



Building America Research Dissemination:

FY 2018 Annual Progress Report

September 2018

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Prepared for
the U.S. Department of Energy
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Pacific Northwest National Laboratory
Richland, Washington 99352

Executive Summary

This report documents FY 2018 additions and upgrades to the Building America Solution Center, <https://basc.pnnl.gov>, a web-based resource developed and maintained by the Pacific Northwest National Laboratory for the U.S. Department of Energy's Building Technologies Office. The Building America Solution Center makes research funded by DOE through its Building America program more readily accessible and easily searched by members of the residential building and remodeling community, including builders, contractors, installers, remodelers, code officials, raters, manufacturers, sales professionals, homeowners, and building science researchers.

Significant activities related to Building America Solution Center content in FY 2018 include the following:

- Launched the Existing Homes Tool.
- Added 24 new guides and made major revisions to 48 guides.
- Added 60 retrofit tabs.
- Added Standard Work Specifications links to more than 80% of the guides with retrofit tabs.
- Updated compliance information to include 2015 and 2018 international code language for more than 80% of the guides.
- Completely revised the home page to improve access to new and current features.

The Building America Solution Center continues to see growth among users. In FY 2018, the total number of users increased 15% over FY 2017 (from about 294,000 to 339,000) and over 500% since the BASC was launched in FY 2013. In FY 2018, the total number of page views was up 11%, from 532,000 to 597,000, and the number of sessions was up 12%, from 337,000 to 381,000.

This report fulfills 1.5.2.75 PNNL - Building America Research Dissemination, Milestone 4, "Prepare an annual summary of significant platform maintenance activities and all content uploaded to the BASC site" (Tasks 1 & 2).

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1.0 Introduction

This report documents FY 2018 additions and upgrades to the Building America Solution Center, <https://basc.pnnl.gov>, a web-based resource developed and maintained by the Pacific Northwest National Laboratory for the U.S. Department of Energy's Building Technologies Office. The Building America Solution Center makes research funded by DOE through its Building America program more readily accessible and easily searched by members of the residential building and remodeling community, including builders, contractors, installers, remodelers, code officials, raters, manufacturers, sales professionals, homeowners, and building science researchers.

This report fulfills 1.5.2.75 PNNL - Building America Research Dissemination, Milestone 4, "Prepare an annual summary of significant platform maintenance activities and all content uploaded to the BASC site" (Tasks 1 & 2).

2.0 Content Additions

In FY 2018, PNNL completed 98% of the content for the Existing Home tool. This year 24 new and existing home guides and 60 retrofit tabs were added. We have also substantially updated new home content for 48 guides. In addition 201 figures, 6 videos, 3 presentations, 14 CAD files, and 91 references were added. These additions and updates are summarized in Table 1 below. A detailed listing follows in Appendix A, which provides full titles for each guide, tab, and code compliance brief added or updated.

Table 1. Building America Solution Center Content Additions and Updates for FY 2018

BASC Elements	FY 2018 Posts
New Guides	24
Retrofit Tabs Added	60
Updated Guides	48
Code Compliance Briefs	3
Figures	201
Videos	6
Presentations	3
CAD	14
References	91

In addition, the following updates were made to content:

- Added Standard Work Specifications links to over 80% of guides with retrofit tabs.
- Added Pre-Retrofit Assessment guide links to over 80% of guides with retrofit tabs.
- Updated compliance information for 2015 and 2018 IRC, IECC, and IMC on most guides. This effort was 80% complete as of September 30, 2018.
- Added retrofit compliance information for IRC and IECC to all applicable retrofit tabs and guides.
- Searched and corrected broken links throughout the site. This effort was 75% complete as of September 30, 2018.
- Cleaned up formatting on all compliance tabs.
- Added a hyperlinked compliance tab reference to the scope tab of each guide.

3.0 Functionality Improvements and Feature Development

In addition to content additions, several updates and improvements have been made to the Building America Solution Center in FY 2018, including:

- Released a new homepage in October 2017.
- Released the Existing Homes tool in October 2017 (see Figure 1).
- Released both iOS and Android mobile application updates.
- Added a Building Science Fundamentals link to the left navigation.
- Updated the registration page and added a new “Why Register” page for users.
- Enhanced the Field Kits to allow users to share a direct link to saved content via email.
- Added a Feedback link to all guides without requiring users to login to provide feedback.

