

Description

Knauf Friendly Feel® Duct Wrap with ECOSE Technology and KwikStretch® Markings is a thermal and acoustical insulation blanket made from highly resilient, inorganic glass fibers bonded by a thermosetting resin. It is available unfaced, with a foil-scrim-kraft (FSK) jacket and with a white or black metalized polypropylene-scrim-kraft (PSK) jacket. Vapor retarders provide a 2" (51 mm) staple flange on one edge, and the factory-applied facing assures uniform quality. KwikStretch Markings on the staple flange allow for easy and accurate job site measurements.

ECOSE Technology

ECOSE Technology is a revolutionary new binder chemistry that makes Knauf Insulation products even more sustainable than ever. It is based on rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals traditionally used in fiberglass insulation products. ECOSE Technology reduces binder embodied energy and does not contain phenol, formaldehyde, acrylics or artificial colors.

Application

Knauf Friendly Feel Duct Wrap is used as external insulation on commercial or residential heating or air conditioning ducts. It is suitable for the exterior of rectangular or round sheet metal ducts and spaces or surfaces where temperature and condensation must be controlled.

Features

- Low "k" factor significantly reduces heat gain or loss when applied with proper compression.
- Flexible.
- Lightweight.
- KwikStretch markings on the staple flanges.
- Excellent acoustical properties.
- Tough and resilient.
- Certified for indoor air quality as a low emitting product by The GREENGUARD Environmental Institute to both the GREENGUARD Certification ProgramSM and the more stringent GREENGUARD For Children and SchoolsTM standard.

Benefits

- Energy conservation, which lowers operating costs.
- System efficiency increases; energy usage/costs decrease.
- Conforms easily to flat or irregular surfaces.
- Rolls allow for faster installation, lower labor costs.
- Easier, faster measurement of stretch-out lengths.
- Reduces sound transmission through the duct wall.
- Assured condensation control when used with proper installation and sealed joints, seams and penetrations.
- Resists damage in shipment, and during and after installation.

Specification Compliance

In U.S.:

- ASTM C 1139 - unfaced; Type I, Type II, Grade 1 - 0.75 lb/ft³
Grade 2 - 1.0 lb/ft³
Grade 3 - 1.5 lb/ft³
- **ASTM C 553; Type I, II, III**
- ASTM C 1136; Type II
- ASTM C 1290

- GREENGUARD Children and SchoolsSM Certification
- California Title 24 (installed at 25% compression)
- HH-1-558C; Form B, Type I, Class 7
- NFPA 90A and 90B

In Canada:

- CAN/ULC S102-M88
- CAN/CGSB-51.5M; Type II (FSK facing)
- CAN/CGSB-51.11-92

Technical Data

Surface Burning Characteristics

- UL/ULC Classified (FSK).
- Unfaced or composite (insulation, facing and adhesive) does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with ASTM E 84 (PSK only), CAN/ULC S102-M88, NFPA 255 and UL 723.

Temperature Range (ASTM C 411)

- Faced, can be used on ducts operating up to 250°F (121°C).
- Unfaced, up to 350°F (177°C).

Water Vapor Permeance (ASTM E 96, Procedure A)

- FSK and white PSK facings have maximum water vapor permeance of .02 perms.
- Black PSK facing has a maximum water vapor permeance of .09 perms.

Water Vapor Sorption (ASTM C 1104)

- Less than 5% by weight when tested for 96 hours at 120°F (49°C) and 95% relative humidity.

Corrosiveness (ASTM C 665)

- Does not accelerate corrosion on steel, copper or aluminum.

Corrosion (ASTM C 1617)

- The corrosion rate in mils/yr will not exceed that of the 1 ppm chloride solution.

Mold Growth (ASTM C 1338)

- No growth.

Puncture Resistance (TAPPI Test T803)

(Beach Units)

- FSK and PSK: 25

Application and Specification Guidelines

Storage

- Protect stored insulation from water damage, construction damage and other abuse.
- If stored outside, proper protection from weather conditions should be provided.

Preparation

- Install Knauf Friendly Feel Duct Wrap over clean, dry sheet metal ducts.
- All sheet metal joints and seams must be sealed to prevent air leakage from the duct.

