

Comparison of Green Building Standards

Standard	International Code Council's 2012 International Green Construction Code (IgCC), 2012 edition	American Society of Heating, Refrigeration, and Air-Conditioning Engineers' ANSI/ASHRAE/USGBC/IES Standard 189.1-2011, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings (ASHRAE 189.1), 2011 edition	National Association of Home Builders' ICC 700 National Green Building Standard (NGBS), 2012 edition	Green Building Initiative's ANSI/GBI 01-2010: Green Building Assessment Protocol for Commercial Buildings (Green Globes), 2010 edition	U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®)	The International Living Future Institute's Living Building Challenge, version 2.1 (May 2012)
Description	<p>A model code that contains minimum requirements for increasing the environmental and health performance of buildings' sites and structures. Generally, it applies to the design and construction of all types of buildings except single- and two-family residential structures, multifamily structures with three or fewer stories, and temporary structures.</p> <p>For more information, see the <a href="#">2012 International Green Construction Code</a>. EXIT</p>	<p>A model code that contains minimum requirements for increasing the environmental and health performance of buildings' sites and structures. Generally, it applies to the design and construction of all types of buildings except single-family homes, multifamily homes with three or fewer stories, and modular and mobile homes.</p> <p>For more information, see <a href="#">ASHRAE Standard 189.1</a>. EXIT</p>	<p>A rating and certification system that aims to encourage increased environmental and health performance in residences and residential portions of buildings. Its criteria apply to the design and construction of homes and subdivisions.</p> <p>For more information, see the National Association of Home Builders' "<a href="#">Sustainability</a>". EXIT webpage.</p>	<p>A series of rating and certification systems that encourage improved environmental and health performance for all types of buildings except residential structures. Green Globes is administered in the United States by the Green Building Initiative.</p> <p>For more information, see <a href="#">Green Globes Certification</a>. EXIT</p>	<p>A series of rating systems aimed at increasing the environmental and health performance of buildings' sites and structures and of neighborhoods. LEED® covers the design, construction, and operations of all types of buildings.</p> <p>For more information, see the <a href="#">U.S. Green Building Council's LEED webpage</a>. EXIT</p>	<p>A certification system that advocates for transformation in the design, construction, and operation of buildings. In addition to encouraging improved environmental and health performance, it supports the building of structures that are restorative, regenerative, and an integral component of the local ecology and culture.</p> <p>For more information, see the <a href="#">Living Building Challenge</a>. EXIT</p>
Standard Type	<ul style="list-style-type: none"> <li>Model code</li> </ul>	<ul style="list-style-type: none"> <li>Model code</li> </ul>	<ul style="list-style-type: none"> <li>Rating and certification system</li> </ul>	<ul style="list-style-type: none"> <li>Rating and certification system</li> </ul>	<ul style="list-style-type: none"> <li>Rating and certification system</li> </ul>	<ul style="list-style-type: none"> <li>Certification system</li> </ul>
Mandatory/Voluntary	<ul style="list-style-type: none"> <li>Mandatory</li> </ul>	<ul style="list-style-type: none"> <li>Mandatory</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary</li> </ul>
Building Type(s)	<ul style="list-style-type: none"> <li>Commercial: all</li> <li>Industrial: all but manufacturing systems and equipment</li> <li>Mixed use: all</li> <li>Residential: multifamily with more than three stories</li> </ul>	<ul style="list-style-type: none"> <li>Commercial: all</li> <li>Industrial: all</li> <li>Mixed use: all</li> <li>Residential: multifamily with more than three stories</li> </ul>	<ul style="list-style-type: none"> <li>Mixed use: residential space</li> <li>Residential: all except institutional</li> </ul>	<ul style="list-style-type: none"> <li>Commercial: all</li> <li>Mixed use: all</li> <li>Residential: multifamily</li> </ul>	<ul style="list-style-type: none"> <li>Commercial: all</li> <li>Industrial: all</li> <li>Mixed use: all</li> <li>Residential: all</li> </ul>	<ul style="list-style-type: none"> <li>Commercial: all</li> <li>Industrial: all</li> <li>Mixed use: all</li> <li>Residential: all</li> </ul>

