Building Industry Institute

Protocol Documentation

Advanced Ventilation

Advanced Ventilation Requirements: CGB requires Air Conditioning Contractors of America (ACCA [or equivalent]) design protocols be used to ensure comfort and adequate ventilation. In addition, Minimum Efficiency Reporting Values (MERV) 6 filters and use of low/no Volatile Organic Compounds (VOC) help improve indoor air quality. CGB features include:

HVAC system designed by a licensed engineer and installed to ACCA Manual J, S and D (or equivalent);
HVAC ducts diagnostically tested per CGB tight duct protocols;
MERV 6 HVAC filters installed on return air grills; and
Low or no VOC for paints, lacquers, floor underlayment and carpet.

The goal for each HVAC system is to provide proper air flow, heating, and cooling to each room. This HVAC installation should follow the BII HVAC Installation protocols (found at www.thebii.org) and should meet the criteria and installation procedures that are listed below. The BII HVAC installation protocols contain more detailed information on design, fabrication, installation, and performance testing.

Criteria for a Quality HVAC System

An HVAC system should:

1. Be properly sized to provide correct air flow, and meet room-by-room calculated heating and cooling loads;
2. Be installed so that the static air pressure drop across the air handler is within manufacturer and design specifications;
3. Have sealed supply ductwork that provides proper air flow;
4. Be installed with a return system sized to provide correct return air flow;
5. Have sealed return ductwork that will provide proper air flow to the fan, and avoid air entering the HVAC system from polluted zones (e.g., fumes from autos and stored chemicals, and attic particulates);
6. Have balanced air flows between supply and return systems to maintain neutral pressure in the home;
7. Minimize duct air temperature gain or loss between the air handler and room registers, and between return registers and the air handler;
8. Be properly charged with refrigerant; and
9. Have proper burner operation and proper draft.

Procedures to Design and Install an Air Distribution System

The following steps should be followed to design and install HVAC systems to ensure efficiency and comfort:

1. Determine room-by-room loads and air-flows using ACCA Manual J calculation procedures (or equivalent);
2. Layout duct system on floor plan, accounting for the direction of joists, roof hips, fire-walls, and other potential obstructions. Determine register locations and types, duct lengths, and connections required to produce layout given construction constraints;
3. Size duct system according to ACCA Manual D (or equivalent) calculation procedures;
4. Size HVAC equipment to sensible load using ACCA Manual S (or equivalent)procedures;
5. Install equipment and ducts according to design specifications, using installation requirements and procedures from the Uniform Mechanical Code, the Air Diffusion Council, SMACNA, California Residential Energy Efficiency Standards (Title 24), and manufacturers' specifications; Using these procedures the duct system should be substantially air tight (≤ 6% total system leakage); and
6. Test the system using California Title 24 testing standards and CEC certified HERS raters to ensure that it performs properly by determining that the system is properly sized, it does not leak substantially, has proper air handler fan flow, and proper register air flows.

CA Green Builder Worksheet Information:

The CGB Worksheet consists of four sections (energy efficiency, air quality, waste management, and water conservation). The builder shall complete *each* section for the application to be valid. The builder shall complete one application and worksheet for each home plan in the community (subdivision). If the builder chooses to type in the information then print the form, calculations will be made automatically. If the builder chooses to print the form and fill it out by hand, the builder shall perform the calculations.

How to complete the Advanced Ventilation section of the Plan Worksheet

Provide calculations documenting the HVAC design and installation of the HVAC system design to ACCA Manual J, S and D (or equivalent). Include the California licensed mechanical engineer's layout and design of the HVAC system.

Documentation of Air Quality Improvements:

CGB documents the air quality improvements from the reduction in green house gas (CO_2) and key criterion pollutants (SO_x and NO_X). The CGB program uses the U.S. Environmental Protection Agency equivalence factors for converting energy conserved into estimated amounts of CO_2, SO_x, and NO_X emissions saved.

Alternatively, the air quality improvements can be calculated by entering the actual energy savings (kWh) into the EPA eGRID program. That program is available at the following website: http://www.epa.gov/cleanenergy/egrid/.