SAN MIGUEL COUNTY
BUILDING DEPARTMENT
PRESCRIPTIVE ENERGY CODE & GREEN BUILDING STANDARD

The Prescriptive Energy Code & Green Building Standard requirements for San Miguel County construction are listed below. This code applies to all new residential (single-family, multi-unit, and affordable housing) and commercial construction, including all additions/renovations.

As an alternative to the Prescriptive Energy Code, if a building is ENERGY STAR certified with a HERS rating equivalent to that required in the Green Building Standards for home size, it complies with the Performance Path to the Energy Code and is thus exempt from the prescriptive Energy Code checklist. If a building is LEED Silver certified, or Built Green and achieves a HERS rating equivalent to that required in the Green Building Standard for home size, or other equivalent green building code, then it will be exempt from both the Prescriptive Energy Code and the Green Building Standard and will receive expedited status through the permitting process.

All pre-fabricated manufactured homes (alternative, modular, HUD, etc.) must be ENERGY STAR certified.

Alternative methodologies to the items in this code are encouraged, if they meet the high performance requirements outlined by this code. Submit proof of performance to Building Department with plans in order to obtain approval.

PRESCRIPTIVE ENERGY CODE

ITEM	Insulation Value	Total Value
FRAME WALLS AND RIM JOIST (LOG HOMES REQUIRE ENERGY ANALYSIS)	R 21[13]	R 24[13]
WINDOW IN FRAME WALLS AND BASEMENT	Low-E double glazed[1]	
WALL WINDOWS TO FLOOR AREA	15% max[2]	
DOORS IN FRAME WALLS AND BASEMENT	R 2.86[14]	
CEILINGS OR RAFTERS	R 49[15]	
AIR INFILTRATION	Prescriptive Air Sealing[3]	
WALLS TO GARAGE OR UNHEATED BUFFER SPACES	R 19	R 21
HEATED GARAGES[10]	Same as home	
HEATED BASEMENT AREAS (WALLS)	R 19	
BASEMENT WINDOW TO FLOOR AREA	10% max[2]	
FLOORS OVER UNHEATED SPACES	R 30[11]	
FLOORS OVER UNVENTED SPACES WITH INSULATED WALLS	None	
CRAWL SPACE WALLS (UNVENTED)	R 21[12]	
CANTILEVER FLOORS	R 38	R 40
SLABS IN HEATED AREAS (EXCEPT GARAGES)	R 7.5[4]	
HEAT IN THE SLAB	R 10[4]	
EXPOSED SLAB EDGES	R 7.5- R 10[5]	
SLABS IN UNHEATED AREAS	0	

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SPACE HEATING SYSTEM PERFORMANCE	
Gas furnaces	90% AFUE
Gas boiler (Including snow-melt boilers)	90% AFUE
Dedicated snow-melt systems	>90% AFUE[17]

DUCTS: Inside envelope, outside conditioned space Outside building envelope	R 5[16] R 8[16]

WOOD-BURNING FIREPLACES/STOVES[8]	Tight fitting enclosures[8]
GAS LOG SETS IN MASONRY FIREPLACES	Tight fitting doors with outside combustion air or automatic flue damper as approved by Building Dept.

WATER HEATER PERFORMANCE	
Gas	.60 energy factor
Electric	.93 energy factor
HOT WATER HEATER PIPING	Heat traps[9]

HOT WATER PIPING IN UNCONDITIONED SPACES	½" wall closed cell form insulation or equivalent

SETBACK THERMOSTAT	Required (except for hydronic heat)

AIR CONDITIONING	15.0 SEER
AIR SOURCE HEAT PUMPS	14.0 SEER
GROUND HEAT PUMPS	11.5 SEER

NOTES:
The R-values given above are the total R-values. The R-values of different materials are added together including air films, air spaces and building materials. The R-value is reduced by the effects of thermal bridging through framing. For instance, unless special methods or rigid insulation sheathing are used, the R-value for walls must be decreased due to thermal bridging. Multiply the R-value of ceilings at the depth of the framing members by .94 and the wall by .87.

