTE: the number of pints per day listed can be considered *worst case conditions* projected over a 24-hour period. The lower number of the range is from the “design cooling day”, or the hottest days of the summer; the higher number is from the “design humidity day”, or the most humid days of the summer.

The actual amount of moisture flow will vary day-to-day and even hour-by-hour as the outside weather changes. Again, the numbers shown are worst case.

Moisture Removal Opportunities (summer time for a typical 2400 sf home):

Potential Removal Strategies	Potential Reduction per Day
1. Build tighter homes	-20 to 40 pints per day from 5 to 3 ACH@50Pa -30 to 50 pints per day from 5 to 2 ACH@50Pa
2. Use an ERV with proper ventilation rate (power use: 17 pints / kWh)	-25 to 35 pints per day at 60 CFM ventilation rate ERVs remove approx. 50% of the moisture difference between outside and inside air. They can only impact dehumidification of the ventilation air
3. Use a properly sized AC unit (power use: 3 pints / kWh)	-60 to 90 pints per day for a 2.5 Ton AC unit running for at least 12 hours a day , with proper set up of airflows and refrigerant.
4. Use a whole house dehumidifier (power use: 6 pints / kWh)	-70 to 90 pints per day for commonly available whole house dehumidifiers. Dehumidifiers can work independently of AC or ventilation systems such that they can deal with all types of moisture sources.

In short:

- There is a wide variation in the moisture sources in homes each day
- There is a wide variation in the moisture removal opportunities in homes each day
- The difference between healthy and risky is just 6-8 extra pints in the air

Effective strategies from lower cost to higher cost include:

1. Don't over-ventilate: measure and adjust flow rates to match required rates
2. Size, setup and adjust AC units correctly to optimize moisture removal
3. Educate homeowners about proper operation of HVAC equipment and controlling their own moisture sources
4. Build tighter homes
5. Create AC specifications and select equipment to optimize humidity control
6. Use ERVs for ventilation
7. Install whole house dehumidifiers
8. Switch to variable output AC units with specific humidity control operation