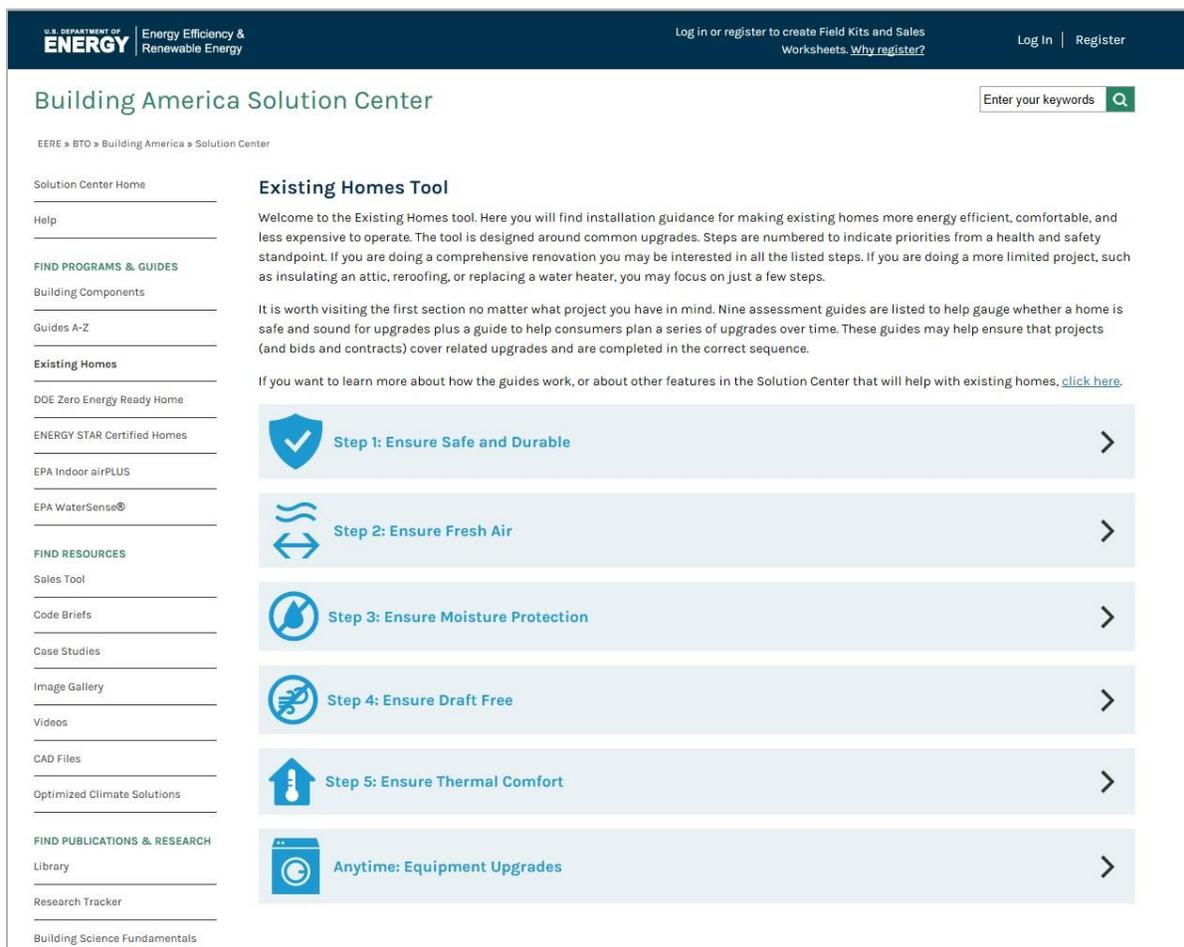


Figure 1. In FY 2018 the Existing Homes tool was added to the BASC to direct users to guidance on installing energy-efficiency measures in existing homes.

4.0 Presentations

In FY 2018, PNNL staff presented on Building America Solution Center features, enhancements, and content at the following conferences and webinars.

Conferences:

- EEBA High Performance Home Summit (Atlanta, GA, October 10-12, 2017).
- RESNET Building Performance Conference (Orlando, FL, February 26-28, 2018).
- BTO Peer Review (Washington, DC, May 1, 2018).
- ACEEE Summer Study on Energy Efficiency in Buildings (Asilomar, CA, August 13-17, 2018).