Application

- Install Knauf Friendly Feel Duct Wrap with facing to the outside to obtain specified R-value using a maximum of 25% compression.
- Butt all insulation joints firmly together. Longitudinal seam of the vapor retarder must be overlapped a minimum of 2" (51 mm). A 2" (51 mm) tab is provided for the circumferential seam and must be overlapped.
- Where vapor retarder performance is necessary, all penetrations, joints, seams and damage to the facing should be sealed with an FSK, PSK or foil tape

or glass fabric and mastic prior to system startup.

- Pressure sensitive tapes should be a minimum of 3" (76 mm) wide and be applied with moving pressure using an appropriate sealing tool. Staples should be outward clinch and placed approximately 6" (152 mm) on center.
- Closure systems should have a 25/50 F.H.C. per UL 723.
- For rectangular ducts over 24" (610 mm) wide, secure the insulation to the bottom side of the duct with mechanical fasteners spaced on 18" (457 mm) centers to reduce sag. Care should be taken to avoid overcompressing the insulation with the retaining washer.
- Unfaced Duct Wrap should be overlapped with a minimum of 2" (51 mm) and fastened with 4" (102mm) to 6" (152 mm) nails or skewers placed 4" (102mm) apart or secured with a wire or banding system. Care must be taken to avoid damaging the duct wrap. Refer to diagram for staple stitching and butt-joint method.

Installation Procedures

- Use the table (back) to determine stretch-outs required for the nominal thickness of insulation to limit average compression of the insulation 25% or less. Use KwikStretch markings on the staple flanges to speed measurement of duct wrap.

Fiber Glass and Mold

Fiber glass insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold, it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced. Air handling insulation used in the air stream must be discarded if exposed to water.

Notes

The chemical physical properties of Knauf Friendly Feel® Duct Wrap with KwikStretch® Markings represent typical average values determined in accordance with accepted test methods. The data is subject to normal manufacturing and testing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

Check with your Knauf Insulation sales representative to assure information is current.

Insertion Loss (Reduction of Sound Transmitted Through Duct Wall) (Sound and Vibration Design and Analysis, National Environmental Balancing Bureau, 1994)

		Duct Wrap		Insertion Loss, dB/LF of Duct							
Duct Dimensions	Sheet Metal	Nominal Thickness	Nominal Density	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	
12" x 12" (305 mm x 305 mm)	24 GA	1½" (38 mm)	.75 PCF (12kg/m³)	.6	.6	.6	.7	7.4	14.2	20.9	
24" x 12" (610 mm x 305 mm)	24 GA	1½" (38 mm)	.75 PCF (12kg/m³)	.6	.6	.6	.7	7.4	14.2	20.9	
48" x 12" (1219 mm x 305 mm)	22 GA	1½" (38 mm)	.75 PCF (12kg/m³)	.5	.5	.5	.6	7.4	14.1	20.9	
24" x 24" (610 mm x 610 mm)	22 GA	1½" (38 mm)	.75 PCF (12kg/m³)	.5	.5	.5	.6	7.4	14.1	20.9	
24" x 12" (610 mm x 305 mm)	26 GA	1½" (38 mm)	.75 PCF (12kg/m³)	.8	.8	.8	.8	7.5	14.2	21.0	
24" x 8" (610 mm x 203 mm)	26 GA	2" (51 mm)	.75 PCF (12kg/m³)	1.0	1.0	1.0	3.6	10.4	17.1	23.9	

Stretch-Outs

Labeled Thickness	Installed Compressed Thickness	Round	Square	Rectangular
1½" (38 mm)	1⅞" (29 mm)	P+9½" (241 mm)	P+8" (203 mm)	P+7" (178 mm)
2" (51 mm)	1½" (38 mm)	P+12" (305 mm)	P+10" (254 mm)	P+8" (203 mm)
2⅜" (56 mm)	1⅝" (42 mm)	P+13" (330 mm)	P+11" (279 mm)	P+8½" (216 mm)
2½" (64 mm)	1⅞" (48 mm)	P+14½" (368 mm)	P+12½" (318 mm)	P+9½" (241 mm)
3" (76 mm)	2¼" (57 mm)	P+17" (432 mm)	P+14½" (368 mm)	P+11½" (292 mm)

P = Perimeter of duct to be installed.

