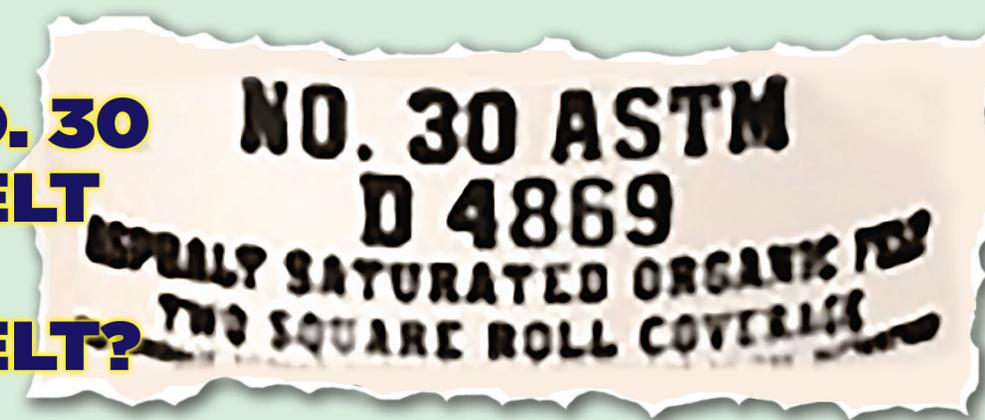


WHEN IS NO. 30 ASPHALT FELT NOT NO. 30 ASPHALT FELT?

By Jeffrey Levine



INTRODUCTION

For quite some time, it has been fairly widely known that 15-lb. and 30-lb. asphalt-saturated organic felts do not really weigh 15 and 30 pounds per square,¹ respectively. They weigh somewhat less. In fact, to avoid confusion, the nomenclature of the product changed to “No. 15 asphalt felt” and “No. 30 asphalt felt” sometime in the late 1970s or early 1980s. The conundrum today is: When is No. 30 asphalt felt not No. 30 asphalt felt? This article will explore the history of the weight classification and nomenclature of asphalt-saturated organic felt, examine the labels being placed on felt manufacturers’ products, explain why there is confusion in today’s roofing felt marketplace, and offer suggestions for specifying new felt underlayments. This is all to help ensure that the No. 30 felt you specify and that your clients expect to be installed on their roof decks really does weigh 26 pounds per square. Confused? Read on.

BACKGROUND

Asphalt-saturated organic felt has long been used as an underlayment in steep-slope roof systems. Beginning in the nineteenth century, the fibers used in manufacturing felts were derived from recycled wool and cotton rags that were then saturated with asphalt. By the 1950s and 1960s, as the supply of these felting² materials became more difficult for manufacturers to procure, the use of wood and vegetable fibers became common.³ Today, post-consumer recycled materials such as corrugated cardboard, wood fiber waste from lumber mills, and mixed paper products (including newsprint) are the fibers used to create the dry felts that are then saturated with asphaltic materials to produce asphalt-saturated organic felt roof underlayments.

Underlayments are installed on the roof deck prior to the roof covering. They are an integral part of steep-slope roof systems and perform several important functions. Among these are:

- Providing temporary protection from the weather while the roof covering is being installed
- Easing small irregularities in the roof deck, such as lippage between roof boards or plywood panel edges, thereby allowing the roof covering to lay more evenly
- Serving as a backup water-shedding layer in the event of damage to the roof covering or should wind-blown rain penetrate the roof covering
- Contributing to the fire resistance classification of the roof system. Most steep-slope roof systems—whether asphalt shingles, slate shingles, clay tile, or metal shingles/panels—include underlayments as part of their Class A, Class B, or Class C fire-rating classification

There are at least two other reasons underlayments are used in steep-slope roofing systems:

Figure 1 – Johns-Manville’s asphalt felt offerings, circa 1930. The “15-lb. weight” felt weighed approximately 60 lbs. per 432-sq.-ft. roll, or 13.9 lbs. per square, almost precisely the 14 lbs. per square required in the 1925 D226 standard. The 30-lb. weight felt weighed approximately 60 lbs. per 216-sq.-ft. roll, or 27.8 lbs. per square, slightly below the later 1938 D226 standard of 29 lbs. per square.

