



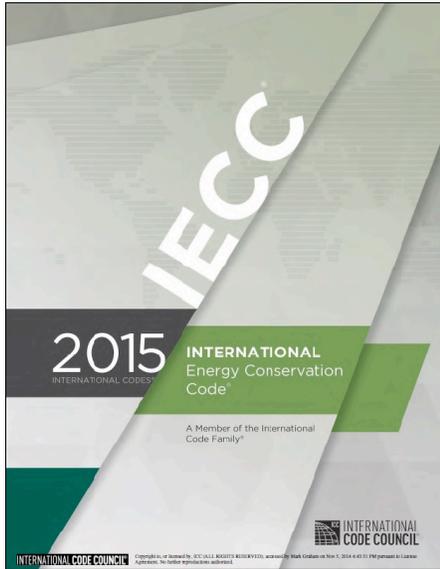
**2017 CRCA Tradeshow & Seminars**  
January 19-20, 2017

## **IECC 2018 and technical issue update**

presented by

**Mark S. Graham**

Vice President, Technical Services  
National Roofing Contractors Association



**Updating IECC...**

## **ICC's code development cycle**

2018 I-codes

- 2015 Group A (IBC-FS, IBC-G, IEBC, IPC, IMC):
  - Memphis, TN -- April 2015
  - Long Beach, CA -- September 2015
  - Online vote
- 2016 Group B (IECC, IBC-S, IRC, IFC):
  - Louisville, KY -- April 2016
  - Kansas City, MO -- October 2016
  - Online vote
- Publication estimated late-Spring 2017
- Adoptions effective beginning in 2018

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## **IECC 2018 (tentative)**

### Roofing-related changes:

- Some editorial/format changes
- No changes in R-values requirements
- No changes in roof reflectivity requirements
- No changes in air barrier requirements

### ASHRAE 90.1-13 to ASHRAE 90.1-16:

- Single-ply membrane roof systems will be a deemed-to-comply air retarder

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**ASCE 7-16 adoption into IBC 2018**

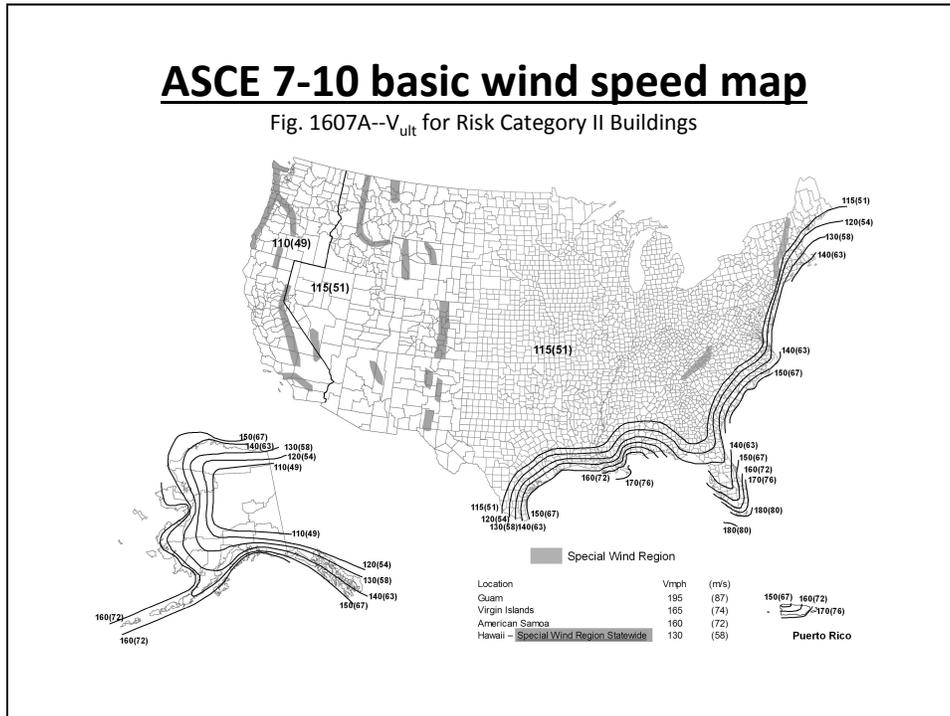
**ASCE 7-16 (public review draft)**

- Revised basic wind speed map
- Changes (and new) pressure coefficients
- Revised perimeter and corner zones

