DANBURY Winair™ COMPANY
558 Federal Road, Brookfield, CT 06804
O. (203) 885-0627 | F. (203) 740-2441
sheetmetal@mywinair.com | www.mywinair.com

2024

SHEET METAL FABRICATION STANDARDS

DANBURY Winair™ COMPANY
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1 in. Wg Static Pos. or Neg.	5ft Joints					
				Joints/Reinf.		
Duct Dimension (in.)	Min. GA	Joint Reinf.	Mid Panel Reinf.	Lock Min. GA	Connection Joint Reinf.	Connection Spacing Reinf.
0-8	24	N/R	N/R	PITTS	S&D	60
19-36	24	N/R	N/R	PITTS	TDC	56
37-54	22	N/R	N/R	PITTS	TDC	56
55-72	22	N/R	MPT	PITTS	TDC	56
73-96	20	JTR	MPT	PITTS	TDC	56
97	18	2-JTR	2-MPT	PITTS	Ductmate	60

5ft Coil/Sheet Stock/ (TDC/TDF) Duct Reinforcement ¾ Tie-Rods
USA Steel G90
Ductmate connections: Any duct larger than 96”

N/R -Not Required
N/A -Not Applicable
JTR -Joint Tie Rod
MPT -Mid Panel Tie Rod(s)

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2 in. Wg Static Pos. or Neg.	5ft Joints					
				Joints/Reinf.		
Duct Dimension (in.)	Min. GA	Joint Reinf.	Mid Panel Reinf.	Lock Min. GA	Connection Joint Reinf.	Connection Spacing Reinf.
0-8	24	N/R	N/R	PITTS	S&D	59
19-30	24	N/R	N/R	PITTS	TDC	56
31-36	22	N/R	N/R	PITTS	TDC	56
37-54	20	N/R	MPT	PITTS	TDC	56
55-72	18	JTR	MPT	L PITTS	TDC	56
73-96	18	JTR	3-MPT	L PITTS	TDC	56
97	18	3-JTR	3-MPT	L PITTS	Ductmate	60

5ft Coil/Sheet Stock/ (TDC/TDF) Duct Reinforcement ¾ Tie-Rods
USA Steel G90
Ductmate connections: Any duct larger than 96”

N/R -Not Required
N/A -Not Applicable
JTR -Joint Tie Rod
MPT -Mid Panel Tie Rod(s)

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4 in. Wg Static Pos. or Neg.	5ft Joints					
				Joints/Reinf.		
Duct Dimension (in.)	Min. GA	Joint Reinf.	Mid Panel Reinf.	Lock Min. GA	Connection Joint Reinf.	Connection Spacing Reinf.
0-12	24	N/R	N/R	PITTS	TDC	56
13-30	22	N/R	N/R	PITTS	TDC	56
31-48	20	N/R	N/R	PITTS	TDC	56
49-54	20	N/R	MPT	PITTS	TDC	56
55-72	18	N/R	MPT	L PITTS	TDC	56
73-96	16	JTR	MPT	L PITTS	Ductmate	60
97	16	JTR	MPT	L PITTS	Ductmate	60

5ft Coil/Sheet Stock/ (TDC/TDF) Duct Reinforcement ¾ Tie-Rods
USA Steel G90
Ductmate connections: Any duct larger than 96”

N/R -Not Required
N/A -Not Applicable
JTR -Joint Tie Rod
MPT -Mid Panel Tie Rod(s)

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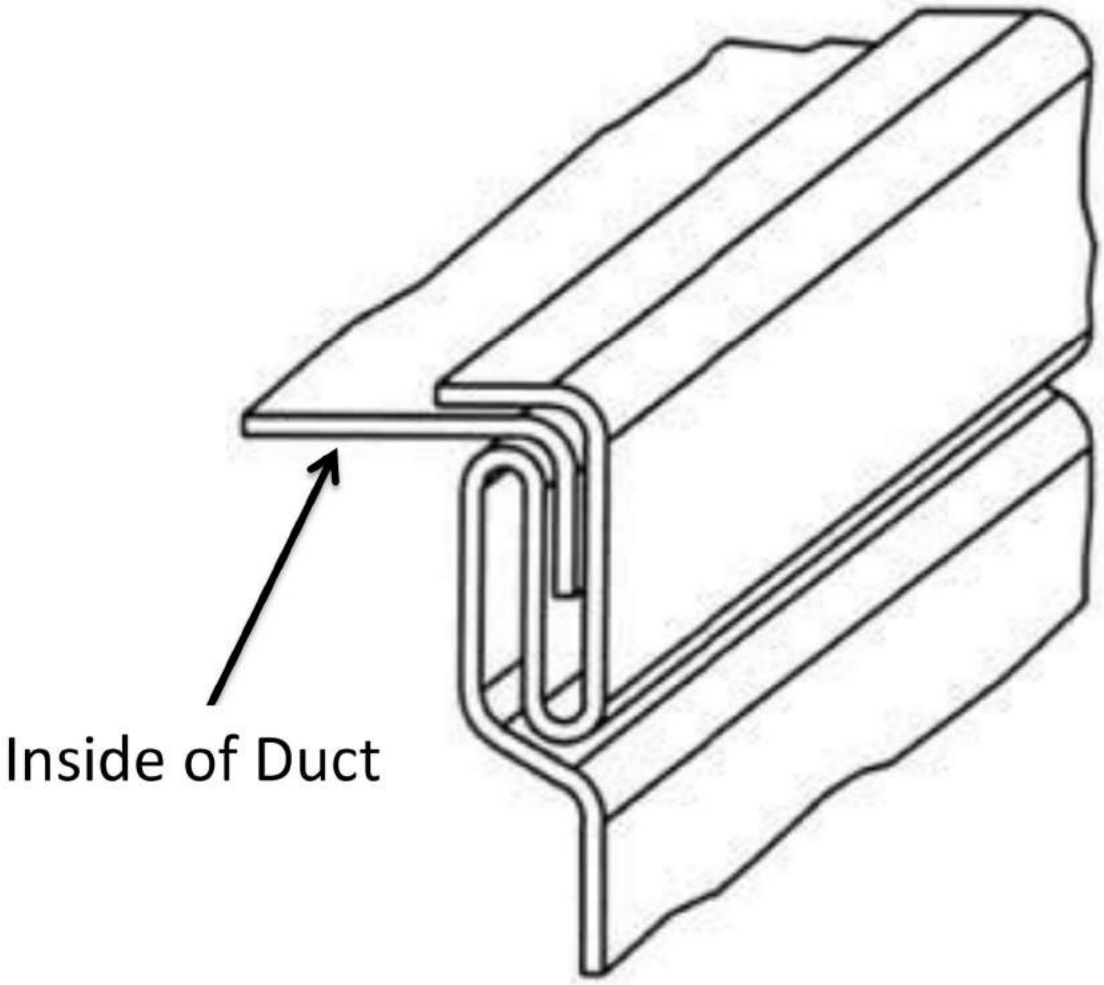