[1] All windows must demonstrate a 0.35 maximum U-value (including glass in doors). All skylights must demonstrate a U-factor of 0.60 (2001 NFRC rated at 20 degrees) or 0.45 (RES97 rated at 90 degrees). All windows must have a high quality thermal isolation break between the inside and outside frames.

[2] Allowable percentage of window area measured by rough opening sizes. R-value for windows is a combination of glass, frame and spacer certified by the National Fenstration Research Council (NFRC). If window area is > 15% then the window must provide a U value of 0.35 or lower. Basement windows with >10% glazing area to exterior wall area must provide a U value of 0.35 or lower. All windows must provide an air leakage maximum rate of 0.3 cfm per square foot of window area. Replacement windows shall meet the same criteria as the aforementioned.

[3] All exterior joints in the building envelope shall be caulked, gasketed, weather-stripped, or otherwise sealed in an approved manner. For the performance approach a home must achieve a HERS rating of 80, or lower as required in the Green Building Standards for home size.

[4] Entire under slab area must be insulated. The slab edge perimeter must be protected with insulation. Exterior slabs require a minimum of R-5 below slab and at all edges.

[5] Foundation insulation and slab insulation where required shall cover all slab edges.

[6] (For future use)

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[7] (For future use)

[8] All wood-burning fireplaces and wood stoves must have outside combustion air with tight fitting doors and shall be designed not to require indoor combustion air. Wood stoves must be EPA certified or listed as an exempt device.

[9] Vertical risers shall have a heat trap on both the inlet and outlet of the water heater. Heat traps not required with recirculation systems. Recirculation pumps shall be provided with timers and a manual on/off switch.

[10] All heated garages shall be constructed to the same requirements as the home.

[11] Water lines must be protected from freezing. Except floors over insulated basements.

[12] Must be unvented areas with a tight fitting ground vapor barrier and constructed as conditioned space.

[13] An energy rating is required of all log structures. HERS rating must be 80 or lower as required in the Green Building Standards for home size.

[14] Opaque doors only.

[15] R-value of 38 is allowed if energy heel trusses are used and insulation extends over top plates. Energy heels on all roof trusses: 12" min. when using fiberglass or cellulose, 7" min. when spray foam is applied. Recessed light fixtures must be "Air-Tight" I.C. rated.

[16] All furnace ducts to be air tight and constructed with commercial grade mastic and fiberglass mesh. Ducts are to be sealed substantially airtight with tapes (not duct tape) mastics or gasketing. Fiberglass ducts that expose fibers to the air steam are not permitted.

GREEN BUILDING STANDARD

In addition to the previously listed energy requirements all new construction must implement the following standards:[1]

- ⇒ Exterior air-infiltration barrier
- ⇒ Foam sill sealer beneath sill plates
- ⇒ Energy heels on all roof trusses (12"min. when using fiberglass or cellulose, 7"min. when spray foam is applied)
- ⇒ Timers or motion sensors are required for bath and laundry exhaust fans
- ⇒ Formaldehyde-free insulation
- ⇒ Carbon monoxide (hard-wired) detectors required near the door between the residence and the garage (if there is an attached garage) and near the mechanical room. Must be installed per manufacturer's recommendations.
- ⇒ Insulating blankets required for hot water heaters
- ⇒ No hot air ducts allowed in exterior walls (unless R-10 insulation is installed on the exterior side of the duct)
- ⇒ Attached garages must be isolated from the dwelling with extensive air-sealing practices
- ⇒ Insulated headers, min R-10, wherever possible. Steel headers must be provided with insulation on both the exterior & interior sides of the steel.
- ⇒ All hot water re-circulation systems must be provided with a timer or an aquastat and manual on/off switch. Piping must be insulated (1/2" thick wall foam insulation minimum or equivalent).
- ⇒ Hot water piping in unconditioned spaces requires R-6 insulation (boilers and domestic water)
- ⇒ Minimum 30 year roof material
- ⇒ Return air ducts are required (panned framing cavities are prohibited)
- ⇒ Range hoods are required and must be ducted to exterior, unless allowed an exemption by the building department under certain design conditions.
- ⇒ Western coal fly ash concrete must be used in all cement mixes, exception from this requirement is allowed for exterior slabs.
- ⇒ Paper covered gypsum board must be raised 1/2 inch above concrete slabs.
- ⇒ 3 stud exterior corners must be capable of being insulated.
- ⇒ Ladder-backed framing or alternate must be at all partition wall connections.
- ⇒ Exterior walls of fireplaces shall comply with minimum wall R-value, R-21