1) They are required by building codes, and have been for some time, including all editions of the International Building Code (IBC) and International Residential Code (IRC); and 2) they are generally required to obtain manufacturers’ warranties.

NOMENCLATURE

Beginning in the 1920s and 1930s, asphalt-saturated organic felt underlayments were classified under ASTM D226, *Tentative Specifications for Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-up Roofs*,⁴ as “15-lb. Type” and “30-lb. Type.” Johns-Manville, for example, advertised “15-lb. weight” and “30-lb. weight” asphalt felt in its January 1, 1930 *Distributors Price List* (Figure 1).⁵

Smooth and Slatekote Roll Roofings

Description	Weights, Sizes and Colors	List Prices per Square F.O.B. Mansfield, N. J., Waukegan, Ill. New Orleans, La.
SLATEKOTE DIAMOND POINT ROOFING—Provides the Diamond Point Pattern so popular for re-roofing. Red, Green and Blue-Black furnished in rolls 36" wide. Variegated 24" wide. Each roll contains sufficient material for covering 100 sq. ft. of roof area. Packed without nails or cement. Weight, approx. 100 lbs. per roll.	Red, Green, Blue-Black..... per sq. Variegated.....	\$2.41 2.39
	<i>Made at Waukegan only</i>	
SPLIT SHEET SLATEKOTE ROOFING—Used as a cap sheet for built-up roofing where color is desired. When used alone provides a non-built-up roof of long life at low cost. Rolls are 36" wide with 10" selvage. Covers 51 sq. ft. of roof area per roll. Weight, approx. 50 lbs. Packed without nails and cement.	Red, Green, Blue-Black..... per roll	\$2.05
<i>Not available from New Orleans</i>		
SLATEKOTE STARTING STRIPS—Standard 35-lb. weight Slatekote Roofing cut in strips for starting shingles, lining valleys and covering ribs and ridges. Packed in rolls 36" long without selvage.	9" wide—Red, Green, Blue-Black—21 lbs. per roll	8.50
	12" wide—Red, Green, Blue-Black—28 lbs. per roll	11.00
	24" wide—Red, Green, Blue-Black—56 lbs. per roll	1.34
	24" wide—Variegated—56 lbs. per roll	1.50
<i>Variegated not available from New Orleans</i>		
ASPHALT FELT—Used as a liner under Asbestos shingles, Slate, or Tile Roofs, as a sheathing and in built-up roofing. Made in three weights.	30-lb. weight—216 sq. ft. per roll, approx. 60 lbs. per roll, 36" wide..... per ton 15-lb. weight—432 sq. ft. per roll, approx. 60 lbs. per roll, 36" wide..... per ton 12-lb. weight—432 sq. ft. per roll, approx. 48 lbs. per roll, 36" wide..... per ton	C. L. \$50.60 50.60 50.60 L. C. L. \$53.10 53.10 53.10
<i>Not available at New Orleans</i>		

Attractive Discounts for Cash and Shipments

Transite Asbestos Wood

Made of Portland cement and asbestos fibers combined under heavy pressure. Suitable for exterior or interior use. Makes an unexcelled slitting closely resembling stone, especially when used in half-tinted redless construction. Because of its durability and fireproof qualities it is especially suited for the construction of gutters and window sills. Large quantities are also used for interior walls instead of plaster. In view of its many uses, you will find it advantageous to include Transite in your next shipment.

Standard size sheets 36" x 48"; 42" x 48"; 42" x 96"
24" x 96" not furnished in 1/2 thickness
36" x 96" sheets furnished at Nashville factory only

List Prices per Square Foot			
Size	Price	Size	Price
1/2" Thick.....	20.00	3/4" Thick.....	25.00
1" Thick.....	30.00	1 1/4" Thick.....	35.00
1 1/2" Thick.....	40.00	2" Thick.....	50.00

Prices of Thickness up to 2" on application

NOTE—Standard Sheet in 1/2" thickness furnished with a true surface on one side only, or sanded both sides. It cannot be made pressed smooth on both sides.