PITTSBURGH SEAM

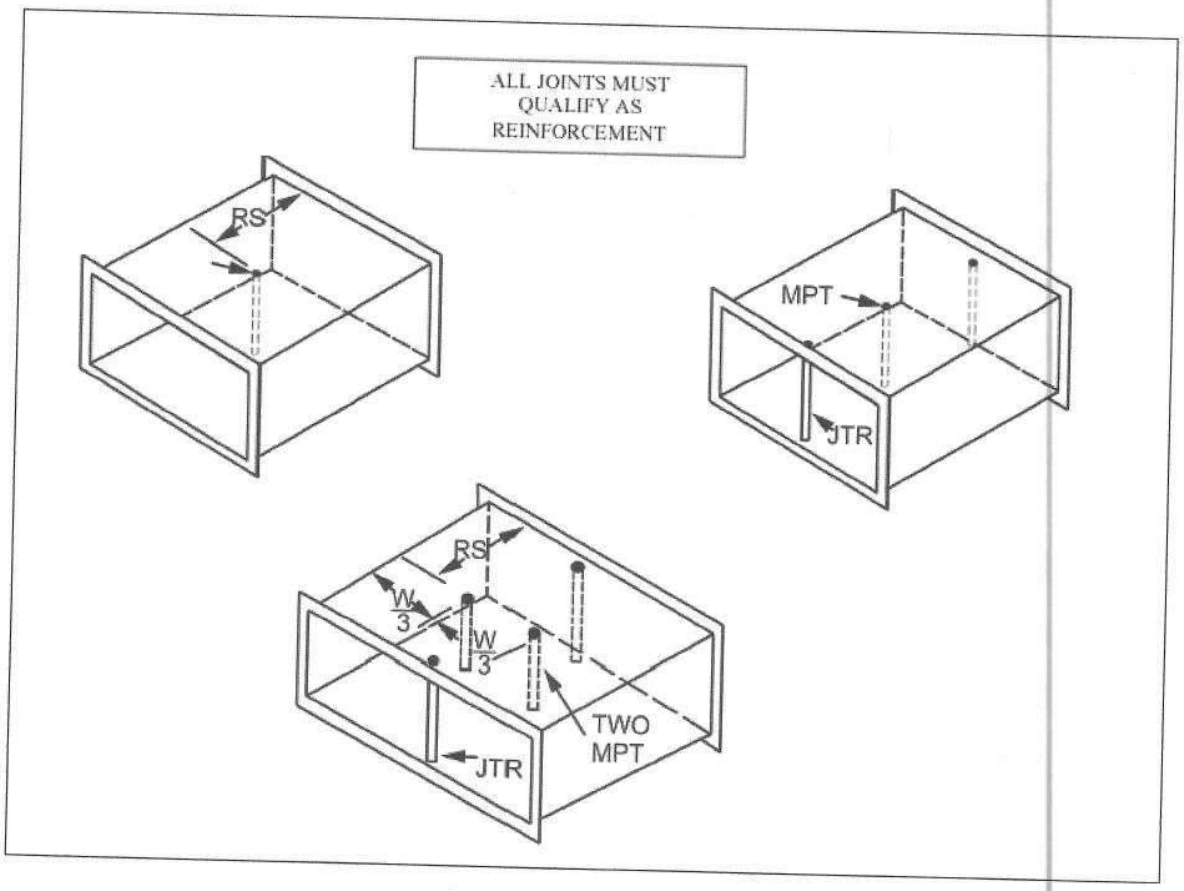
Large: 1-1/4” Allowance
Small: 1” Allowance