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			uses		<ul style="list-style-type: none"> <li>• Mixed use: all</li> <li>• Residential: all</li> </ul>	
Project Type	<ul style="list-style-type: none"> <li>• New construction</li> <li>• Additions</li> <li>• Alterations</li> </ul>	<ul style="list-style-type: none"> <li>• New construction</li> <li>• Additions</li> </ul>	<ul style="list-style-type: none"> <li>• New construction</li> <li>• Additions</li> <li>• Alterations</li> </ul>	<ul style="list-style-type: none"> <li>• New construction</li> <li>• Additions</li> <li>• Alterations</li> <li>• Existing buildings</li> </ul>	<ul style="list-style-type: none"> <li>• New construction</li> <li>• Existing buildings</li> <li>• Additions</li> </ul>	<ul style="list-style-type: none"> <li>• All</li> </ul>
Subject Areas	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Materials and resource use</li> <li>• Indoor environmental quality</li> <li>• Emissions</li> <li>• Operations and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Materials and resource use</li> <li>• Indoor environmental quality</li> <li>• Construction and</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Materials and</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Materials and resource</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable sites</li> <li>• Energy efficiency</li> <li>• Water efficiency</li> <li>• Materials and resource</li> </ul>

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		<ul style="list-style-type: none"> <li>operations plans</li> </ul>	<ul style="list-style-type: none"> <li>resource use</li> <li>Indoor environmental quality</li> <li>Operations and maintenance</li> <li>Building owner education</li> </ul>	<ul style="list-style-type: none"> <li>energy use</li> <li>Indoor environmental quality</li> <li>Emissions</li> <li>Project/environmental management</li> </ul>	<ul style="list-style-type: none"> <li>energy</li> <li>Water efficiency</li> <li>Materials and resource use</li> <li>Indoor environmental quality</li> <li>Emissions</li> <li>Operational maintenance</li> </ul>	<ul style="list-style-type: none"> <li>energy use</li> <li>Indoor environmental quality</li> <li>Equity</li> <li>Aesthetics</li> </ul>
Community Adoption/Use	<ul style="list-style-type: none"> <li>Designed to be incorporated into a jurisdiction's codes and ordinances and function as an overlay to other International Code Council model codes.</li> </ul>	<ul style="list-style-type: none"> <li>ASHRAE 189.1 is designed to be used and enforced with a jurisdiction's other building codes and</li> </ul>	<ul style="list-style-type: none"> <li>Communities could use this stand</li> </ul>	<ul style="list-style-type: none"> <li>Communities could use this protocol as the basis</li> </ul>	<ul style="list-style-type: none"> <li>Commu</li> </ul>	<ul style="list-style-type: none"> <li>Communities could use this system as the basis</li> </ul>

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	<ul style="list-style-type: none"> <li>Requires adoption by a governing jurisdiction before it becomes mandatory.</li> <li>Jurisdictions that do not have other International Code Council codes in place might want to make a detailed review of local building ordinances to ensure that they adequately correlate with this code.</li> <li>In addition to the mandatory requirements, IgCC offers jurisdictions a range of options for increasing the stringency of the code or encouraging improved levels of performance in areas of particular importance to the community.</li> </ul>	<p>ordinances.</p> <ul style="list-style-type: none"> <li>Requires adoption by a governing jurisdiction before it becomes mandatory.</li> <li>Jurisdictions might want to make a detailed review of local building ordinances to ensure that they adequately correlate with this standard.</li> </ul>	<p>ard as the basis for a voluntary program to encourage construction of greener commercial buildings.</p>	<p>for a voluntary program that encourages construction of greener commercial buildings.</p>	<p>es could use the entire rating system to encourage greener construction.</p>	<p>for a green building program.</p>
Certification/Compliance Process	<ul style="list-style-type: none"> <li>Designed to be incorporated into a jurisdiction's codes and ordinances and enforced by building officials and inspectors.</li> <li>All provisions of the model code are designed to be mandatory, except those the</li> </ul>	<ul style="list-style-type: none"> <li>Designed to be incorporated into a jurisdiction's codes and ordinances and enforced by building officials and inspectors.</li> </ul>	<ul style="list-style-type: none"> <li>There are four green certification levels for home</li> </ul>	<ul style="list-style-type: none"> <li>Certification to one of four levels (i.e., 1 to 4 globes) require</li> </ul>	<ul style="list-style-type: none"> <li>LEED® points</li> </ul>	<ul style="list-style-type: none"> <li>Projects must meet up to 20 requirements to achieve full</li> </ul>