Webinars:

- Enterprise Green Communities Webinar (January 25, 2018).
- Zero Energy Ready Homes Webinar (April 3, 2018).
- WAP Trainers Consortium Webinar (June 4, 2018).
- Building America Webinar (June 26, 2018).
- EPA WaterSense Webinar (July 18, 2018).

5.0 User Statistics

Building America Solution Center user statistics for FY 2018 are provided in Table 2 below. In FY 18, the Building America Solution Center continued to see growth in all primary user statistics. The tables and figures below provide user statistics, and growth metrics since launch in January 2013.

Table 2. FY 18 Building America Solution Center User Statistics

Statistic	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep	FY18 Total	FY18 Monthly Average
Page Views	49,906	46,031	38,716	48,781	45,994	53,103	53,233	50,787	49,779	50,042	56,095	54,248	596,715	49,726
Users	27,452	25,329	22,242	26,976	24,926	30,214	30,027	30,289	28,912	28,205	31,136	33,029	338,737	28,228
Sessions	30,733	28,544	25,035	30,485	28,178	34,078	34,032	34,280	32,343	31,348	35,274	36,382	380,712	31,726
Average Time on Page (min:sec)	1:09	1:13	1:08	1:10	1:13	1:10	1:06	0:59	1:02	1:07	1:07	1:00		1:09
Downloads	3,497	3,618	2,786	3,278	4,001	3,727	3,460	3,031	2,726	3,183	3,418	3,183	39,908	3,326
New User Registrations	20	22	13	33	32	40	46	37	43	30	40	27	383	32
New User Account Activated	15	18	11	26	25	34	37	28	36	25	31	21	307	26
Comments Received: Content	2	1	1	2	1	2	1	2	4	1	4		21	2
Comments Received: Application	1	--	--	--	--	--	1	1	1	--	--		4	1
Desktop Visits	22,799	20,877	18,331	22,232	18,749	22,501	22,394	22,139	20,563	20,178	22,661	23,742	257,166	21,431
Tablet Visits	1,925	1,759	1,539	2,035	1,409	1,615	1,676	1,680	1,775	1,777	2,023	1,991	21,204	1,767
Mobile visits	6,009	5,898	5,165	6,218	4,717	6,081	6,151	6,725	6,608	6,190	6,700	6,816	73,278	6,107
Total Field Kits Created (cumulative)	718	735	738	749	757	783	790	796	807	819	831	831	78	10
Number of Users with Field Kits (cumulative)	275	279	279	283	288	301	305	307	313	316	320	320	32	4

Table 3 and 4 below illustrate total and average Building America Solution Center user statistic from FY 2013 to FY 2018. Figure 2 presents the total FY statistics graphically.

Table 3. Total Building America Solution Center User Statistics (2013-2018)

Statistic	FY13 Total	FY 14 Total	FY 15 Total	FY 16 Total	FY 17 Total	FY18 Total
Page Views	161,016	259,618	322,561	431,281	532,184	596,715
Users	53,157	124,671	154,053	221,356	294,528	338,737
Sessions	62,882	141,212	175,543	250,760	336,822	380,712
Downloads	11,599	23,696	30,829	32,202	38,709	39,908
New User Registrations	507	587	301	238	22	383
Desktop Visits		89,859	133,140	198,507	253,445	257,166
Tablet Visits		12,531	16,844	15,153	19,694	21,204
Mobile Visits		13,269	25,185	37,139	63,583	73,278