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- ⇒ All bath or shower rooms shall have an exhaust fan ducted to outside
- ⇒ Skylight shafts and knee walls must be air sealed and insulated to the same level as the exterior walls. Insulation on attic knee walls and skylight shafts shall be encapsulated on all 6 sides of the enclosure.
- ⇒ Insulate under and around bathtubs to prescriptive code requirements.
- ⇒ Openings to unconditioned space must be fully sealed.
- ⇒ Crawlspace wall insulation must be permanently attached to the walls. Exposed earth in crawlspaces must be covered with continuous vapor retarder with overlapping joints taped or sealed with mastic.
- ⇒ Windows & Doors: Caulking, gasketing, adhesive flashing tape, foam sealant, or weather-stripping must be installed forming a complete air barrier.
- ⇒ Band/rim joists must be insulated and air sealed.
- ⇒ Recessed light fixtures must be "Air-Tight" I.C. rated in all building envelope ceilings. 4" minimum depth of insulation must be maintained between the light fixture and exterior sheathing. Recessed light fixtures are strongly recommended to be "Air-Tight" I.C. rated for interior ceilings to improve air quality and to reduce airflow through the building envelope.
- ⇒ Recessed step lights are not permitted in exterior building walls, except where fully encased in stone or concrete, or with sufficient remaining wall insulation to maintain the required wall R-value.
- ⇒ Radon Mitigation – One of the following 3 options must be complied with:
  1. Install a passive radon mitigation system.
  2. Provide the Building Department with results of a soils test indicating radon levels prior to construction.
  3. The property owner (not contractor, architect, project manager), if he will be the resident, must provide the Building Department with a signed Radon Mitigation Waiver which declares the owner understands the proposed building site may have radon producing soils, but the owner has decided not to design and/or construct a radon mitigation system into the project.
- ⇒ VOC Homeowner awareness sheet must be signed by the General Contractor and included in sale of home documents.
- ⇒ Snowmelt System Requirements:
  1. Snow-melt areas must not exceed 1000 sq. ft. Increase is allowed for demonstrated genuine safety issues or if the structure achieves a 50 or less HERS rating, 30% more free snow-melt area is allowed. Requests for greater than 1000 sq. ft. of snow melt may be considered at the discretion of the Building Official if energy used for the system comes from on-site renewable energy sources.
  2. Electric snowmelt is not permitted.
  3. Snowmelt systems must include both moisture and temperature sensors to control snowmelt operation.
  4. Idling snowmelt systems are not permitted.
  5. Under the slab insulation of at least R-10 is required.
- ⇒ Out door Spa and Pool Requirements:
  1. No electric resistance heating
  2. Outdoor spas must have fully insulated enclosures insulated to at least R-12.
  3. A readily accessible on-off switch mounted on the outside of the heater, that allows shutting off the heater without adjusting the thermostat setting, is required for all heated outdoor spas and pools.
  4. Pools shall have directional inlets that adequately mix the pool water.
  5. At least 46" of pipe between the filter and heater must be installed to allow for the future addition of solar heating equipment.
  6. An insulated cover (minimum R-6) must be installed on all pools and spas.
- ⇒ Note: Tight home construction requires a source of ventilation air supply; ANSI/ASHRAE Standard 62.2 – 2007 (“Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings”) is the national ventilation standard. It is highly recommended that an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) be installed in all residences.

Residences that are 3000 - 5000 sq.ft. must comply with all aforementioned standards plus the following:

- ⇒ Space heating and cooling system/equipment shall be sized according to heating and cooling loads calculated using the latest versions of ACCA Manuals J and S, ASHRAE 2001 Handbook of Fundamentals, or an equivalent computation procedure. Applicable also to additions and renovations where new HVAC equipment is installed.
- ⇒ Duct system is sized, designed, and installed according to ACCA manual D or equivalent.