Prices subject to change without notice

<p>ASPHALT FELT—Used as a liner under Asbestos shingles, Slate, or Tile Roofs, as a sheathing and in built-up roofing. Made in three weights.</p>	<p>30-lb. weight—216 sq. ft. per roll, approx. 60 lbs. per roll, 36" wide..... per ton 15-lb. weight—432 sq. ft. per roll, approx. 60 lbs. per roll, 36" wide..... per ton 12-lb. weight—432 sq. ft. per roll, approx. 48 lbs. per roll, 36" wide..... per ton</p>	<p>C. L. \$50.60 50.60 50.60 L. C. L. \$53.10 53.10 53.10</p>
<p><i>*Not available at New Orleans</i></p>		

ASTM D226 - SUMMARY OF SELECT INFORMATION CONTAINED WITHIN REPRESENTATIVE STANDARDS, 1925-2017

Date	Type/Classification Names ^a	Width of Roll	Marking	Area of Roll, Min., Sq. Ft.			Min. Weight of Saturated Felt per 100 Sq. Ft., Lbs.			Min. Weight of Saturant per 100 Sq. Ft., Lbs.			Min. Weight of Desaturated Felt per 100 Sq. Ft., Lbs.			
				Type I	Type II	Type III	Type I	Type II	Type III	Type I	Type II	Type III	Type I	Type II	Type III	
1925	none given	36" or 32" +/- 1/4"	Each roll shall be plainly marked with the manufacturer's name and brand or as agreed upon by the purchaser and the seller, and shall bear a notation showing the type of saturant.				14 ^b				1.4 x wt. of dry felt [7.875]			5.625 +/- 10%		
1938	15-lb. Type, 30-lb. Type	ditto	ditto	432	216		14	29			1.4 x wt. of dry felt [7.3]	1.5 x wt. of dry felt [15.0]		5.2	10.0	
1947	15-lb type, 30-lb type	ditto	ditto	432	216		13	26			7.3 (1.4 x wt. of dry felt)	15.0 (1.5 x wt. of dry felt)		5.2	10.0	
1960	ditto	ditto	ditto		216		13	26			7.3 (1.4 x wt. of dry felt)	15.0 (1.5 x wt. of dry felt)		5.2	10.0	
1977	Type I-Nominal 15 lb/100 ft ² Type II-Nominal 30 lb/100 ft ² Type III-Nominal 20 lb/100 ft ²	36" +/- 0.7% [+/- .252"]	Each roll shall be plainly marked with the manufacturer's name and brand or as agreed upon by the purchaser and the seller, and shall bear a notation showing the type of saturant if not evident in the label name of the product.	216 or 432	216	216 or 324	13	26	17		7.3 (1.4 x wt. of dry felt)	15.0 (1.5 x wt. of dry felt)	9.6 (1.4 x wt. of dry felt)	5.2	10.0	6.8
1982	Type I-Commonly called No. 15 asphalt felt Type II-Commonly called No. 30 asphalt felt Type III-Commonly called No. 20 asphalt felt	36" +/- 0.7% [+/- .252"] or as agreed upon by purchaser and seller	Unless otherwise specified, each package shall be plainly marked with the manufacturer's name, brand, and type of bitumen if not evident in the label name of the product.	216 or 432	216	216 or 432	13	26	17		7.3 (1.4 x wt. of dry felt)	15.0 (1.5 x wt. of dry felt)	9.6 (1.4 x wt. of dry felt)	5.2	10.0	6.8
1989	Type I-Commonly called No. 15 asphalt felt Type II-Commonly called No. 30 asphalt felt	ditto	ditto	216 or 432	216		11.5	26			6.2 (1.2 x wt. of dry felt with a saturation efficiency of not less than 70%)	15.0 (1.5 x wt. of dry felt)		5.2	10.0	
1997	ditto	ditto	Unless otherwise agreed upon between the supplier and purchaser, each product package shall be plainly marked with the supplier's name, the product brand, the ASTM designation, and type of bitumen if not evident in the label name of the product.	216 or 432	216		11.5	26			6.2 (1.2 x wt. of dry felt with a saturation efficiency of not less than 70%)	15.0 (1.5 x wt. of dry felt)		5.2	10.0	
2017	ditto	ditto	ditto	216 or 432	216		11.5	26			6.2 (1.2 x wt. of dry felt with a saturation efficiency of not less than 70%)	15.0 (1.5 x wt. of dry felt)		5.2	10.0	

Footnotes: a) Heading with the Standard changed from "Type" to "Classification" sometime between 1960 and 1977. b) Not a minimum weight; rather an approximate weight, +/- 1 lb. Note data in block parenthesis [] are not part of the Standards; inserted by author for clarification/information.