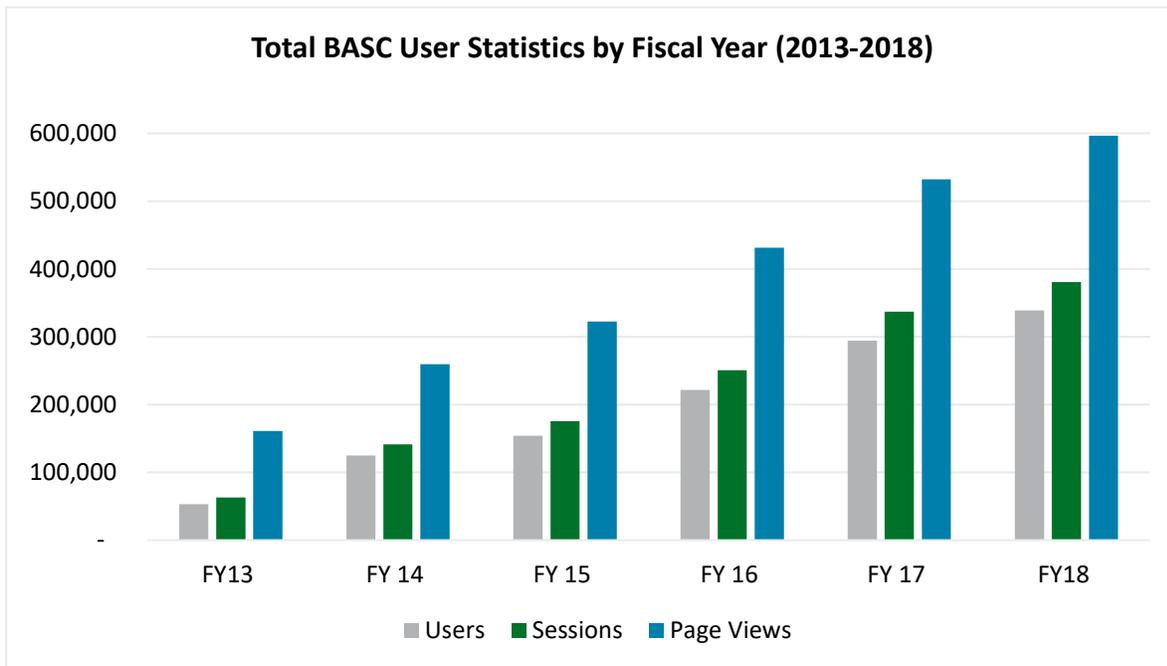


Figure 2. Total Building America Solution Center User Statistics by Fiscal Year (2013-2018).

Table 4. Average Monthly Building America Solution Center User Statistics (2013-2018)

Statistic	FY13 Avg	FY 14 Avg	FY 15 Avg	FY 16 Avg	FY 17 Avg	FY 18 Avg
Page Views	18,941	21,634	26,880	35,940	44,349	49,726
Users	6,390	10,389	12,838	18,446	24,544	28,228
Sessions	6,987	11,768	14,629	20,897	28,069	31,726
Downloads	1,402	1,975	2,569	2,684	3,226	3,326
New User Registrations	42	49	25	20	266	32
Desktop Visits		8,986	11,755	16,542	21,120	21,431
Tablet Visits		1,253	1,404	1,263	1,641	1,767
Mobile Visits		1,327	2,099	3,095	5,299	6,107

The Building America Solution Center continues to see growth. In FY 2018, the total number of new users increased 15% over FY 2017, and over 500% since the BASC was launched in FY 2013. Figure 3 below illustrates the growth in total users between FY 2013 and FY 2018.