6 in. wg Static Pos. or Neg.	5 ft Joints			5 ft Joints w/2 ½ ft Reinf. Spacing				
				Joints/Reinf.			Int. Reinf.	
Duct Dimension	Min ga	Joint Reinf.	Alt. Joint Reinf.	Min ga	Joint Reinf.	Alt. Joint Reinf.	Tie Rod	Alt. Reinf.
8 in. and under	26	N/R	N/A	Use 5 ft Joints				
9 – 10 in.	24	N/R	N/A	26	N/R	N/R	MPT	B
11 – 12 in.	24	N/R	N/A	26	N/R	N/R	MPT	C
13 – 14 in.	22	N/R	N/A	26	N/R	N/R	MPT	C
15 – 16 in.	22	N/R	N/A	26	N/R	N/R	MPT	C
17 – 18 in.	22	N/R	N/A	26	N/R	N/R	MPT	D
19 – 20 in.	22	N/R	N/A	26	N/R	N/R	MPT	D
21 – 22 in.	22	N/R	N/A	24	N/R	N/R	MPT	E
23 – 24 in.	22	N/R	N/A	24	N/R	N/R	MPT	E
25 – 26 in.	20	N/R	N/A	24	N/R	N/R	MPT	E
27 – 28 in.	20	JTR	(2) E	22	N/R	N/R	MPT	F
29 – 30 in.	18	N/R	N/R	22	N/R	N/R	MPT	F
31 – 36 in.	18	JTR	(2) H	20	N/R	N/R	MPT	G
37 – 42 in.	16	JTR	(2) H	20	JTR	(2) E	MPT	H
				18	N/R	N/R	MPT	H
43 – 48 in.	16	JTR	(2) H	20	JTR	(2) H	MPT	I
49 – 54 in.	Not Designed			20	JTR	(2) H	MPT	I
55 – 60 in.				20	JTR	(2) H	MPT	I
61 – 72 in.				18	JTR	(2) I	MPT	J
73 – 84 in.				18	JTR	(2) K	2 MPT	L
85 – 96 in.				16	JTR	N/A	2 MPT	It
97 – 108 in.				16	JTR	N/A		Jt
109 – 120 in.				16	JTR	N/A		Kt

Table 2–20 5 ft Coil/Sheet Stock/T25a/T25b (TDC/TDF) Duct Reinforcement

N/R - Not Required
N/A - Not Applicable
JTR - Joint Tie Rod
MPT - Mid Panel Tie Rod(s)
(2) (X) - Indicates 2 external reinforcements of class (X) to be used in lieu of Joint Tie Rods

Note: t following Reinforcement Class letter indicates tie rod required.



2.9 MIDPANEL TIE ROD SELECTIONS

Example No. 1:

48 × 18 in. (1200 × 450 mm) duct, 2 in. wg (500 Pa) positive pressure per Table 2-3; 5 ft (1.50 m) joint spacing; T-25a or T-25b joints:

In Table 2-3 for 48 in. (1200 mm) width, Column 6 gives reinforcement for 5 ft (1.50 m) RS (reinforcement spacing) as H-20 and Column 9 for 2 1/2 ft (0.75 m) RS as F-24; these are basic alternatives, but the joint ratings must be checked for duct gage override per text Section 2.1.4 and S1.13 and S1.14.

Therefore, for 5 ft (1.50 m) RS option Table 2-32 shows T-25 joints of H Code requiring 18 ga (1.31 mm) duct wall to satisfy the H joint rating; however, T-25 of 20 ga (1.00 mm) with tie rods at the joints (JTR) is I Code which satisfies both Tables 2-3 and 2-32. No between joint reinforcement is required. On the 18 in. (1.31 mm) wide sides, Column 2 shows that reinforcement is not required.

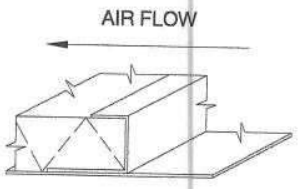
For 48 in. (1200 mm) width, the alternative of 2-½ ft (0.75 m) RS would only require 24 ga (0.70 mm) duct wall per Table 2-3, Column 9, but the F Code in Table 2-32 requires the use of T-25 of 22 ga (0.85 mm) duct wall, an override upgrade from Table 2-3. No tie rod is required at the joint, but one must be used at mid panel between joints (unless external reinforcement per Table 2-29 and 2-30 is used there). 22 ga (0.85 mm) metal will be used on all four sides; *see* text section 2.1.1 (3). On the 18 in. (1.31 mm) side, T-25 of 22 ga (0.85 mm) is F Code (which exceeds the C Code required in Column 9 of Table 2-3).

The requirements for tie rods at T-25 joints are the same as they would be for external reinforcement systems. The joints must qualify independently according to the reinforcement interval. For the conditions in Example No. 1, rods at T-25 joints are only required for 5 ft (1.50 m) RS intervals. Therefore, the rod size for the joint is selected based on one rod per Fig. 2-5(G) or two rods per Fig. 2-5(D) and the load from Table 2-34. In Table 2-34, the load for 2 in. wg (500 Pa) and 5 ft (1.50 m) RS on 48 in. (1200 mm) width is 156 pounds (70.76 kgs) (for one rod or 78 pounds (35.38 kgs) for each of two). From Table 2-35, ¼ in. (6.4 mm) rod suffices. From S1.19.4, ½ in. (12.7 mm) EMT is adequate.