Table 1 – ASTM D226 - summary of select information contained within representative standards, 1925-2017.

Later, in 1936, Johns-Manville marketed:

An asphalt-saturated rag felt used as a liner under [asphalt] shingles, slate or tile. . .36" wide. . . Furnished in four weights: 12, 14, 15, and 30 lbs. per sq. . . 15-lb. weight furnished in rolls containing 432 sq. feet, weighing approximately 65 lbs. 30-lb. weight furnished in rolls containing 216 sq. feet, weighing approximately 65 lbs.⁶

The 15-lb. and 30-lb. felts offered by Johns-Manville in 1936 thus weighed 15 lbs. and 30 lbs. per square respectively, slightly above the minimums that would be required by the future 1938 ASTM D226 standard of 14 lbs. and 29 lbs., respectively (see Table 1).

Starting in the mid- to late 1960s or early 1970s, the ASTM D226 nomenclature was changed to "Type I – Nominal 15 lb/100 ft²" and "Type II – Nominal 30 lb/100 ft²" to reflect the fact that the felts did not really weigh 15 pounds and 30 pounds per square, respectively (and, in fact, had not

from the very beginning of the standard in 1925; see Table 1). By 1982, seeking further correctness and explicitness, the nomenclature changed once again, eliminating the pound designation entirely in favor of "Type I – Commonly called No. 15 asphalt felt," and "Type II – Commonly called No. 30 asphalt felt."

What is remarkable about the ASTM D226 standard is how consistent the physical properties and material characteristics contained within the standard have remained over the years. For No. 30 asphalt felt, the roll width, area of the roll, minimum weight of saturated felt, minimum weight of saturant, and minimum weight of dry felt have remained unchanged since the 1940s (Table 1).⁷ No. 15 asphalt felt has been almost as consistent, with a change in the minimum weight of saturated felt from 13 pounds per square to 11.5 pounds per square, and a corresponding change in the minimum weight of saturant, taking place in the mid- to late 1980s.

In 2002, ASTM D4869, *Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope*

Roofing, was approved and the number of classifications for organic felt increased from two to four.⁸ ASTM D4869 uses the following four classifications: Type I – #8 Underlayment, Type II – #13 Underlayment (equivalent to No. 15 under D226), Type III – #20 Underlayment, and Type IV – #26 Underlayment (equivalent to No. 30 under D226; see Table 2).⁹

The IBC and many manufacturers still reference D226, even though D226 does not mention steep-slope roofing anywhere in the standard. Hopefully, this historical holdover will be phased out as a reference standard for asphalt-saturated organic felts used in steep-slope roofing, as the D4869 standard contains requirements for two important physical attributes that are not included in the D226 standard:

- 1) A liquid-water transmission test (pass/fail; must pass to be in compliance with the standard), and
- 2) Dimensional stability limits to address wrinkling concerns (maximum average percentage change in length from low humidity to high humidity, 2% for Type I and Type II

underlayment and 1.75% for Type III and Type IV underlayment)

In fact, Section 1.2 of the D4869 standard states, “The objective of this specification is to provide a finished product that will lie flat and resist wrinkling, puckering, and shrinking when left exposed to the sun, rain, frost, or dew for a period of two weeks after application.” The D226 standard does not contain such a statement. Rather, it is intended to address asphalt-saturated organic felts used with asphalts in the construction of built-up roofs and waterproofing systems.

PRODUCT LABELING

Section 11 of both the D226 and D4869 standards contains information on product packaging and marking. As shown in Table 2, the most current edition of the D226 standard states, “Each product package shall be plainly marked with the supplier’s name, the product brand, the ASTM designation, and type of bitumen if not evident in the label name of the product.” Similarly, the D4869 standard notes, “Each package shall be plainly marked with the manufacturer’s name, brand name, ASTM designation, and type of underlayment.” Unfortunately, neither standard states that the product name has to agree with the ASTM designation. This is where the confusion begins.

Several years ago, the author noticed that the No. 30 asphalt felt underlayment being installed on various projects felt thin when grasped between the thumb and forefinger. When questioned, the roofing mechanics on site invariably said it seemed thin to them too, but the label said “number 30” on it.¹⁰ As it turned out, both observations were accurate. Despite the number “30” being printed on the paper sleeve wrapped around each roll of felt, the net mass of the saturated

felt actually weighed 8.0 or 13.0 pounds per square, rather than the expected 26 pounds per square. How could this be?