Thermal Efficiency (ASTM C 177)

Mean Temperature	0.75 PCF		1.0 PCF		1.5 PCF	
	k	k (SI)	k	k (SI)	k	k (SI)
50°F (10°C)	.28	.040	.26	.037	.23	.033
75°F (24°C)	.29	.042	.27	.039	.24	.035
100°F (38°C)	.31	.045	.29	.042	.26	.037
125°F (52°C)	.33	.048	.31	.045	.28	.040
150°F (66°C)	.36	.052	.34	.049	.31	.045
175°F (80°C)	.39	.056	.37	.053	.33	.048
200°F (93°C)	.43	.063	.40	.058	.36	.052

R-Value @ 75°F Mean Temperature

Density	Thickness	Out-Of Package R-Value	Installed R-Value (at 25% Compression)
.75 PCF (12 kg/m³)	1½" (38 mm)	5.1	4.2
	2" (51 mm)	6.8	5.6
	2⅜" (56 mm)	7.4	6.0
	2½" (64 mm)	8.5	7.0
	3" (76 mm)	10.2	8.4
1.0 PCF (16 kg/m³)	1½" (38 mm)	5.6	4.5
	2" (51 mm)	7.4	6.0
1.5 PCF (24 kg/m³)	1½" (38 mm)	6.1	4.8
	2" (51 mm)	8.2	6.4

Forms Available

Density	Thickness	Width	Length	Facing
.75 PCF (12 kg/m³)	1½" (38 mm)	48"	100' (30.48 m)	FSK, PSK, unfaced
	2" (51 mm)	(1219 mm)	75' (22.86 m)	
	2⅜" (56 mm)		75' (22.86 m)	
	2½" (64 mm)		75' (22.86 m)	
	3" (76 mm)		50' (15.24 m)	
1.0 PCF (16 kg/m³)	1½" (38 mm)	48"	100' (30.48 m)	FSK, PSK, unfaced
	2" (51 mm)	(1219 mm)	75' (22.86 m)	
1.5 PCF (24 kg/m³)	1½" (38 mm)	48"	75' (22.86 m)	
	2" (51 mm)	(1219 mm)	50' (15.24 m)	

Condensation Control

Recommended minimum install R-Values for condensation control on flat surfaces. Surface emittance : 0.2 (aged aluminum foil or galvanized sheet metal).

RH %	Operating Temperature																
	45°F (7°C)						55°F (13°C)						60°F (18°C)				
	Ambient Temperature (°F)						Ambient Temperature (°F)						Ambient Temperature (°F)				
	70	80	90	100	110		70	80	90	100	110		70	80	90	100	110
60	2.2 ¹	3.3 ¹	4.3 ¹	4.3 ²	5.4 ³		1.1 ¹	2.2 ¹	3.3 ¹	3.3 ¹	4.3 ²		1.1 ¹	1.1 ¹	2.2 ¹	3.3 ¹	4.3 ²
70	3.3 ¹	5.4 ³	6.5 ⁴	7.6 ⁵	—		1.1 ¹	3.3 ¹	4.3 ²	6.5 ⁴	6.5 ⁴		1.1 ¹	1.1 ¹	3.3 ¹	5.4 ³	6.5 ⁴
80	7.0 ⁴	—	—	—	—		3.3 ¹	6.5 ⁴	—	—	—		2.2 ¹	3.3 ¹	6.5 ⁴	—	—
90	—	—	—	—	—		—	—	—	—	—		6.5 ⁴	—	—	—	—

¹ All Duct Wrap products

² 0.75 PCF, 2" and greater; 1.0 PCF, 1½" and greater; 1.5 PCF, 1½" and greater

³ 0.75 PCF, 2" and greater; 1.0 PCF, 2"; 1.5 PCF, 2"

⁴ 0.75 PCF, 2½" and greater

⁵ 0.75 PCF, 3"

Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: February 7, 2017

Attention: stl-cac@cannondesign.com

Contact Person / WTA Field Inspector:
Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Mike Nolte

Project No. WT 14127.01

☐

UPS

☐

Courier

☒

Email

Copies	No.	Description
1 PDF	232500M01	(Submittal No.'s:) (R&B CxSRC)
		(Cannon #232500-001) - (Paric #15051-0453) - (WES #607)
		➤ Mechanical Insulation Product Data

***Remarks: See Review Comments on PAGE 2.**

c: Kelvin Patel
Kpatel@cannondesign.com

☐ Furnish as Submitted

☒ ***Furnish as Noted**

☐ Rejected

☐ Revise & Resubmit

☐ Reviewed

☐

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for review of general conformance with the design concept of project and general compliance with information given in contract documents. Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