NOTE:

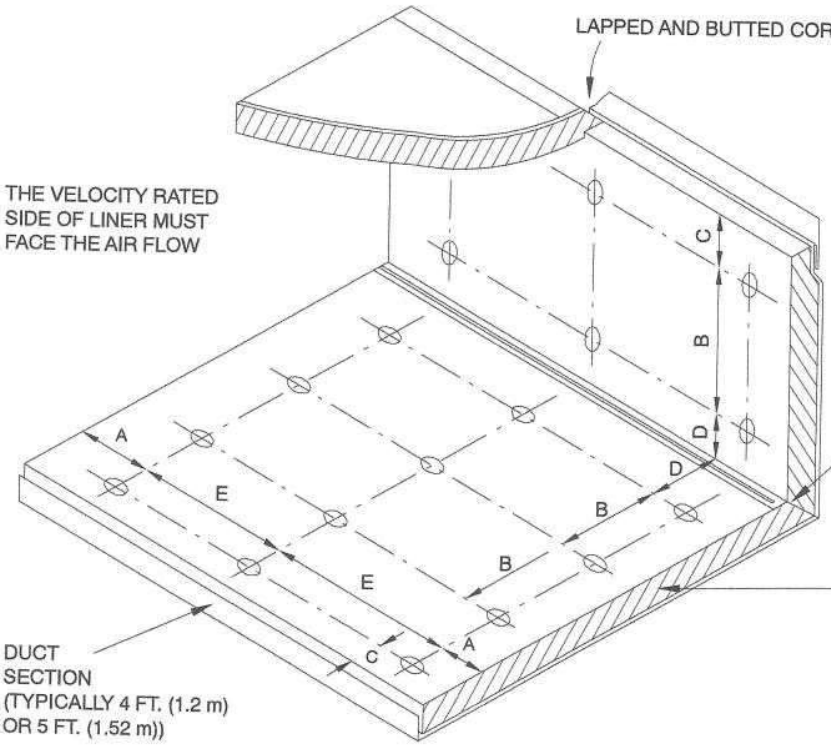
SEE TYPICAL DUCT BRANCH ENTRY CONDITION IN FIG. 4–6.

METAL NOSING MUST BE USED WHEREVER LINER IS PRECEDED BY UNLINED METAL; OTHERWISE WHEN VELOCITY EXCEEDS 4000 FPM (20.3 MPS) USE METAL NOSING ON EVERY LEADING EDGE. NOSING MAY BE FORMED ON DUCT OR BE CHANNEL OR ZEE ATTACHED BY SCREWS, RIVETS OR WELDS.



DETAIL – A
METAL NOSING
CHANNEL OR ZEE

INTERIOR WIDTH OF 8" (200 mm) AND LESS DOES NOT REQUIRE PINS.



THE VELOCITY RATED SIDE OF LINER MUST FACE THE AIR FLOW

PLACE PINS 3" (76 mm) ALONG EACH SIDE OF A BUTTED LONGITUDINAL LINER SEAM THAT IS AWAY FROM A CORNER

ALTERNATE FOLDED CORNER

ALL TRANSVERSE EDGES TO BE COATED WITH ADHESIVE EXCEPT WHEN NOSING IS PRESENT

DUCT SECTION (TYPICALLY 4 FT. (1.2 m) OR 5 FT. (1.52 m))

MAXIMUM SPACING FOR FASTENERS. ACTUAL INTERVALS ARE APPROXIMATE.

"A" PIN ROW MAY BE OMITTED WHEN METAL NOSING IS USED. "E" THEN STARTS FROM THE NOSING.

LINER ADHERED TO THE DUCT WITH 90% MIN. AREA COVERAGE OF ADHESIVE

Velocity *	Dimensions				
	A	B	C	D	E
0 – 2500 FPM (0 – 12.7 MPS)	3" (76.2)	12" (305)	4" (102)	6" (152)	18" (457)
2501 – 6000 FPM (12.7 – 30.5 MPS)	3" (76.2)	6" (152)	4" (102)	6" (152)	16" (406)

* UNLESS A LOWER LEVEL IS SET BY MANUFACTURER OR LISTING AGENCY

FIGURE 7–11 FLEXIBLE DUCT LINER INSTALLATION

Sheet Metal Fabrication
(203)885-0627
558 Federal Rd, Brookfield, CT 06804
Place orders at sheetmetal@mywinair.com

Oval Spiral Duct Sizes

6"	8"	10"	12"	14"	16"	18"
16 / 6	17 / 8	17 / 10	18 / 12	21 / 14	20 / 16	25 / 18
19 / 6	20 / 8	20 / 10	22 / 12	24 / 14	23 / 16	28 / 18
22 / 6	24 / 8	23 / 10	25 / 12	27 / 14	26 / 16	31 / 18
25 / 6	27 / 8	26 / 10	28 / 12	30 / 14	29 / 16	34 / 18
18 / 6	30 / 8	29 / 10	31 / 12	33 / 14	32 / 16	37 / 18
31 / 6	33 / 8	32 / 10	34 / 12	36 / 14	35 / 16	40 / 18
34 / 6	37 / 8	35 / 10	37 / 12	39 / 14	38 / 16	43 / 18
37 / 6	40 / 8	38 / 10	41 / 12	42 / 14	41 / 16	46 / 18
42 / 6	43 / 8	42 / 10	44 / 12	45 / 14	44 / 16	
45 / 6	46 / 8	45 / 10	47 / 12	49 / 14	47 / 16	
48 / 6	49 / 8	48 / 10	51 / 12			
51 / 6	52 / 8	51 / 10				
54 / 6						