*Expect higher field, perimeter and corner uplift pressures*

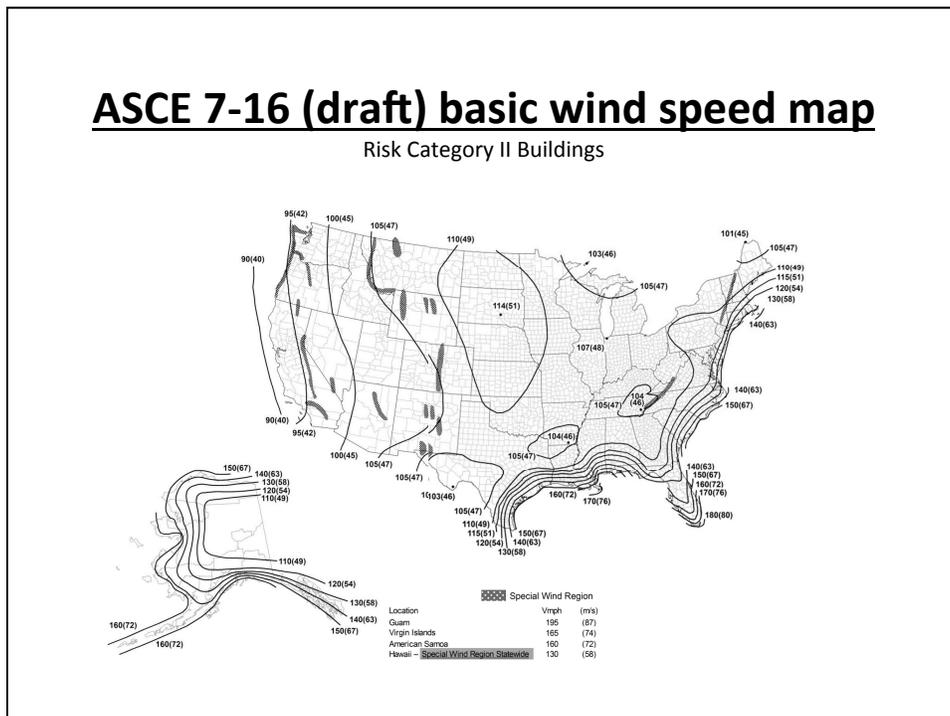
## ASCE 7-10 basic wind speed map

Fig. 1607A-- $V_{ult}$  for Risk Category II Buildings



## ASCE 7-16 (draft) basic wind speed map

Risk Category II Buildings



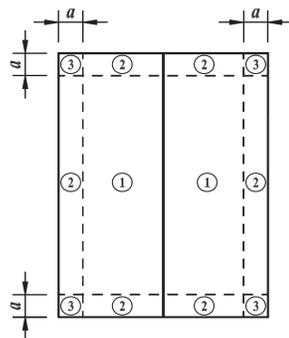
### GC<sub>p</sub> pressure coefficients

$h \leq 60$  ft., gable roofs  $\leq 7$  degrees

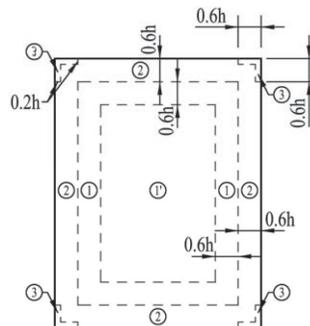
Zone	ASCE 7-10	ASCE 7-16 (draft)
1 (field)	-1.0	-1.7
1'	--	-0.9
2 (perimeter)	-1.8	-2.3
3 (corners)	-2.8	-3.2

### Zones

$h \leq 60$  ft., gable roofs  $\leq 7$  degrees



**ASCE 7-10**



**ASCE 7-16 (draft)**

*Proper wind design (which is oftentimes avoided) is getting even more complicated.*

