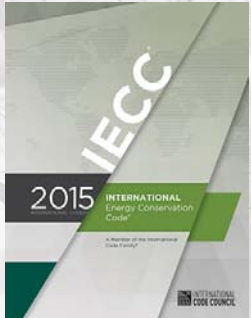




IECC Residential Code Compliance *Plumbing, Electrical and Lighting*





**Salt Lake
Community
College**
ENERGY INSTITUTE
INVESTING IN THE ENERGY WORKFORCE



Brent Ursenbach, CBO, LEED AP
Energy/Mechanical Specialist



West Coast Code Consultants, Inc.
BrentU@WC-3.com
www.WC-3.com
O: (385) 237-3722
C: (801) 381-1449

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Funding for Energy Code Training



Contracted to:

- Provide Group Instruction
- Answer Questions
 - Email and Text Best
- Advise
- Provide Individual Training
 - Jurisdiction
 - Design Professionals
 - Contractors

Funding Limits

www.utahenergycode.com

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R403.4 - Mechanical Piping Insulation

Mechanical system piping capable of carrying fluids above 105°F (41°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

- Boilers
- Chilled water



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R403.4.1 Protection of Piping Insulation

Piping insulation exposed to weather shall be protected from damage including caused by:

- Sunlight
- Wind
- Moisture
- Equipment maintenance
- Shall provide shielding from solar radiation that can cause degradation of the material
 - Adhesive tape shall not be permitted




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Service Hot Water System Efficiency

- Conduction losses
- Radiant losses
- Periods of use
- Utah Ultra Low NOx requirement
- Often ignored



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Utah - Low NOx Water Heaters

- Home water heaters can be significant sources of nitrogen oxides (NOx)
 - precursor gas that plays a significant role in the formation of ozone and fine particulates (PM2.5)
- Legislature and Air Quality Board passed a new rule to reduce NOx emissions from water heaters
- NOx emissions < 20 ppm or 14ng/j
- Utah Code 19-2-107.7 Water Heater Regulations requires that all water heaters sold/purchased in Utah must Ultra Low NOx emissions listed as of July 1, 2018

Rinnai
CORPORATION
Nagoya, Japan

Direct-Vent Automatic Instantaneous Water Heater
Chauffe-eau instantané automatique à ventilation directe
DIRECT VENT AUTOMATIC INSTANTANEOUS WATER HEATER
FOR INSTALLATION IN A MANUFACTURED HOME (MOBILE HOME)
CHAUFFE-EAU INSTANTANÉ AUTOMATIQUE À ÉVENT DIRECT
POUR INSTALLATION DANS UNE MAISON PRÉFABRIQUÉE (MOBILE)

Type of Gas / (Type de gaz):	Natural Gas (Gaz naturel)	
Input Rating / (Débit calorifique):	Maximum:	150,000 BTU/H
	Minimum:	15,200 BTU/H
Maximum Inlet Gas Pressure / Maximum à l'arrivée d'alimentation:		10.5" W.C. / (2.51 kPa)
Minimum Inlet Gas Pressure / Minimum à l'arrivée d'alimentation:		4.0" W.C. / (1.00 kPa)
Minimum Inlet Gas Pressure for adjustments / Minimum (pour les réglages):		7.0" W.C. / (1.74 kPa)
Manifold Pressure - High Fire / Pression à la rampe (plein feu):		3.0" W.C. / (0.75 kPa)
Manifold Pressure - Low Fire / Pression à la rampe (petit feu):		0.42" W.C. / (0.10 kPa)
Recovery Rating / Taux de récupération (GPH):		7.5
Maximum Water Pressure / Pression d'eau maximum:		150 psi
NOx Emissions:		< 14 ng/j

(Pursuant to South Coast Air Quality Management District Rule 1146.2)
(suivant la réglementation de district en côte Sud sur la gestion de la qualité de l'air)
Minimum clearances from combustibles / Développements minimaux à assurer entre les parois de l'appareil et les constructions combustibles.