Danbury Winair
Sheet Metal Fabrication
(203)885-0627
558 Federal Rd, Brookfield, CT 06804
Place order at sheetmetal@mywinair.com

All Spiral Estimation is based on:

4” Ø to 18” Ø	Gasketed
20” Ø and Above	Accuflange

Gauge:

4” Ø to 10” Ø	26g
12” Ø to 18” Ø	24g
20” Ø to 30” Ø	22g

SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION

Manufacturer's name and address:

K-FLEX USA

K-FLEX USA
100 Nomaco Dr
Youngsville, NC 27596
USA

Supplier's name and address:

Refer to Manufacturer

Telephone No.	:	(800) 765-6475
Website Address	:	www.kflexusa.com
Product Identifier	:	K-FLEX Elastomeric Foam; K-FLEX INSUL-TUBE, K-FLEX INSUL-SHEET, K-FLEX INSUL-LOCK, K-FLEX INSUL-LOCK SEAM SEAL K-FLEX ECO, K-FLEX DUCT LINER GRAY, K-FIT, K-TEK K 41-E, ELASTOMERIC TAPE
Chemical Name	:	NBR/PVC Elastomeric Foam
Recommended Use	:	This product is classified as an "article" according to Title 29 of the Code of Federal Regulations, OSHA Part 1910.1200C.

SECTION 2 – HAZARD(S) IDENTIFICATION

Hazardous Ingredient : None

SECTION 3 – COMPOSITION/INFORMATION OF INGREDIENTS

Description : Elastomeric closed-cell foam comprised of nitrile butadiene rubber/polyvinyl chloride (NBR/PVC). Available in rolls and sheets of various dimensions.

SECTION 4 – FIRST-AID MEASURES

Inhalation	:	Unlikely route of exposure. No measures established.
Skin Contact	:	If rash or irritation develops, wash with soap and water. If rash or irritation persists, consult a physician.
Eye Contact	:	Small particles may cause irritation. Flush with water. If irritation persists, consult a physician.
Ingestion	:	Unlikely route of exposure. No adverse effects anticipated.

SECTION 5 – FIRE-FIGHTING MEASURES

Extinguishing Media	:	Water, CO_2, Dry Chemical, Foam
Special Firefighting Procedures	:	Recommend NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing be worn.
Decomposition Products	:	Upon combustion, HCl, HCN, and other hazardous gases may be evolved.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions	:	Recommend light to medium duty cloth or leather gloves and approved safety glasses.
Emergency Procedures	:	None.

SECTION 7 – HANDLING AND STORAGE

Hints for Safe Handling	:	None.
Hints for Fire and Explosion Protection	:	None.
Hints for Separation of Incompatible Materials	:	None.
Storage Recommendations	:	Avoid storage in confined areas where temperatures may exceed 51°C (125°F).

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Medical Conditions Aggravated by Exposure	:	Not established.
Codes Used	:	N/A
General Health Measures	:	N/A
Engineering Controls	:	Local exhaust ventilation is recommended for control of airborne dust, fumes, and vapors in confined areas.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Sheets, rolls, and tubes; some with self-adhesive
Color	:	Black, white, or gray.
Odor	:	Negligible to no odor.
Melting Point	:	N/A
Boiling Point	:	N/A
Lower Explosion Limit	:	N/A
Upper Explosion Limit	:	N/A
Vapor Pressure @ 20°C	:	0.1

Vapor Density (Air = 1)	: N/A
Solubility	: Insoluble
Specific Gravity (H_2O = 1)	: N/A
Flash Point	: N/A

SECTION 10 – STABILITY AND REACTIVITY

Stability	: Stable.
Incompatibility	: N/A
Decomposition Products	: Upon combustion, HCl, HCN, and other hazardous gases may be evolved.

SECTION 11 – TOXICOLOGICAL INFORMATION

Effects on short- and long-term Exposure : When used and handled according to specification, the product does not have any harmful effect to the best of our knowledge.

SECTION 12 – ECOLOGICAL INFORMATION

Classified as non-hazardous to waters.

SECTION 13 – DISPOSAL CONSIDERATIONS

Disposal : Not a RCRA hazardous waste. Dispose of in accordance with local, state, and federal regulations.

SECTION 14 – TRANSPORT INFORMATION

No hazardous materials.

SECTION 15 – REGULATORY INFORMATION

N/A

SECTION 16 – OTHER INFORMATION

Revised January, 2015. The information and recommendations contained herein are based upon data that is accurate and reliable, to the best of K-FLEX USA, LLC knowledge and belief. With respect to information and recommendations, K-FLEX USA, LLC makes no representations or warranties of any kind or nature, expressed or implied.