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	<p>jurisdiction indicates are not applicable or those designated as project electives. Project electives give jurisdictions the flexibility to encourage the consideration and implementation of beneficial practices without making those particular practices mandatory.</p>	<ul style="list-style-type: none"> <li>Based on mandatory requirements with two compliance path options: Prescriptive Path (considered to be the simpler option with minimal choices and few calculations) and Performance Path (considered to be the more sophisticated option that provides flexibility and more options but also requires greater effort).</li> </ul>	<p>s: Bronze, Silver, Gold, and Emerald. Land Development can earn One, Two, Three, or Four Stars.</p> <ul style="list-style-type: none"> <li>NGBS contains few minimum criteria but allows the builder or developer great flexibility in selecting green building practices.</li> <li>Projects receive points in each subject area for reaching certain performance or construction goals.</li> <li>Certification requires</li> </ul>	<p>s achieving minimum thresholds of 1,000 points.</p> <ul style="list-style-type: none"> <li>Has no minimum criteria (i.e., does not require any specific practice), but instead rates buildings on the green building practice that the builder has chosen to include.</li> <li>Does not require any ongoing documentation, but it might be required as proof of compliance during the third-party assessment.</li> <li>Requires third-party review of building documentation and onsite walk-through</li> </ul>	<p>are awarded partial recognition is attainable, including a Net Zero Energy Building Certification.</p> <ul style="list-style-type: none"> <li>The certification process involves a review of written elements and a site visit by an independent auditor.</li> </ul>	

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			<p>es verifi cation by third- party inspe ctors accre dited by the Natio nal Assoc iation of Home Build ers (NA HB) at the rough -in stage and on comp letion . Inse ctor verifi es that every criteri on cited by the build er in the NAH B's onlin e scorin g tool has been met.</p>	s.	w hi ch ad dr es s re gi o na ll y sp ec ifi c en vi ro n m en ta l is su es . A pr oj ec t m us t sa tis fy al l pr er eq ui sit es an d ea rn a m in i m u n n u m be r of p oi nt s to be ce rti fi ed .	

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					<p>T hird - part y certification is required.</p> <ul style="list-style-type: none"> <li>In cl u de s fo ur le ve ls of ce rti fi ca ti o n: C er tif ied, Si lv er , G ol d, or Pl at in u m .</li> </ul>	
Relationship to Other Standards	<ul style="list-style-type: none"> <li>ANSI/ASHRAE/USGBC/IES Standard 189.1-2011, <i>Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings</i> (ASHRAE 189.1) is an alternate compliance path to IgCC; i.e., in jurisdictions that adopt IgCC, a builder has the option to design and construct a building in</li> </ul>	<ul style="list-style-type: none"> <li>It is an alternate compliance path for the <i>International Green Construction Code</i> (IgCC); i.e., in jurisdictions that adopt IgCC, a builder has the option to design and construct a building in</li> </ul>	<ul style="list-style-type: none"> <li>Incl u de s a se pa ra te gre en ra ti ng sy ste m fo r en ti re su bdi vi si on s, si mi la r to</li> </ul>	<ul style="list-style-type: none"> <li>Mode l ed af te r Bu il di ng Re se ar ch Es ta bl ish men t En vi ro n men ta l As se ss men t Me th od</li> </ul>	<ul style="list-style-type: none"> <li>Me e ti ng or ac hi ev in g A S H</li> </ul>	

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	<p>accordance with the provisions of ASHRAE 189.1 rather than those of IgCC.</p> <ul style="list-style-type: none"> <li>● IgCC provides jurisdictions with options for mandating that residential structures comply with the National Association of Home Builders' <i>National Green Building Standard</i> (ICC-700).</li> <li>● IgCC is designed to coordinate and integrate with the family of International Code Council codes and complement voluntary green building rating systems.</li> <li>● Some provisions reference standards published by other organizations, e.g., ASTM International, National Science Foundation, and South Coast Air Quality Management District.</li> </ul>	<p>accordance with the provisions of 189.1 rather than those of IgCC.</p> <ul style="list-style-type: none"> <li>● ASHRAE 189.1 is designed to complement voluntary green building rating systems.</li> <li>● Some provisions reference standards published by other organizations, e.g., ASTM International, National Science Foundation, and South Coast Air Quality Management District.</li> </ul>	<p>the LEED for Neighborhood Development system.</p> <ul style="list-style-type: none"> <li>● Many of the mandatory measures found in the ICC 700 National Green Building Standard are consistent with the family of International Code Council's codes.</li> </ul>	<p>(BREEAM).</p>	<p>R A E st an da rd s is ne ce ss ar y fo r ac hi ev in g se ve ra l of th e L E E D ® cr ed its , in cl u di n g A S H R A E 9 0. 1- 2 0 0 7 an d 6 2. 1- 2 0 0 7.</p>	

<sup>1</sup> In the building community, there is no consistent use or definition of the terms "standard" or "code." EPA uses the term "standard" here in a broad sense to mean "something established by authority, custom, or general consent as a model or example: CRITERION" (Merriam-Webster). EPA uses it as an umbrella term to encompass model codes, rating systems, and other publications that provide criteria for the design, construction, and maintenance of buildings.

<sup>2</sup> Any standard can be adopted as a voluntary or mandatory program. We indicate here the intent of the authors.



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