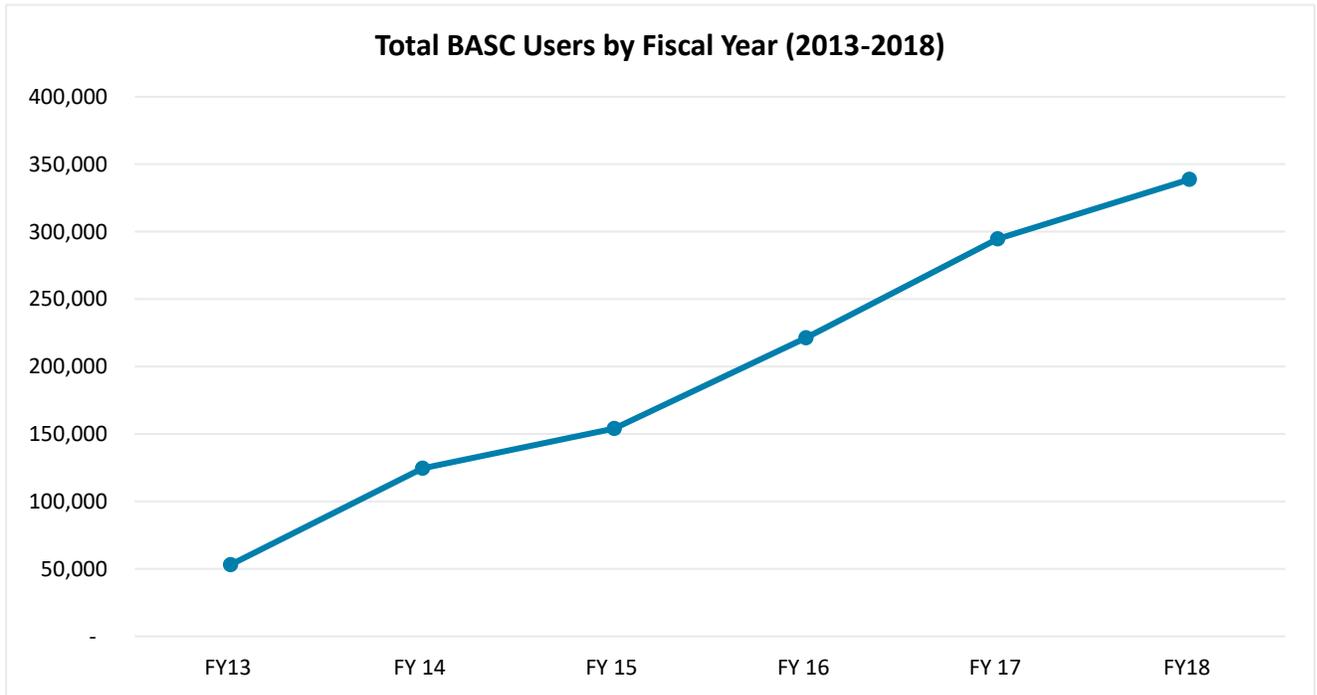


Figure 3. Total Building America Solution Center Users by Fiscal Year (2013-2018)

Appendix A

Content Additions and Updates to the Building America Solution Center, FY 2018

Appendix A

Content Additions and Updates to the Building America Solution Center, FY 2018

Date Posted	Taxonomy	Title
Guides Added		
11-20-17	TE 6.2.2	Air Sealed, Insulated Basements
12-12-17	LA 2.1	Refrigerators
12-13-17	LA 2.2	Dishwashers
12-14-17	LA 2.3	Clothes Washers
12-15-17	LA 2.4	Condensing Clothes Dryers
12-21-17	TE 6.7	Ducts in Interstitial Floor Framing
1-30-18	DS 1.2.2	Corrosion-Proof Rodent/Bird Vent Screens
2-2-18	--	Pre-Retrofit Home Performance Assessment
2-20-18		Pre-Retrofit Site Assessment of Ventilation Systems
2-19-18	TE 5.4	Enclosure Leakage Test
2-22-18	TE.4.4.5	Stucco Over Rigid Foam Insulation
4-23-18	HVAC 2.4.4	Steam System Balancing for Multifamily Existing Buildings
3-6-18	HVAC 6.2	Whole House Ventilation Strategies for Existing Homes
3-13-18	TE.7.2.4.1	Exterior Edge Insulation for Existing Foundation Slabs
3-19-18	WM 4.6	Condensing HVAC has Corrosion-Resistant Condensate Drain Pan
5-29-18	HVAC 2.5.5	Pressure Balancing Supply and Return Ducts in Existing Homes
5-29-18	HVAC 1.5.1	Existing HVAC System Upgrade or Expansion – full guide
6-12-18	DS.1.4.5	Mechanical Ventilation for Attached Garage
6-4-18	DS 1.4.9	Air Leakage Test Garage to House
6-12-18	WH 2.1	Tankless Water Heaters
6-18-18	TE 7.2.2.6	Batt Insulation for Existing Exterior Walls
6-18-18	TE.6.8	Sealing Duct Boots to Floor or Drywall
6-13-18	WM.3.6.1	Water Managed Existing Skylights
9-13-18	DS 5.4	Conditioned or Unconditioned Attic
Retrofit Tab Added		
10-4-17	HVAC 2.1.4	Compact Air Distribution
10-5-17	HVAC.6.3.1	Thermostat Control
11-21-17	TE 6.2.2	Air Sealed, Insulated Basements