**Polyisocyanurate insulation**

Knit line, thickness and dimensional stability concerns

**Knit lines**



**Knit lines -- continued**

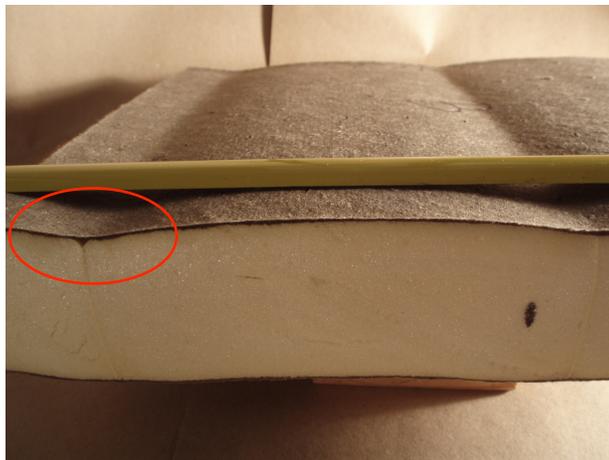


### Thickness and knit lines



As delivered by manufacturer.

### Knit lines -- continued



After conditioning:  $158 \pm 4$  F and  $97 \pm 3\%$  RH for 7 days

### **Knit lines -- continued**

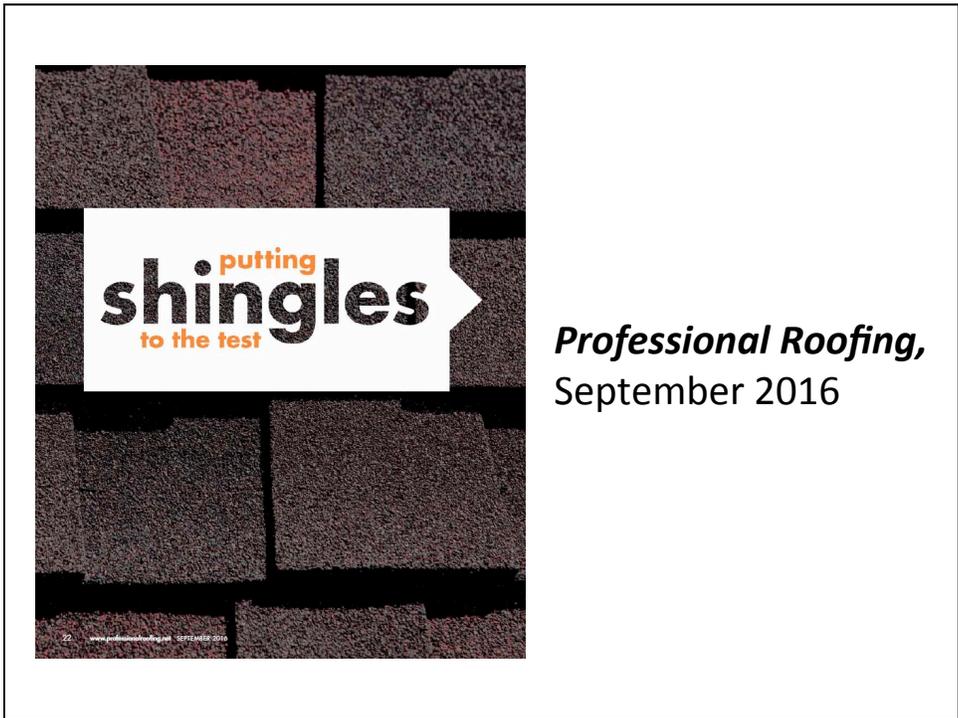


Knit line and V-groove close-up (after conditioning)

### **NRCA's interim recommendations**

Polyiso. knit line, thickness and dimensional stability concerns

- Measure polyiso. thickness upon delivery
- Look for knit lines and board unevenness
- Contact manufacturer and NRCA if you see any issues