Shop Drawing Submittal Review

***Submittal Review Comments**

1. Contractor responsible to verify that all adhesives, sealants and sealant primers meet the requirements of LEED Credit IEQ 4.1. Provide Product Data for Credit IEQ 4.1 for all adhesives, sealants and sealant primers, including printed statement of VOC content. The submittal does not appear to contain this information for all sealants submitted.
2. Provide aluminum jacketing on all exterior piping per Specification 232500-2.2-D-5: For insulation installed outdoors and insulation subject to water damage, provide an additional **0.016 inch** aluminum jacket with lock seam, longitudinal joint and gasketed bands for butted joints as required for a watertight installation. Jacket shall be complete with waterproof, laminated paper lining and shall be manufactured by ITW Insulation System or RPR Products.

14127.01 - 232500 M01
MTN TO REVIEW -
01/18/17

From: STL-CAC <STL-CAC@CANNONDESIGN.COM>
To: 'Patrick Garner' <pgarner@wmtao.com>, "WTASHOP (WTASHOP@wmtao.com)"
<WTA...
CC: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
Date: 1/18/2017 3:01 PM
Subject: Webster ISB - 23 2500-001
Attachments: 232500-001 Mechanical Insulation Product Data.pdf

Attached for review.

Melissa Pirtle

[cid:image001.png@01D2719B.8CD710A0]
1100 Clark Ave
St. Louis, Missouri 63102
T 314.425.8797
cannondesign.com

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

PROJECT NAME	
ADDRESS	
NUMBER	
OWNER	
ARCHITECT / ENGINEER	
SUBMITTED BY	
CONTRACTOR / CM SUBMITTAL NO.	CANNON DESIGN SUBMITTAL NO.
DRAWING / DETAIL REFERENCE	SPECIFICATION SECTION / PARAGRAPH
MANUFACTURER / SUPPLIER	ITEM / PRODUCT ID
REQUIRED DATE	PRIORITY
CRITICAL	☐

To be completed by Reviewer

CANNON DESIGN SUBMITTAL NUMBER
RECEIVED DATE

- ☐ **A. No Exceptions Taken**
No further review of submittal is required.
- ☐ **B. Make Corrections Noted**
Incorporate corrections in work;
resubmission is not required.
- ☐ **C. Revise and Resubmit**
Revise as noted, and resubmit for review.
- ☐ **D. Rejected**
Submittal is not in compliance with Contract Documents;
provide new submittal.
- ☐ **E. For Record / Information Only**
Submittal was reviewed for Record / Information
purposes only.
- ☐ **F. Not Required for Review**
Submittal is not required by Contract Documents
and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

ITEM BEING SUBMITTED (check only one)

- ☐ Shop Drawings ☐ Certification / Qualifications ☐ Coordination Drawing
☐ Samples ☐ Record Documents ☐ Calculations
 (_____ copies) ☐ Product Data ☐ Schedules
☐ LEED Submittal ☐ O&M Manuals
☐ Other

ITEM BEING SUBMITTED FOR (check only one)

- ☐ Action ☐ Information Only ☐ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

Ry:

By:
Devin D. Gates

REVIEWED BY	DATE

A/E COMMENTS

- ☐
- See attached sheet(s) for additional comments

REVIEWED BY	DATE



77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0453

Paric Corporation

PROJECT: 15051-Webster University Interdisciplinary Science Building

DATE: 01/17/2017

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

Fax;
314-241-2203

RE: Mechanical insulation product data

ATTN: Kelvin Patel

JOB: 15051

WE ARE SENDING:		SUBMITTED FOR:	ACTION TAKEN:
☐ Shop Drawings		☒ Approval	☐ Approved as Submitted
☐ Letter		☐ Your Use	☐ Approved as Noted
☐ Prints		☐ As Requested	☐ Returned After Loan
☐ Change Order		☐ Review and Comment	☐ Resubmit
☐ Plans			☐ Submit
☐ Samples		SENT VIA:	☐ Returned
☐ Specifications		☐ Attached	☐ Returned for Corrections
☒ Other: Product Data		☐ Separate Cover Via:	☒ Due Date: 08/26/2016

Item	Package	Code	Rev.	Copies	Date	Description	Status
Submittal		232500-001	1		01/17/2017	Mechanical insulation product data	Submitted

NOTES:

CC:

Signed: _____
Devin Gates



Mechanical

LETTER OF TRANSMITTAL

TO: Paric Corporation

77 West Port Plaza #250

St. Louis, MO 63146

ATTN: Jason Szachnieski, Devin Gates

DATE: 1/16/17

JOB #: 5768

RE: Webster ISB

We are sending you

☒

Shop drawings

☐ Attached

☐ Prints

☐ Under separate cover

☐ Plans

☐ Samples

☐ Specifications

☐ Copy of letter

☐ Change order

☐ Other

COPIES	DATE	NO.	DESCRIPTION
1	1/16/17	232500	Mechanical Insulation

These are transmitted as checked below:

☐ For signature

☐ For your use

☐ As requested

☐ For bids due

☒

For review and comment

☐ Approved as submitted

☐ Approved as noted

☐ Returned for corrections

☐ Prints returned after loan to us

☐ Other

☐ Resubmit

☒ Submit

☐ Return

☐ copies for approval

☐ copies for distribution

☐ corrected prints

Remarks: Please return by 1/24/17

COPY TO: file

SIGNED:

Alex Chambers



Mechanical

Webster University ISB Webster Groves, MO

Submittal #:

232500

Submittal Description:

Mechanical Insulation

Return By:

1/24/17

Please Note: To avoid scheduling delays and equipment release delays, please submit by the "Return By" date.

CHECKED BY:			
DESIGNER:		ENGINEER: X	
X	NO EXCEPTION TAKEN		MAKE CORRECTIONS NOTED
	SUBMIT SPECIFIED ITEM		REVISE AND RESUBMIT
	REJECTED		
Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Equipment supplier is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and satisfactory performance of his work.			
		Job #:	5768
		Date:	1/16/17
		By:	ARC



TDK Mechanical Services

745 Merus Ct.
Fenton, Missouri 63026
636-600-1662 phone / fax

SUBMITTAL TRANSMITTAL

DATE: December 21, 2016

COMPANY: Trenholm Mechanical Insulation
ATTENTION TO: Audra Trenholm
EMAIL: audra@trenholminsulation.com

FROM: Dan Esker
PHONE: (636) 290-3733 cell / (636) 600-1662 office
EMAIL: dan@tdkmechanical.com

PROJECT: Webster University Interdisciplinary Science E
St. Louis, MO
DESCRIPTION: _____

Mechanical System	Insulation	Thickness	Occurs at
Heating Hot Water	Fiberglass ASJ Pipe Covering	1"	Indoors - Pipe Sizes Under 4"
Heating Hot Water	Fiberglass ASJ Pipe Covering	1-1/2"	Indoors - Pipe Sizes 4" & Over
Chilled Water	PolyISO Pipe Covering	1"	Indoors - All Pipe Sizes
Chilled Water Equipment	Elastomeric Sheet Rubber	1"	Indoors - Mechanical Room
PCS/PCR	PolyISO Pipe Covering	1"	Indoors - All Pipe Sizes
Glycol Piping	Elastomeric Pipe Covering	1"	Indoors - All Pipe Sizes
Refrigeration Piping	Elastomeric Pipe Covering	1"	Indoors - All Pipe Sizes
Medium Pressure Supply Air Duct	FSK Fiberglass Duct Wrap	1-1/2" / 0.75#	Indoors - Concealed
Fume Exhaust Duct	Unifrax Fyre Wrap	(1) layer of 1-1/2"	Indoors - Concealed
Kitchen Exhaust Hood Duct	Unifrax Fyre Wrap	(2) layers of 1-1/2"	Indoors - Concealed
Outside Air Duct	FSK Fiberglass Duct Board	1-1/2" / 3#	Indoors - Concealed
All Duct Work Systems	Foil Tape	4"	Indoors - Concealed
PVC Fittings	Proto PVC Fittings	N/A	At Fiberglass & PolyISO Pipe Covering Fittings
Vimasco Adhesive	WC-5	N/A	At Fiberglass Pipe Covering
Armaflex Adhesive	Armaflex 520 Adhesive	N/A	At Elastomeric Pipe Covering
PolyISO Adhesive	Childer's CP-10	N/A	At PolyISO Pipe Covering

NOTES/CLARIFICATIONS:

Low Pressure Round Supply Air Duct. FSK Fiberglass Duct Wrap. 1-1/2" / 0.75#. Indoors - Concealed