Back/Arrière:	0	Front/Avant:	6" (15.2cm)	Top/Dessus:	6" (15.2cm)
Sides/Côtés:	2" (5.1cm)	Ground/Sol:	12" (30.5cm)	Vent/Ventilation:	0

For Closet Installations, 6" from front / Pour installation dans un endroit fermé: 6" de l'avant
et les constructions incombustibles / Développements minimaux à assurer entre les parois de l'appareil et les constructions incombustibles:

Back/Arrière:	0	Front/Avant:	6" (15.2cm)	Top/Dessus:	2" (5.1cm)
Sides/Côtés:	1/2" (1.3cm)	Ground/Sol:	12" (30.5cm)	Vent/Ventilation:	0

FOR INDOOR INSTALLATION ONLY / POUR INSTALLATION EN INTERIEUR SEULEMENT
120 VOLT 60 HZ less than 10 AMPS / 120 V 60 Hz, moins de 10 A
For field-wired connections use No. 14 AWG wires rated for at least 140°F (60°C) /
Pour les connexions sur site utilisez des fils de calibre 14 AWG supportant au moins 140°F (60°C)

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Heated Water Circulation & Temperature Maintenance Systems – (MANDATORY)

Any installed Hot Water Maintenance System **MUST** comply

- Mandatory requirements apply IF installed
- Systems are not Mandatory



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R403.5.1.1 Heated Water Circulation Systems

- Heated water circulation systems shall be provided with a circulation pump
- The system return pipe shall be a dedicated return pipe or a cold water supply pipe
- *Gravity and thermosyphon circulation systems shall be prohibited*
- Controls for circulating hot water system pumps shall start the pump based on time of occupancy
- The controls shall automatically turn off when the water in circulation loop is at desired temperature and no demand for hot water



Photo Courtesy Grundfos

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R403.5.1.2 Heat Trace Systems

Heat Trace hot water temperature maintenance systems designed to provide commercial buildings with immediate hot water at the tap *without the use of recirculation system*

- Electric heat trace comply with IEEE 515.1 or UL 515
- Controls auto adjust to maintain desired water temperature in the piping
- In accordance with times of occupancy.

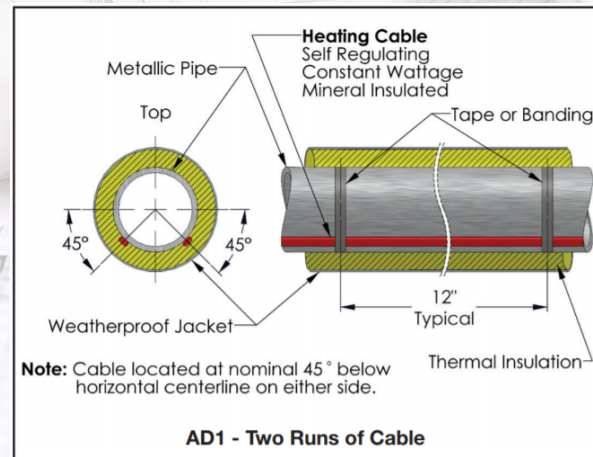


Photo courtesy Chromalox

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R403.5.2 Demand Recirculation Systems

- Use cold water line to return to water heater
- Demand recirculation pump only operates typically upon motion detection of user
- Pump pulls hot water up while pushing cold back to WH
- Limits return water in cold line to 104°F



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R403.5.3 Hot Water Pipe Insulation

1. Piping 3/4 inch (19.1 mm) and larger in nominal diameter (ID).
2. Piping serving more than one dwelling unit.
3. Piping located outside the conditioned space.
4. Piping from the water heater to a distribution manifold.
5. Piping located under a floor slab.
6. Buried in piping. *deleted by state amendment*
7. Supply and return piping in recirculation systems other than demand recirculation systems



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R403.5.4 Drain Water Heat Recovery Units

- Comply CSA B55.2, tested to CSA B55.1
- Water line pressure loss less than 3psi one or two showers
- Less than 2 psi for three + showers



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R403.8 Systems Serving Multiple Dwelling Units

Must Comply with:

- C403 Mechanical Systems
- C404 Service Water Heating
- In lieu of R403
 - All hot water lines insulated
 - No amendments

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R403.9 Snow Melt & Ice System Controls

Include Automatic Controls shutting off system:

- Pavement temp > 50°F
- No precipitation
- Outdoor air temp > 40°F



R403.10 Pool & Permanent Spa Energy Consumption – (MANDATORY)

- Accessory to detached one- and two- family dwellings
- Energy consumption
 - Heaters
 - Time Switches
 - Covers
- Required *when installed*
- Other requirements in IRC
- In accordance with APSP-145
(reference removed from 2018 IECC, Standard appears to have disappeared – See this section and the ICC ISPSC Code)