Test results for three-tab asphalt strip shingles						
Sample	Tear strength (g)	Weight of displaced granules (g)	Fastener pull-through resistance (lbf)		Pliability	
			73 F	32 F	Top	Bottom
T-1	797	0.71	24.6	30.2	Pass	Pass
T-2	855	0.40	28.1	31.3	Pass	Pass
T-3	1,654	0.31	33.4	44.2	Pass	Pass
T-4	958	0.63	35.5	40.4	Pass	Pass
T-5	1,755	0.08	37.0	51.4	Pass	Pass
T-6	1,682	0.25	36.7	44.4	Pass	Pass
T-7	1,488	0.29	30.0	41.3	Pass	Pass
T-8	1,502	0.73	30.1	41.1	Pass	Pass
ASTM D3462 requirement	1,700 (minimum)	1.0 (maximum)	20 (minimum)	23 (minimum)	4 of 5 pass (minimum)	

Test results for architectural laminated shingles					
Sample	Tear strength (g)	Fastener pull-through resistance (lbf)		Pliability	
		73 F	32 F	Top	Bottom
L-1	1,208	53.7	79.3	Pass	Pass
L-2	1,333	57.0	64.4	Pass	Pass
L-3	1,235	58.7	67.8	Pass	Pass
L-4	1,549	52.7	62.8	Pass	Pass
L-5	1,299	53.7	64.6	Pass	Pass
L-6	1,210	51.5	68.0	Pass	Pass
L-7	1,678	58.7	69.6	Pass	Pass
L-8	1,667	58.1	71.8	Pass	Pass
L-9	1,797	63.2	71.5	Pass	Pass
ASTM D3462 requirement	1,700 (minimum)	30 (minimum)	40 (minimum)	4 of 5 pass (minimum)	

**WHO COMPLIED?**

Only two of the 17 products evaluated in NRCA's most recent round of testing complied with the physical property requirements of ASTM D3462, "Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules."

Four other asphalt shingle products had tear strength values slightly below ASTM D3462's 1700-g minimum requirement. Based upon the known variability in the tear strength test method's results, these four products can be considered as complying with ASTM D3462's tear strength minimum requirement and, therefore, as complying with ASTM D3462's physical property requirements evaluated in NRCA's test program.

The six products (listed alphabetically) are:

- GAF Royal Sovereign®
- Malarkey Roofing Products Dura-Seal™ AR
- Owens Corning Classic® (Midwest)
- Owens Corning Oakridge® (Midwest)
- Pabco Roofing Products Premier®
- Tamko Building Products Inc. Heritage®

When considering the results of NRCA's asphalt shingle testing, understand the values and conclusions from the testing only apply to the specific product sample specimens evaluated and the specific values only may apply at the time of testing. These results may not represent all the manufacturers' products. Asphalt shingle products from different production lots and products of the same brand names manufactured in different manufacturing plants may have differing values and compliances with ASTM D3462.

Users of asphalt shingles should consult with manufacturers and suppliers regarding specific products' compliance with ASTM D3462.

**Manufacturers' installation instructions**

**International Building Code, 2015 Edition**

Section 1506-Materials

**SECTION 1506  
MATERIALS**

**1506.1 Scope.** The requirements set forth in this section shall apply to the application of roof-covering materials specified herein. Roof coverings shall be applied in accordance with this chapter and the manufacturer's installation instructions. Installation of roof coverings shall comply with the applicable provisions of Section 1507.



## A quest for clarity

A new NRCA task force is reviewing manufacturers' installation instructions  
by Mark S. Graham

**Instructions for some products are not written at a level appropriate for intended users**

As roofing products and roof systems become increasingly proprietary and complex, proper installation instructions are an important consideration. Roofing product and roof system manufacturers generally are responsible for providing users with instructions explaining how to properly install their products.

**Instructional variations**

Although some manufacturers make their product-specific installation instructions readily accessible to users, instructions for some products are difficult to locate and not written at a level appropriate for the intended users—field applicators.

Most asphalt shingle manufacturers, for example, imprint product-specific installation instructions on shingle bundle wrappers. Some manufacturers print instructions in multiple languages to recognize some installers may not speak or read English.

Installation instructions for other products and systems, such as single-ply membranes, generally are not included with the product or product packaging. For these products, users need to rely on manufacturers' printed literature or websites for system-specific installation instructions. Some website-based application instructions are difficult or nearly impossible to locate on manufacturers' websites. In addition, some online forums are not compatible with mobile devices, which a field applicator likely would use for access.