S A F E T Y D A T A S H E E T

SECTION I - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	Water Based Liner Adhesive
MANUFACTURERS'	Elgen Manufacturing Company INC.
ADDRESS:	10 Railroad Ave, Closter NJ 07624
EMERGENCY PHONE:	INFOTRAC: (800) 535-5053
BUSINESS HOURS:	6AM - 6PM
REVISION DATE:	04/01/2016
INFORMATION PHONE:	(800)503-9805
REVISION #:	3-15
PREPARED BY:	IT Department. Supersedes all previous
DOT HAZARD CLASS:	Not Hazardous - UN Number: N/A

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

HMIS Ratings: Health: 1 Flammability: 0 Reactivity: 0 Personal Protective Equipment: B

REPORTABLE COMPONENTS	CAS NUMBER	Weight %
None		

SECTION III – COMPOSITION/INFORMATION ON INGREDIENTS

PROPRIETARY COMPONENT	CAS NUMBER	CONCENTRATION
Trade Secret	Proprietary Blend	

SECTION IV – FIRST AID MEASURES

INHALATION: Remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, administer artificial respiration. Contact physician or emergency medical facility immediately.

SKIN: Remove contaminated clothing and shoes. Wash exposed area thoroughly with soap and water for at least 15 minutes. Do not rub affected area. If irritation persists, get medical attention. Skin reaction may take 24 to 48 hours to develop. Wash contaminated clothing before reuse.

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes while frequently lifting the upper and lower eyelids. If irritation persists, call a physician.

INGESTION: Do not induce vomiting. Contact physician or emergency medical facility immediately. Never give anything by mouth to an unconscious person.

SECTION V - FIRE-FIGHTING MEASURES

FLASH POINT	None
FIRE AND EXPLOSION HAZARD	Closed containers exposed to extreme heat may rupture due to pressure build up
EXTINGUISHING MEDIA	The product will only burn after the water it contains is driven off. For dried film use water, foam, carbon dioxide or dry chemical.
FIRE FIGHTING INSTRUCTIONS	Water may be used to cool exposed containers.

SECTION VI – ACCIDENTAL RELEASE MEASURES

SPILL CLEANUP: Dike, contain, or absorb with inert absorbent material. Collect spilled material in a salvage container. Prevent spill from entering sewers, drains, streams, waterways, or other bodies of water.

ACCIDENTAL RELEASE MEASURES: Dispose of in accordance with all local, state and federal regulations.

SECTION VII – HANDLING AND STORAGE

HANDLING: DO NOT ALLOW TO FREEZE. Store in a cool dry location away from heat. Keep containers tightly closed and store with adequate ventilation.

OTHER PRECAUTIONS: DO NOT TAKE INTERNALLY. Avoid inhalation of excess vapors, ingestion, and unnecessary, prolonged, or repeated contact with this and any other chemical. Change soiled work clothes frequently. Clean hands after handling. KEEP OUT OF REACH OF CHILDREN.

STORAGE: Keep in a dry, cool place, protect material from freezing.

SECTION VIII – EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS : Use only in area provided with appropriate exhaust ventilation.

EYE PROTECTION : Use chemical splash goggles or OSHA permitted safety glasses.

SKIN PROTECTION : Protection gloves

RESPIRATORY PROTECTION : Not required under normal conditions. Provide sufficient ventilation to maintain constant fresh air in workspace. If TLV is exceeded, use NIOSH/MSHA approved organic vapor and mist, supplied air, or self-contained breathing apparatus. Avoid breathing sanding dust.

SECTION IX - PHYSICAL / CHEMICAL PROPERTIES

FORM	Mobile Liquid	**SPECIFIC GRAVITY**	(H_20=1) 1.1-1.2
COLOR	White or Black	**BOILING POINT**	212°F
ODOR	Mild, Sweet	**PH**	8.0-9.5
SOLUBILITY IN WATER	Miscible	**PERCENT VOLATILE BY WEIGHT**	55-65%
COATING V.O.C.	22 g/l	**VISCOSITY (CPS)**	approx. 2,000-3,500
WATER SOLUBILITY	Soluble	**FREEZING POINT**	32°F(0°C)

SECTION X – STABILITY AND REACTIVITY DATA

CONDITIONS TO AVOID : Coagulation may occur after freezing, thawing, or boiling.

INCOMPATIBILITY : Metal salts, mineral acids (i.e. sulfuric, phosphoric, etc.) Strong oxidizing agents. Strong reducing agents.

DECOMPOSITION : May form toxic materials on thermal decomposition including Carbon monoxide (CO), Carbon dioxide (CO2), and various hydrocarbons. Under fire conditions, this product will release hydrogen chloride gas.

POLYMERIZATION : Polymerization will not occur.

STABILITY : Stable at ambient temperatures.

SECTION XI – TOXICOLOGICAL INFORMATION

SKIN : Prolonged and repeated contact with product may cause skin irritation.

EYES : Direct contact, may cause irritation.

INHALATION : Adverse health effects from vapors or spray mists in poorly ventilated areas may include irritation of the mucous membranes of the nose, throat, and respiratory tract and symptoms of headache and nausea.

SECTION XII – ECOLOGICAL INFORMATION

ECOTOXICITY: No ecotoxicity data was found for the product

ENVIRONMENTAL FATE: No environmental information found for this product

SECTION XIII – DISPOSAL CONSIDERATIONS

Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines.