A quick survey of the product data sheets of seven asphalt felt manufacturers/suppliers indicated that product labels are not always very clear (Table 3). An asphalt felt with the product name “#30 Saturated Felt,” “No. 30 ASTM 4869,” or “#30W,” but which complies with ASTM D4869, Type I or Type II, is going to weigh 8.0 or 13.0 pounds per square, not the purported or expected 26 pounds per square. Further scrutiny of Table 3 indicates that the labeling issue seems to be confined to asphalt felts classified under ASTM D4869 and felts that are not classified.

Seeking a rationale for the labeling practices, the author contacted the representatives of two manufacturers. One stated that

the use of the term “No. 30” in the name of the product is a branding prerogative left up to the manufacturer and further likened their naming to that of pickup trucks, wherein a model 150 pickup may no longer have a half-ton payload, but retains its “150” moniker for historical and marketing reasons. The logic is, of course, a bit backwards, as most modern 150 pickups have a greater payload rating than earlier models, rather than offering less, as is the case of the felt manufacturer’s D4869-compliant products.¹¹ Another manufacturer’s representative stated that although changes to the ASTM standards through the years brought the weights per square down, the product names “just never changed.” This is a dubious proposition since: A) the weight of saturated felt for D226 No. 15 and No. 30 asphalt felt has not changed since

ASTM D226 AND ASTM D4869 FELTS - CURRENT PHYSICAL REQUIREMENTS

CLASSIFICATION		ASTM D226	ASTM D4869
First Edition		1925	2002
Current Edition		2017	2016
Current Designation		D226/D226M-17	D4849/D4869M-16a
Felt Classifications			Type I-#8 Underlayment
	Type I-Commonly Called No. 15 asphalt felt		Type II-#13 Underlayment
			Type III-#20 Underlayment
	Type II-Commonly called No. 30 asphalt felt		Type IV-#26 Underlayment
Width of Roll		36" +/- 0.7%, or as otherwise agreed upon by purchaser and seller	36" +/- 0.7%, or as otherwise agreed upon by purchaser and seller
Area of Roll, Min., Sq. Ft.	Type I	216 or 432	432
	Type II	216	432
	Type III		216
	Type IV		216
Net Mass of Saturated felt, lb/100 ft ² , min	Type I	11.5	8.0
	Type II	26	13.0
	Type III		20
	Type IV		26
Mass of Saturant, lb/100 ft ² , min	Type I	6.2	4.0
	Type II	15.0	6.0
	Type III		12.6
	Type IV		15.0
Net Mass of Desaturated Felt, lb/100 ft ² , min	Type I	5.2	4.0
	Type II	10.0	5.0
	Type III		9.0
	Type IV		10.0
Package Marking		Unless otherwise agreed upon between the supplier and purchaser, each product package shall be plainly marked with the supplier's name, the product brand, the ASTM designation, and type of bitumen if not evident in the label name of the product.	Unless otherwise specified, each package shall be plainly marked with the manufacturer's name, brand name, ASTM designation, and type of underlayment.

Source: ASTM D226/D226M-17, *Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing*, and ASTM D4869/D4869M-16a, *Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing*, ASTM International, West Conshohocken, PA.

Table 2 – Current physical requirements for felts per ASTM D226 and ASTM D4869.

