TRUSTED

"Emerging technologies — such as microgrid and nanogrid, along with advanced control systems islanded with solar photovoltaic and battery energy storage systems (BESS) — will serve as a road map to making our planet more sustainable and reducing our dependency on fossil fuels. Over the next decade, we expect scientists will learn to capture the sun's energy and transfer it to Earth via special lenses that will eliminate the need for power plants to generate electricity, which will be another revolution in renewable energy. This IAPMO publication is essential for communicating with industry and all stakeholders to achieve our renewable goals as well as cheaper source of energy that will meet the needs of industry, net zero energy (NZE) goals, and ultimately the end user."

Amir Tabakh, USM, P.E.
Manager of Efficiency Solutions Engineering & DWP La Kretz Labs

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"The 2021 USHGC addresses the latest provisions and technologies: solar, hydronics and geothermal energy systems. The geothermal energy provisions have been expanded and the organization of the chapter is easily navigable making it easy to find Code provisions by system type. The USHGC Code is inclusive, enforceable, easy to read, and written to address every aspect of hydronic and renewable installations. This code is needed in jurisdictions throughout the nation to pave the road to zero net energy and includes the background for integrating multiple renewable technologies."

Cary Smith, CEM CGC CGI
Sound Geothermal Corporation

Since it was founded in 1926, The International Association of Plumbing and Mechanical Officials (IAPMO) has provided jurisdictions everywhere with a plumbing code that helps protect the health and safety of each and every citizen. That code is now the basis for plumbing codes around the globe that offer protection to populations worldwide. Our expertise, however, does not end with plumbing. Whether the energy is obtained from the sun for solar energy systems or from the ground for geothermal systems or anywhere in between for hydronic systems, the USHGC is the only code that addresses solar, hydronics and geothermal.

GLOBAL

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2021 Uniform Solar, Hydronics and Geothermal Code®

AN AMERICAN NATIONAL STANDARD
IAPMO/ANSI USHGC 1 – 2021

AMERICAN NATIONAL STANDARD

The *Uniform Solar, Hydronics and Geothermal Code® (USHGC)* is developed using IAPMO's American National Standard Institute (ANSI) accredited consensus-development procedures. This ensures due process, openness and balance, and brings together stakeholders representing a variety of viewpoints and interests to achieve true consensus on the proper installation and inspection of such systems. This process, in which all parties have a voice and a vote, ensures the *USHGC* is a comprehensive document that promotes the public's health, safety and welfare. The *USHGC* addresses hydronics systems along with renewable energy such as solar and geothermal in one easy-to-use document.

PROVISIONS

The *USHGC* maintains the necessary balance between prescriptive requirements and allowable performance standards; it details exactly how solar, hydronics, and geothermal systems need to go together.

Enforcement is simplified, as there are fewer areas for field interpretation, and the code allows engineered design systems by architects and the professional design community. The *USHGC* maintains proven health and safety standards, while remaining current with technology. It is the most cost-effective, consistent and easy-to-use code available in the industry.

Key provisions of the 2021 *USHGC* and changes from the 2018 edition include:

- New requirements for additives and chemicals installed in hydronic systems
- New requirements for terminal units installed with hydronic systems
- New maximum allowable oxygen permeation rate for PEX and PE-RT tubing in hydronic systems
- Additional material standards for hydronic and solar thermal system piping, tubing and fittings
- New requirements for both water source and air source heat pumps
- New solar thermal system piping and tubing insulation requirements
- Additional expansion tank requirements including methods for calculating maximum volume of forced and diaphragm type tanks
- New requirements for design and installation of geothermal energy systems including open-loop, closed-loop and direct-exchange (DX) systems
- New applicable material standards for geothermal plastic ground source loop piping and fittings
- New requirements for pressure relief and shutoff valves installed in geothermal energy systems
- New requirements for geothermal system installation requirements such as trenching, markings, setbacks, testing, just to name a few
- New listing requirements for solar PV equipment
- Updated solar photovoltaic (PV) provisions to correlate with the latest NFPA 70-2020
- New Appendix D – (IAPMO IS 34) Installation Standard for Residential Solar Photovoltaic and Energy Storage Systems

CREDIBILITY

In 2009, the American National Standards Institute (ANSI) formally designated the *Uniform Solar Energy Code®* (now known as *Uniform Solar, Hydronics, and Geothermal Code®*) as an American National Standard. It joins the *Uniform Plumbing Code® (UPC)*, *Uniform Mechanical Code® (UMC)* and *Uniform Swimming Pool, Spa and Hot Tub Code® (USPSHTC)* as the only codes of their kind to earn this prestigious designation.

GREEN

Progressive municipalities and jurisdictions seeking to be on the leading edge of sustainable initiatives will find an invaluable ally in IAPMO and the *Uniform Solar, Hydronics and Geothermal Code®*.