SECTION XIV – TRANSPORT INFORMATION

DOT HAZARD CLASS	Not Hazardous
UN NUMBER	N/A
PACKING GROUP	N/A
SHIPPING NAME	N/A

SECTION XV –REGULATORY INFORMATION

This product is considered non-hazardous under the OSHA Hazard Communication Standard 29 CFR 1910.1200.
EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW (SARA TITLE III):
Section 311/312 Categorizations (40 CFR 370): Immediate (Acute) Health Hazard.
Section 313 Information (40 CFR 372) – Toxic Chemicals List: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372:Component: none. Toxic Substances Control Act (TSCA): All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.
CALIFORNIA PROPOSITION 65 (Safe Drinking Water and Toxic Enforcement Act of 1986): None listed.

SECTION XVI –OTHER INFORMATION

CREATION DATE	06/10/2009
REVISION DATE	06/01/2016
REVISION NOTE	SDS - 16 Section
AUTHOR	IT Department

WATER-BASED LINER ADHESIVE

Product Data Sheet

Description

Elgen's Water - Based Liner Adhesive is an economical, water-based product for bonding insulation to metal surfaces. A non-oxidizing vinyl copolymer adhesive with excellent temperature and moisture resistance after curing, it forms a durable bond that will not become brittle with age.

Standard Construction

Properties	Value
Composition	A high solids, water base adhesive that is non-flammable when wet.
Color	White/Black
Viscosity	2000 to 3000 cps
Solids Content	37% ± 2%
Weight per Gallon	10.0 ± 0.1 #/gallon
Drying time	Tack-free: 3 to 4 hours (depending on humidity and temperature) Complete drying: 2 to 3 days at room temperature
Application and storage	KEEP FROM FREEZING 50°F TO 100°F Store and ship at temperatures above 32°F. Use within 6 months after receipt.
Service temperature	0°F to 180°F
Flammability	Wet - Non-flammable. Dry - Slow burning.
Clean-up	Thin with water. Clean up when wet with warm water. Dry clean up with aromatic or chlorinated solvents.

Features

This adhesive can be sprayed, brushed, or rolled and is designed for both manual and automatic applications. It provides excellent results with easy cleanup. Our duct liner adhesive contains antimicrobial agents that remain effective after the adhesive has cured.

Non-flammable, no unpleasant odors or hazardous fumes. Safe to use in enclosed areas.

Easy clean up with warm water

Good wet-tack

Fast drying with high tack.

Excellent coverage.

Contains zero VOC (volatile organic compounds).

Meet Requirements For Iowa Precision Coil Lines.

LEED Compliant

Meets requirements of NFPA 90A & 90B
Meets requirements of ASTM C-916

Packaging

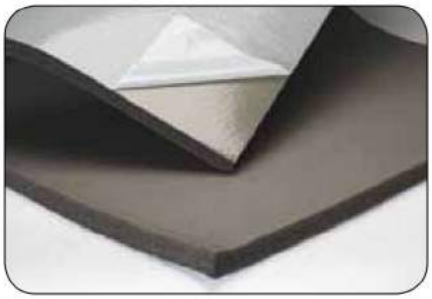
5 Gallon Pails
52 Gallon Drums

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

K-FLEX DUCT® LINER GRAY



Flexible, Closed Cell Elastomeric Foam Insulation
Responsive to Market
Industry & Product Expertise
3rd Party Certified Products
25/50-rated up to 2" thick
Systems Approach
Factory-applied Options
14 Production Facilities Worldwide

K-FLEX USA
INNOVATION IN INSULATION

DUCT LINER BENEFITS

A key design objective of modern residential, commercial and industrial facilities is to incorporate a concern for energy consumption, as well as occupant comfort and safety. A healthier, more productive and more attractive environment depends in large part on well-designed and properly-insulated HVAC duct systems, which carry air to conditioned spaces inhabited by people, sensitive equipment, or a combination of both.

The advent of enhanced Indoor Air Quality (IAQ) has influenced engineers to 1) keep interior ducts free of foreign materials that bring fibers into the air stream, absorb moisture, or support mold growth, and 2) address sound reduction mechanically through deflection and other methods. However, not using interior insulation results in increased transferred noise, energy loss, and higher cost solutions. Using a fiber-free, closed cell elastomeric liner provides a solution for all of these issues.

TECHNICAL PROPERTIES

COMPARISON BETWEEN MATERIALS

	K-FLEX Duct® Liner Gray Closed Cell Elatomeric	Fibrous	Semi-Closed Cell Elastomeric
Closed Cell Structure	Yes	No	No
Flexible	Yes	Yes	Yes
Thermal k (75°F mean)	0.25	0.23	0.25
water vapor transmission (wvt) without jacketing (perm-in)	<0.06	25.00	Info not available
25/50 flammability rating	Yes (2")	Yes	Yes (1")
Service Temperature (°F)	-297°F to +220°F	0°F to +250°F	-297°F to + 180°F
Density (pcf)	3 - 4	1.5 - 3	3 - 6
Available with PSA	Yes	No	No
Fiber-free	Yes	No	Yes
Non-porous	Yes	No	No
Resists Dirt Accumulation	Yes	No	Yes
NRC Value (1")	0.50	0.75	0.60

NOISE REDUCTION

Effective noise reduction in ducts requires an integrated strategy of good mechanical layout, vibration isolation and insulation with noise absorbing properties. Acoustic performance can be categorized into two functions: noise reduction (absorption) and sound barrier. For duct lining applications, the primary acoustical goal of the insulation is to achieve noise reduction through the absorption of sound waves and the subsequent conversion of sound energy into heat. The insulation absorbs noise from the air handler (fan) and room, and prevents it from traveling down the duct and exiting at the vent openings.