Date Posted	Taxonomy	Title
11-20-17	TE 6.2.1	Unvented, Insulated Crawl Spaces
11-13-17	LA 1.1	High Efficacy Lighting
12-4-17	TE 6.4	Ducts in Raised Ceiling Sections
12-4-17	TE 6.3	Ducts in Dropped Ceilings
12-12-17	DS 1.4.4	Air Sealing Attached Garage
12-12-17	HVAC 4.1	High-MERV Filter
12-12-17	HVAC 4.2	Proper Installation of Furnace and Air Handler Filters
12-12-17	LA 2.1	Refrigerators
12-13-17	LA 2.2	Dishwashers
12-14-17	LA 2.3	Clothes Washers -
12-15-17	LA 2.4	Condensing Clothes Dryers
12-18-17	TE.5.3.1	Air Sealing Doors Adjacent to Unconditioned Space
12-18-17	TE.5.1.2	Air Sealing Plumbing and Piping
12-18-17	TE.5.1.3	Air Sealing Electrical Wiring
12-21-17	TE 6.7	Ducts in Interstitial Floor Framing
12-20-17	WM 4.2	Cement Board Installed Behind Tile and Panel Tub and Shower Enclosures
12-20-17	WM 4.5	Building Materials with High Moisture Content Not Enclosed
12-20-17	WM 4.1	Carpet Not Installed in Wet Areas
12-20-17	Wm 1.9	Drain or Sump Pump Installed in Basements or Crawlspace
12-20-17	Wm 1.8	Footing Drain Pipe
1-15-18	DS 1.1.2	Radon Fan
1-19-18	DS 1.1.1	Vertical Radon Vent Pipe
1-30-18	DS 1.2.2	Corrosion-Proof Rodent/Bird Vent Screens
1-30-18	DS 1.2.1	Reduce Pest Intrusion
2-13-18	TE 4.1	Attic Eave Minimum Insulation
2-13-18	TE.5.2.2	Air Seal Top Plates or Blocking at Top of Walls Adjoining Unconditioned Spaces
2-13-18	WM 3.1	Step and Kick-Out Flashing at Roof/Wall Intersections
2-19-18	TE 5.4	Enclosure Leakage Test
2-22-18	TE.4.4.5	Stucco Over Rigid Foam Insulation
3-19-18	WM 4.6	Condensing HVAC has Corrosion-Resistant Condensate Drain Pan
3-13-18	TE 5.1.1	Air Sealing Duct and Flue Shafts
3-13-18	TE 5.1.4	Air Sealing Bathroom and Kitchen Exhaust Fans
3-13-18	TE 5.1.6	Air Sealing Light Tubes
3-13-18	TE 5.3.2	Air Sealing Attic Access Panels/Doors/Stairs
3-14-18	TE 5.3.3	Air Sealing Whole-House Fans
3-14-18	HVAC 7.5	Proper Clothes Dryer Venting
4-6-18	TE.6.5	Ducts Buried in Attic Insulation
4-6-18	TE.6.6	Ducts Buried in Attic Insulation and Encapsulated
4-6-18	HVAC 2.2.5	Ducts Encapsulated
6-12-18	DS.1.4.5	Mechanical Ventilation for Attached Garage
6-4-18	DS 1.4.9	Air Leakage Test Garage to House