Photo By Sleblanc - Own work, CC BY-SA 4.0

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R403.10.1 Pool and Spa Heaters

- Ready access to power switch
 - Within 3' of heater
 - Not change temperature
 - In addition to circuit breaker
 - May or may not be disconnect
- No standing/continuous gas pilot light



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R403.10.3 Time Switches

- Time switch or control method
- Automatically turn on and off per preset schedule
 - Pumps and Heaters
- Exception:
 - Public health standard require 24 hr. operation
 - Pumps for solar & waste heat-recovery

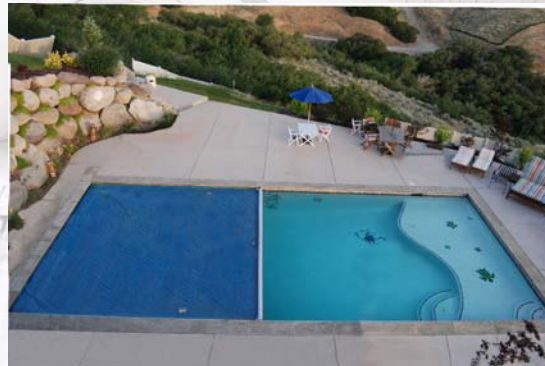


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R403.10.4 - Covers

- Heated pools and spas
 - Vapor-retardant cover
 - Other *approved* vapor-retardant means
- Exception
 - 70% of heating energy site recovery
 - Heat pump
 - Solar



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R403.11 Portable Spas (Mandatory)

Energy Consumption

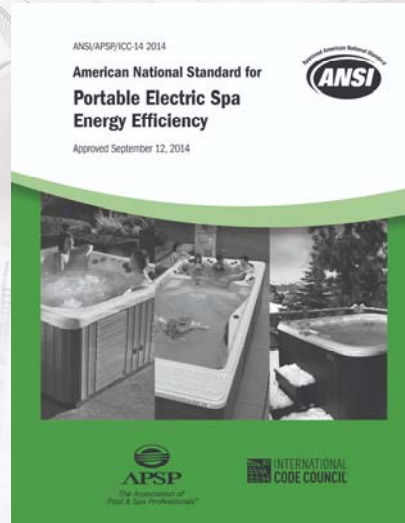
- APSP – 14 (code text)
- Pump motor efficiency

Note: The Former Association of Pool & Spa Professionals/National Swimming Pool Foundation – **APSP**

Changed name to Pool & Hot Tub Alliance – **ASP**

ASP are general recognized as ANSI, ASP, ICC Standards:

ANSI/ASP/ICC-14

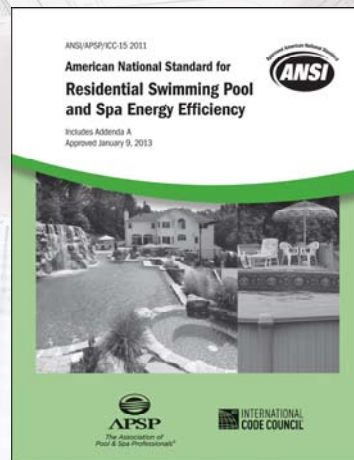


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R403.12 Residential Pools & Permanent Residential Spas

- References APSP-15 for motor efficiency

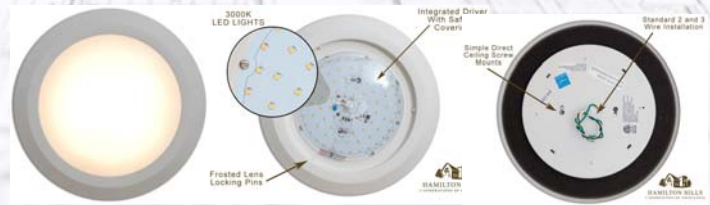


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Lighting Equipment – (MANDATORY)

- Not less than 75% of lamps and permanent fixture must be high-efficacy
 - 15 watts or less: Minimum of 40 lumens/watt
 - 15 to 40 watts: Minimum of 50 lumens/watt
 - More than 40 watts: Minimum of 60 lumens/watt



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Lighting Equipment – Gas (MANDATORY)

- Fuel Gas lighting systems shall not have continuously burning pilot lights



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