CLARITY OF ASPHALT SATURATED ORGANIC FELT PRODUCT LABELING

Manufacturer/Supplier	Product Name	ASTM Designation	Width, In.	Sq. Ft. per Roll	Net Mass of Saturated Felt, lb/100 ft ² per Product Data Sheet	Net Mass of Saturated Felt, lb/100 ft ² per ASTM Designation	Assumed Mass of Saturated Felt, lb/100 ft ² , based on Product Name	Clearly Labeled?
Atlas Roofing Corporation, Atlanta, GA ¹	#15 Saturated Felt	ASTM D4869, Type I	36	432	not provided	8.0	13.0	No
	#30 Saturated Felt	ASTM D4869, Type I	36	216	not provided	8.0	26	No
CertainTeed Saint-Gobin, Malvern, PA ²	ShingleFelt 30	ASTM D4869, Type I	36	432	not provided	8.0	26	No
G.A.P. Roofing Inc., Pryor, OK ³	15 ASTM 4869 Felt	ASTM D4869, Type I	36	432	8.0	8.0	13.0	No
	ASTM 15 D226 Felt	ASTM D226, Type I	36	432	11.5	11.5	11.5	Yes
	G 15 Felt	Not Rated	36	432	8.0	n/a	11.5 or 13.0	No
	G 30 Felt	Not Rated	36	216	13.0	n/a	26	No
	No. 30 ASTM 4869	ASTM D4869, Type I	36	216	13.0	8.0	26	No
	ASTM 30 D226 Felt	ASTM D226, Type II	36	216	26	26	26	Yes
Tarah Asphalt Products, Inc., Calexico, CA ⁴	Type 15 ASTM	ASTM D226, Type I	39-3/8	432	not provided	11.5	11.5	Yes
	Type 30 ASTM	ASTM D226, Type II	39-3/8	216	not provided	26	26	Yes
	No. 15 ASTM	ASTM D4869, Type I	39-3/8	432	not provided	8.0	13.0	No
	No. 30 ASTM	ASTM D4869, Type II	39-3/8	216	not provided	13.0	26	No
Tamko Building Products, Inc., Joplin, MO ⁵	No. 15 ASTM	ASTM D226, Type I	36	432	not provided	11.5	11.5	Yes
	No. 15 ASTM D 4869	ASTM D4869, Type I	36	432	not provided	8.0	13.0	No
	No. 15	Not Rated	36	432	not provided	n/a	11.5 or 13.0	No
	No. 30 ASTM	ASTM D226, Type II	36	216	not provided	26	26	Yes
	No. 30 ASTM D4869	ASTM D4869, Type I/III	36	216	not provided	8.0 or 20	26	No
	SuperX 30	ASTM D4869, Type I/III ⁸	36	216	not provided	8.0 or 13.0	26	No
Tarco, Little Roc, AR ⁶	15# ASTM Specification Felt	ASTM D226, Type I	36	432	not provided	11.5	11.5	Yes
	30# ASTM Specification Felt	ASTM D226, Type II	36	216	not provided	26	26	Yes
	Pro 15 Specification Felt	ASTM D4869, Type I	36	432	not provided	8.0	13.0	No
	Pro 30 Specification Felt	ASTM D4869, Type II	36	216	not provided	13.0	26	No
	No. 15 Specification Felt	ASTM D4869, Type I	36	432	not provided	8.0	13.0	No
	No. 30 Specification Felt	ASTM D4869, Type I	36	216	not provided	8.0	26	No
Warrior Roofing Manufacturing, Tuscaloosa, AL ⁷	#15W	ASTM D4869, Type I	36 +/- 0.7%	432	8.0	8.0	13.0	No
	#15 ASTM	ASTM D226, Type I	36 +/- 0.7%	432	11.5	11.5	11.5	Yes
	#15 Plain	ASTM D4869, Type I	36 +/- 0.7%	400	8.0	8.0	13.0	No
	#30W	ASTM D4869, Type II	36 +/- 0.7%	216	13.0	13.0	26	No
	#30 ASTM	ASTM D226, Type II	36 +/- 0.7%	216	26	26	26	Yes
	#30 Plain	ASTM D4869, Type II	36 +/- 0.7%	200	13.0	13.0	26	No

1. www.atlasroofing.com/roof-underlayment/15-saturated-felt/tab/technical#tabs, February 6, 2019, 2:42 pm.
2. "ShingleFelt 30," *Technical Data Sheet*, CertainTeed Saint-Gobin, Malvern, PA, www.certainteed.com, April 1, 2019.
3. *Product Data Sheets*, G.A.P. Roofing Inc., Pryor, OK, www.gaproofing.us/, April 1, 2019.
4. *Technical Specification Sheets*, Tarah Asphalt Products, Inc., Calexico, CA, www.tarah.com, April 1, 2019.
5. *Product Data Sheets*, Tamko Building Products, Joplin, MO, www.tamko.com, May 9, 2019.
6. www.tarcoroofing.com/products/roofingshingles/mechanically-attached/asphalt-saturated-organic-felt, February 6, 2019, 2:51 pm.
7. *Specifications*, Warrior Roofing Manufacturing, Tuscaloosa, AL, www.warriorroofing.com, February 6, 2019.
8. Does not comply with the dimensional stability requirements of the D4869 Standard.