Also, the intended users and amount of information included in manufacturers' installation instructions vary significantly.

I recently downloaded installation instructions from several manufacturers for a conventional built-up membrane roof system specification. One manufacturer has a single-page instruction sheet indicating the intended components, application rates, cautions and limitations, as well as a graphic illustration of ply-lay terms.

Another manufacturer's instructions for a similar built-up membrane specification consist of a 37-page, text-only document that includes minimal installation-specific information but detailed structural roof deck, wind uplift resistance and fire-rating design information. Such an installation instruction document is of little use to field applicators and appears to be an attempt to shift some design responsibility to roofing contractors and field applicators.

**Code requirements**

Most building codes include specific provisions requiring roofing products and roof systems to be installed according to manufacturers' installation instructions.

For example, in Chapter 15—Roof Assemblies and Roofing Structures of the International Building Code, 2015 Edition (IBC), Section 1506—Materials includes the following statement: "... Roof coverings shall be applied in accordance with the chapter and the manufacturer's installation instructions ..."

Section 1507—Requirements for Roof Coverings includes similar requirements.

Chapter 9—Roof Assemblies of the International Residential Code, 2015 Edition (IRC) includes similar provisions in Section R904—Materials and Section R905—Requirements for Roof Coverings.

Previous editions of IBC and IRC contained similar provisions.

Manufacturers' installation instructions specifically are required by building codes, which underscores the importance of the instructions being easily accessible, relevant and easily understandable to roofing contractors' field personnel.

**NRCA review task force**

This year, NRCA established a Manufacturer Application Instruction Review Task Force to review manufacturers' installation instructions and provide manufacturers with input and suggestions for improvement. A specific objective of the task force is to make manufacturers' installation instructions more useful to field personnel.

It has been noted the concept of an NRCA installation instruction review task force is not new. NRCA had a similar task force during the late 1970s and early 1980s, and it was primarily focused on achieving consistency in manufacturers' application instructions for cold air and asphalt-based built-up systems. That effort eventually evolved into the development (with several manufacturers and, later, the Asphalt Roofing Manufacturers Association) of NRCA's application quality control document.

During NRCA's Fall Governance Meeting, which will be held Nov. 14-17 in Chicago, the task force will meet with several manufacturers to discuss and, NRCA hopes, improve installation instructions. Although this meeting is an initial step, the effort is intended to be an ongoing, long-term undertaking by NRCA addressing all common roofing products and roof systems. We look forward to working with manufacturers in this effort. ■■■■

MARK S. GRAHAM is NRCA's vice president of technical services.

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# Professional Roofing, October 2016

## NRCA Manufacturers Spec Review Task Force



**LOW SLOPE ROOFING SYSTEM SPECIFICATION**  
**FOUR-PLY CONVENTIONAL S24 RCap™ Plus (Base, Ply & Cap)**

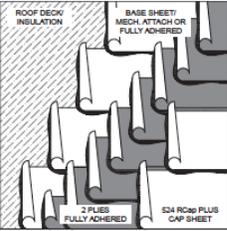
System Configuration	
R4-AKD (S15, 2,500 Type IV, S24 RCap Plus)	
R4-AD (S15, 2,500 Type IV, S24 RCap Plus)	
R4-BKD (S01, 2,500 Type IV, S24 RCap Plus)	
R4-BD (S01, 2,500 Type IV, S24 RCap Plus)	
<b>Materials per 100 sq.ft. of Roof Area:</b>	
<b>Base Sheet:</b> (choose one of the following)	25.0 lbs.
One (1) ply of S15	-OR-
One (1) ply of S01	30.6 lbs.
<b>Ply Sheet Options:</b> (choose one of the following)	
Two (2) plies of S00	7.2 lbs. per ply/14.4 lbs.
-OR-	
Two (2) plies of S06	9.2 lbs. per ply/18.4 lbs.
<b>Cap Sheet:</b>	77 lbs.
One (1) ply of S24 RCap Plus	
<b>Adhesive for Roofing Piles:</b>	ASTM D 313 Type III, or IV 25.0 lbs. per ply/50 sq.
<b>Insulation:</b>	Specified
<b>Weight per Square: (-Insulation)</b>	<b>192.4 lbs. to 199.4 lbs.</b>

**Roof deck and general information:** Roof deck must be clean, dry, smooth, and structurally sound to receive the new roofing system. Drainage must be incorporated in the design to prevent ponding water. For more information, please refer to the current Malarkey Roofing Products (Malarkey) Specification Manual: General requirements and Commercial Installation Instructions.