Date Posted	Taxonomy	Title
4-30-18	MEL 2.1	Smart Power Strips
6-12-18	WH 2.1	Tankless Water Heaters
6-14-18	HVAC 8.1	Whole-House Dehumidification
6-6-18	TE.5.2.3	Air Sealing Drywall to Top Plate
6-6-18	HVAC.2.3.1	Total Duct Leakage
6-6-18	HVAC.2.3.2	Duct Leakage to Outdoors
6-6-18	TE.6.1	Unvented Attic Insulation
6-6-18	WM.4.3	Class I Vapor Retarders Not Installed in Above-Grade Walls in Warm-Humid Climate
6-18-18	TE.6.8	Sealing Duct Boots to Floor or Drywall
6-27-18	HVAC 2.4.5	Multifamily Boiler Controls
6-29-18	LA 3.1	Variable Speed Pool Pumps
6-29-18	WH 5.1	Anti-freeze
6-29-18	WH 5.3	Drain-Back
6-29-18	WH 5.4	Integrated Collector/Storage
6-29-18	WH 5.5	Solar Hot Water Heater Thermosiphon
9-13-18	DS 5.4	Conditioned or Unconditioned Attic
Guides Updated		
10-6-17	HVAC 6.3.1	Thermostat Controls
11-9-17	HVAC 2.1.4	Compact Air Distribution
11-9-17	HVAC 2.3.2	Duct Leakage to Outdoors
11-9-17	TE 6.5	Ducts Buried in Attic Insulation
11-9-17	TE 6.6	Ducts Buried in Attic Insulation and Encapsulated
11-9-17	HVAC 2.3.1	Total Duct Leakage
11-9-17	HVAC 2.2.5	Encapsulated Ducts
11-15-17	DS.1.4.4	Air Sealing Attached Garage
11-20-17	TE 6.2.1	Unvented, Insulated Crawl Spaces
11-13-17	LA 1.1	High Efficacy Lighting
11-28-17	TE 6.4	Ducts in Raised Ceiling Sections
11-30-17	TE 6.3	Ducts in Dropped Ceilings
12-5-17	TE.5.3.1	Air Sealing Doors Adjacent to Unconditioned Space
12-11-17	HVAC 4.1	High-MERV Filter
12-11-17	HVAC 4.2	Proper Installation of Furnace and Air Handler Filters
12-12-17	LA 2.1	Refrigerators
12-13-17	LA 2.2	Dishwashers
12-14-17	LA 2.3	Clothes Washers -
12-18-17	TE.5.1.2	Air Sealing Plumbing and Piping
12-18-17	TE.5.1.3	Air Sealing Electrical Wiring
12-20-17	WM 4.2	Cement Board Installed Behind Tile and Panel Tub and Shower Enclosures
12-20-17	WM 4.5	Building Materials with High Moisture Content Not Enclosed

Date Posted	Taxonomy	Title
12-20-17	WM 4.1	Carpet Not Installed in Wet Areas
12-20-17	Wm 1.9	Drain or Sump Pump Installed in Basements or Crawlspace
12-20-17	Wm 1.8	Footing Drain Pipe
12-21-17	DS 1.1.2	Radon Fan
12-21-17	DS 1.1.1	Vertical Radon Vent Pipe
1-21-18	DS 1.2.1	Reduce Pest Intrusion
1-30-18	DS 1.2.2	Corrosion-Proof Rodent/Bird Vent Screens
3-13-18	TE 5.1.6	Air Sealing Light Tubes
3-10-18	HVAC 7.5	Proper Clothes Dryer Venting
3-13-18	HVAC 2.5.1	Ducted Return
3-13-18	HVAC 2.5.2	Transfer Grilles
3-13-18	HVAC 2.5.3	Jump Ducts
3-13-18	HVAC 2.1.4	Compact Air Distribution
4-6-18	TE.6.5	Ducts Buried in Attic Insulation
4-6-18	TE.6.6	Ducts Buried in Attic Insulation and Encapsulated
4-6-18	HVAC 2.2.5	Ducts Encapsulated
6-14-18	HVAC 8.1	Whole-House Dehumidification
6-6-18	TE.5.2.3	Air Sealing Drywall to Top Plate
6-6-18	TE.6.1	Unvented Attic Insulation
6-6-18	WM.4.3	Class I Vapor Retarders Not Installed in Above-Grade Walls in Warm-Humid Climate
6-27-18	HVAC 2.4.5	Multifamily Boiler Controls
6-29-18	LA 3.1	Variable Speed Pool Pumps
6-29-18	WH 5.1	Anti-freeze
6-29-18	WH 5.3	Drain-Back
6-29-18	WH 5.4	Integrated Collector/Storage
6-29-18	WH 5.5	Solar Hot Water Heater Thermosiphon
Code Briefs Added		
3 New Code Compliance Briefs Added	Aerosol Sealing Building Enclosures in Single and Multifamily Dwellings Moisture-Durable High-R Wall Options Attic Retrofit Nail-Base Insulated Panels	
5 Code Compliance Briefs Significantly Revised	Heat Pump Water Heater Buried ducts within ceiling insulation in vented attics Controlling Moisture in unvented attics Installation of Photovoltaic Systems Design and Installation of Stationary Storage	
3 Code Compliance Briefs Minor Revisions	Sealing HVAC Supply and Return Register Boots Bathroom Fan Ratings Double Wall Framing	



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