Table 3 – Clarity of asphalt-saturated organic felt product labeling.

the 1980s and 1940s, respectively (Table 1); and B) the D4869 standard was first approved relatively recently, in 2002 (Table 2). It would seem that the labeling of D4869 asphalt felt is arbitrary and that the old adage “buyer beware” is apt.

WHY IT MATTERS

The presence of confusing labels on asphalt felt products is of concern for several reasons. One is how little attention the matter has received in trade publications. Second, it is possible that much of the asphalt felt being installed on steep-slope roofs is lighter in weight than that being specified or contemplated by the contractor or building owner. Third, it raises building code compliance issues. The minimum requirements for underlayments used in steep-slope roof systems are provided for in the IBC and IRC. Both codes require underlayments for steep-slope roofing materials—asphalt shingles, metal shingles and panels, slate shingles, clay and concrete tiles, and wood shingles/shakes—to comply

with ASTM D226, Type I or II; and D4869, Type I, II, III, or IV, depending on the roof covering type and the wind speed in the area where the project is located.¹²

For example, the minimum underlayment requirement for an asphalt shingle roof per Table R905.1.1(1), Underlayment Types, of the 2018 IRC is one that complies with either ASTM D226 Type II or ASTM D4869 Type III or IV in regions where the maximum ultimate design wind speed, V_{ult} , is greater than or equal to 140 mph. Similarly, the minimum underlayment requirement for a slate roof per Table 1507.1.1(1), Underlayment Types, of the 2018 IBC is one that complies with either ASTM D226 Type II or ASTM D4869 Type III or IV in regions where the maximum basic design wind speed, V , is less than 140 mph. Should a felt underlayment that weighs less than the required minimum be mistakenly installed due to a confusing label on the underlayment (an event, we would posit, that occurs every day), the new roof system will not meet code. Unfortunately, the only

way to rectify such a situation (should the authority having jurisdiction choose to do so) is to remove the roof and replace the felt.

SPECIFYING ASPHALT FELT UNDERLAYMENT

Underlayments for steep-slope roof coverings should be carefully selected based on the minimum requirements contained in the IBC and IRC, and enhanced as required to meet the specific requirements of the project and the recommendations of the roof covering manufacturer. The National Slate Association, for example, recommends that, at minimum, a single layer of No. 30 asphalt-saturated organic felt be used as underlayment on slate roofs where the slate measures from 3/16 inch to 1/4 inch in thickness and the roof slope is 8:12 or greater.¹³ This underlayment complies with the minimum requirements set by the building codes. Although it is common to refer to felt underlayments as No. 30 or No. 15, it is not enough to formally specify asphalt felts in that manner. Given the confusing labeling

mentioned previously, greater specificity is needed. When specifying asphalt felts for steep-slope applications, the following are recommended:

- 1) Make reference to ASTM D4869 since this standard is specific to asphalt felts used in steep-slope roofing and contains requirements for two physical properties relevant to steep-slope roofs (a liquid-water transmission test and dimensional stability limits to address wrinkling concerns) not found in the ASTM D226 standard.
- 2) Have a product data sheet for the specified asphalt felt (with the ASTM number and classification type highlighted) be submitted for review and approval.
- 3) Have samples of the specified asphalt felt submitted for review and approval.
- 4) If you know the common source of felt underlayments in the region in which the project is located, include a photo of the paper sleeve wrapped around the roll of the felt listed in the specification. This tends to eliminate all confusion. Images can be obtained from the manufacturer's website or from photos taken on previous job sites.
- 5) When making site observation visits during construction, check the labels on the rolls of felt and compare the thickness of the material being installed to that of the approved samples.

SUMMARY

Manufacturers today typically label their felt underlayment as #15 or No. 15, or #30 or No. 30. You might be tempted to assume these designations correlate to No. 15 asphalt felt (weighing 11.5 or 13 lbs. per square) or No. 30 asphalt felt (weighing 26 lbs. per square), but that is not necessarily the case. Many manufacturers make multiple products within each category. For example, one manufacturer markets "30# ASTM," "Pro 30," and "No. 30" underlayments (Table 3). All of these products are asphalt-saturated organic felt and come packaged with "30" printed on the label in large characters. The "30# ASTM" felt does weigh 26 lbs. per square as one might expect, but the "Pro 30" and "No. 30" felts weigh just 13.0 and 8.0 pounds per square, respectively. To find the true weight of asphalt felts, check the fine print on the label or the product data sheet, which indicates the ASTM compliance and classification of the product.