**Special requirements:** This roofing system can be installed as illustrated on slopes up to 1" in 12". Slopes that are greater than 1" in 12" are to be installed in a strapped fashion using ASTM D 313 Type IV asphalt, and second membrane/insulation strips to facilitate back nailing of the roofing system. For more information, please refer to the current Malarkey Specification Manual: General Requirements/Strapped Installations.

**Application: Hot Mopped -** Install all inter-piles so that the water runs over (shingle fashion) or parallel to (strapped), but never against the slope in a uniform mopping of hot asphalt at the nominal rate of 25 lbs. per ply, per square. Broom all piles to ensure contact between the asphalt and the bottom surface of the roofing felt. Cap sheet will be installed so that the water runs over (shingle fashion) or parallel to (strapped), but never against the back. Cut cap to 1/3 of the total length (11') and allow to mix prior to installation. Position cap membrane for installation and embed into a uniform mopping of asphalt applied at the rate of 25 lbs. per square. Ensure contact between the asphalt and the bottom of the sheet. Stagger all end laps a minimum of 12".

Prior to the application of interply sheets, all valleys and waterways shall receive an extra layer of Malarkey ply sheet (or comparable product) which shall be at least a full width sheet and shall extend at least 12 inches (30 cm) up to the inclines out of the valleys.



Four-ply, hot mopped, built-up roofing system with fiberglass baseply sheets, and a highly-reflective, factory coated cap sheet installed over an approved roof deck.

**Flashing:** Install all primed flashings (lead, metal, scuppers, etc.) in a layer of plastic cement on top of the interply and stripped off with Two (2) of reinforcement, flashing each ply 3" from the edge of the flange and corresponding ply. Install cap sheet after all flashings have been stripped in.

**Base Flashing:** Base flashing (stripping ply) is to be installed over the interply before the installation of the field surfacing. Stripping ply(s) are to extend 3" beyond the toe of the cant and up the vertical surface of all flat to vertical transitions (curbs, walls, roof top equipment, etc.). After the installation of the field surfacing, install the specified cap sheet base flashing extending 6" beyond the toe of the cant and up the vertical surface. Terminate the base flashing as shown in the commercial roofing details of the current Malarkey Specification Manual.

**Fire Ratings:** The specification carries a Class 'A' rating up to 1/2" in 12" over the following decks: Wood, Metal, Concrete, Lightweight Concrete, Structural Wood Fiber, and Gypsum. For other ratings, contact the Malarkey Technical Services Department.

**Touch Up:** Install S24 RCap Touch Up to dress out roof for a more pleasing appearance. Staining water scallions must receive additional coatings of S24 RCap Touch Up.

REV 7/11
4-24 Specification Manual
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**LOW SLOPE ROOFING SYSTEM SPECIFICATION**  
**FOUR-PLY CONVENTIONAL S24 RCap™ Plus (Base, Ply & Cap)**

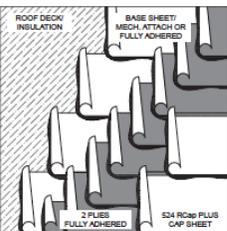
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<b>FIRESTONE BUILT-UP ROOFING SYSTEMS</b> <b>APPLICATION GUIDE</b> <b>3/14/2011</b>	
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Firestone BUR Roof System Application Guide Interim Updates at <a href="http://www.firestoneipco.com">www.firestoneipco.com</a> 3/14/2011	
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## **NRCA's interim recommendations**

Manufacturers installation instructions

- Access and file manufacturers' application instructions
- Review instructions
- Exclude not applicable information
- Should be the basis for QA/QC
- Contact NRCA with any questions

## The NRCA Roofing Manual - 2017



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**Questions... and other topics**

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