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- ⇒ Ducts are sealed with UL 181 tape, low-toxic mastic (FDA, USDA, & EPA-approved), gaskets, or an approved system as required by the IRC (Section M1601.3.1) or IMC (Section 603.9) to reduce leakage.
- ⇒ Ducts external to conditioned airspace (i.e. through crawlspace or attics) must have insulation R-8 or greater.
- ⇒ All furnace ducts must be air tight and constructed with commercial grade mastic and fiberglass mesh. Ducts are to be sealed substantially airtight with tapes (not duct tape) mastics or gasketing. Fiberglass ducts that expose fibers to the air stream are not permitted.
- ⇒ Heating appliances must be 92% efficient or greater
- ⇒ Multi-boiler systems must be provided with a staging device and outdoor reset
- ⇒ Digital thermostats required
- ⇒ Heating duct leakage test required; leakage outside of conditioned space must not exceed 5% of design flow, within conditioned space 10% is allowed.
- ⇒ No "wrap & heat" construction projects are allowed unless: 1) renewable energy is used as the heat source or 2) the building meets a HERS rating of 70 or less, certified by a Home Energy Rater.
- ⇒ Engineered framing products instead of dimensioned solid lumber for floor framing, rafters and headers that are larger that 2x8 material.
- ⇒ Oriented strand board for wall sheathing
- ⇒ 25% of the exterior walls must be provided with non-wood siding material
- ⇒ Note: Tight home construction requires a source of ventilation air supply; ANSI/ASHRAE Standard 62.2 – 2007 ("Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings") is the national ventilation standard. It is highly recommended that an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) be installed in all residences.

Residences greater than 5,000[1] sq.ft. must comply with all the aforementioned standards, plus the following:

- ⇒ Buildings must achieve a HERS rating of 70 or less by a certified Home Energy Rater.
- ⇒ Mechanically engineered space heating, cooling and ventilating systems are required.
- ⇒ Blower door tests must demonstrate less than 0.35 air changes per hour (ACH).
- ⇒ Note: ANSI/ASHRAE Standard 62.2 – 2007 ("Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings") is the national ventilation standard. It is required that the mechanical engineer design a mechanical ventilation system, i.e., Heat Recovery Ventilation (HRV) or Energy Recovery Ventilation (ERV) unless the mechanical design professional justifies the exclusion of the whole house ventilation system.
- ⇒ Windows must demonstrate 0.3 cfm per sq.ft. maximum allowable air leakage
- ⇒ Direct vent, on-demand or side-arm water heaters required
- ⇒ Engineered wall studs (not dimensioned solid lumber) or solid lumber from a certified sustainable forest required; certification must be from the Forest Stewardship Council or Certified Forest Products Council.
- ⇒ 100% of the home's electricity use must be provided for with renewable energy, either produced on-site or purchased through a Green Power production program. The Building Department will track the owner's participation in the program on a yearly basis. Creative alternative options will be considered by the Building Department.

[1]Floor Area is the sum of all floors protected by an impervious membrane calculated using the exterior dimensions of the adjacent walls excluding covered decks, porches, patios or covered surfaces not enclosed by exterior walls. Unheated areas less than 5 feet in height are not included in the floor area calculations. Attached garages are included in floor area calculations.

COMMERCIAL:
All buildings built under the IBC shall be considered commercial. All commercial buildings 5000 SF and greater shall be LEED silver or above. All commercial buildings below 5000 SF shall comply with this prescriptive code or be LEED certified. Buildings 5000 SF and greater may be granted an exemption from LEED Silver certification by the Building Department based on building type/use, however, the structures must still comply with prescriptive code requirements.

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VOLUNTARY MEASURES:
The following measures are currently voluntary, but highly encouraged for all construction.
1. Construction material recycling to approach zero waste goals.
2. Smart lighting design that incorporates energy saving measures, such as maximum use of CFLs, LEDs, and dimmer switches.
3. Energy-saving & water-conserving low-flow water fixtures.
4. Use of products with a high percentage of recycled content.
5. Renewable material floorings.
6. Renewable energy power systems.
7. ENERGY STAR appliances.