The bottom line is, don't be confused by the names manufacturers place on the paper labels used to package their asphalt felts. Always specify the applicable ASTM reference standard (although D4869 should be preferred due to its inclusion of a liquid-water transmission test and dimensional stability limits), and then, during submittal review and application, check compliance of the felt underlayment to make sure you are getting what you specified. 

ENDNOTES

1. A square is enough material to cover 100 sq. ft. of roof area when installed in accordance with the manufacturer's instructions.
2. Felting is the process of consolidating fibrous materials via the application of heat, moisture, and pressure, which causes the interlocking, or matting, of the fibers.
3. WSRCA Steep-Slope Roofing Committee. "WSRCA Underlayment Testing and Research Project, Interim Technical Bulletin No. 2016-S1." Western States Roofing Contractor Association, Morgan Hill, CA, 2016, p. 2.
4. Although "Tentative Specifications for" was changed to "Standard Specifications for" sometime in the 1940s, the title of the D226 standard did not change to its current *Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing* until February 1978. From the beginning, it is clear that the D226 standard was never intended to apply to steep-slope roof underlayments. The scope section of the original D226 standard from 1925 states that the specification is intended to cover asphalt-saturated felts used "in the membrane system of waterproofing and in the construction of built-up roofs." The scope of the standard has changed little over

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the years since its introduction. For comparison, the scope of the 2017 D226 standard states that the specification covers asphalt-saturated organic felts intended for use “with asphalts conforming to the requirements of Specification D312/D312M in the construction of built-up roofs, and with asphalts conforming to the requirements of Specification D449/D449M in the construction of water proofing systems.”

5. *Johns-Manville Distributors Price List*. Johns-Manville Corporation. January 1, 1930, p. 13, available from Association for Preservation Technology International, Building Technology Heritage Library, an online digital resource at <https://archive.org/details/buildingtechnologyheritagelibrary&tab=collection>.
6. *Home Owners' Catalogs, A Guide to the Selection of Building Materials Equipment and Furnishings*. F.W. Dodge Corporation, New York, New York, 1936, p. 34.
7. The D226 standard was revised in 1941, 1942, and 1947. Only data for the 1947 standard are given in *Table 1*.
8. The introduction of D4869 in 2002 seemingly legitimizes the use of asphalt-saturated organic felt as a steep-slope roofing underlayment. It is somewhat surprising that it took 77 years for this to occur.
9. Note that a third type of asphalt

felt underlayment, an inorganic felt reinforced with fiberglass, complying with ASTM D6757, *Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing*, and first approved in 2002, is beyond the scope of this article.

10. In this instance the label actually read “30W ASTM D4869 Type II,” but with “30W” in a font eight times larger than that of the rest of the copy. The labels of other manufacturers simply state “No. 30 ASTM, D4869,” with no mention of the classification type. Either way, the label is confusing at best.
11. Most modern model 150 pickup trucks (colloquially referred to as “half-ton” trucks) can haul nearly a ton of cargo, or more, depending on the engine options and gross vehicle weight rating package the truck comes with. For example, a 2018 Ford F-150 with a 3.3L V6 engine has a payload rating of 1950 pounds.
12. Asphalt shingles and photovoltaic shingles may also be installed with an underlayment complying with ASTM D6757. Clay and concrete tiles may also be installed with heavier underlayments complying with ASTM D2626, *Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing* (an organic felt with

mineral surfacing primarily used as a base ply in built-up roofing) or ASTM D6380, *Standard Specification for Asphalt Roll Roofing (Organic Felt)*.

13. Levine, Jeffrey, et al. *Slate Roofs: Design and Installation Manual, 2010 Edition*, National Slate Association, Poultney, Vermont, 2010, p. 64. Given the anticipated service life of slate shingles, it is often desirable to go beyond the minimum and install a double layer of No. 30 asphalt felt, laid shingle fashion.



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