Noise reduction, quantified by the Noise Reduction Coefficient (NRC), measures the percentage of sound absorption in a reverberation room by determining noise decay rate. K-FLEX Duct® Liner Gray outperforms fibrous, and is comparable to semi-closed cell elastomeric, in absorbing noise at low frequencies associated with equipment rumble (125 - 500 Hz), which is the #1 target for acoustical treatment. Noise from higher frequencies, i.e. high pitched screeching, is the result of a mechanical problem downstream and is not usually a consideration.

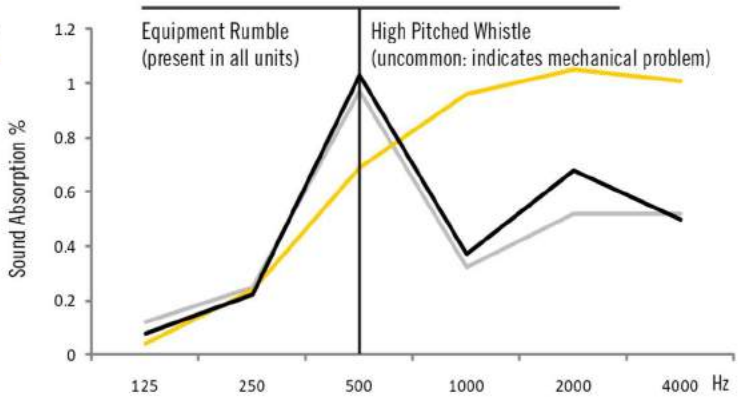
Sound barriers, quantified by the Sound Transmission Loss (STL), reduce the amount of noise that pass through an area being by reflecting the sound waves back to its source. STL values are defined as the difference in decibels (dB) between the average sound pressure levels in the source and receiving rooms before and after acoustic treatment which are then used to determine the Sound Transmission Class (STC) of the product. Sound barrier properties are generally related to the mass of the material in that the higher the mass, the higher (better) the STC value. In the case of metal air ducts, the metal duct itself is a good barrier material and the insulation is not a major contributor as a sound barrier. When STC values are given for duct lining materials, they are often tested as a composite (insulation and metal together) as this provides a more accurate measure of the STL of the application and if the insulation were tested by itself, it would not provide a very high value. It should be noted however, that insulation, when adhered to the duct will reduce noise created by vibration from the duct.

Sound Performance Comparison

K-FLEX DUCT® LINER GRAY

Fiberglass

Semi-Closed Cell Elastomeric



Sound Absorption	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
1" K-FLEX Duct® Liner Gray	0.12	0.25	0.97	0.32	0.52	0.52	0.50
1" Fibrous*	0.04	0.24	0.69	0.96	1.05	1.01	0.75
1" Semi-Closed Cell Elastomeric*	0.08	0.22	1.03	0.37	0.68	0.50	0.60

*Sound Barrier***	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	STC
1.5" K-FLEX Duct® Liner Gray	12	10	13	14	22	31	16

*Taken from manufacturer's published data.

**Tested as insulation only. Testing conducted with insulation attached to metal would lead to high STC rating around 25.

ENERGY CONSERVATION

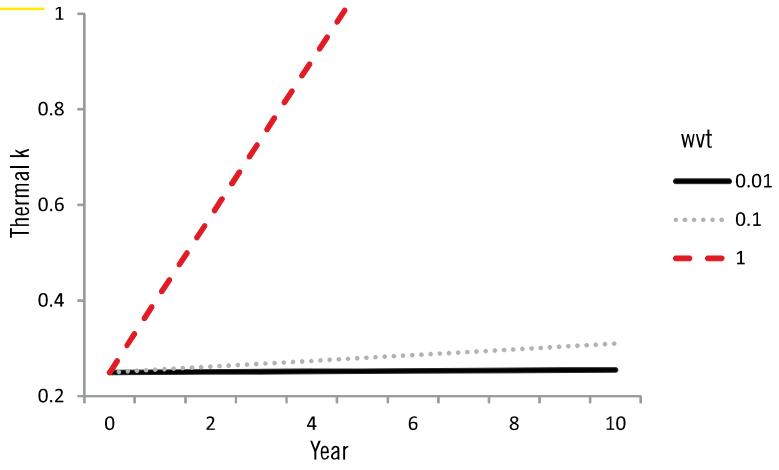
Thermal insulation is commonly used to reduce energy consumption of HVAC systems and equipment. If improper insulation is used, potential threats include heat loss through duct walls and moisture intrusion into the interior structure of the insulation. Since water is a very good conductor, the capability of an insulation material to slow water vapor from penetrating into its interior structure is fundamental for the long-term efficiency of the application.

SMACNA allows 5% moisture intrusion for fiberglass liner, **BUT:** *For every 1% moisture gain, the insulation effectiveness drops 7.5%.* As indicated below, if the wvt of the insulation is less than 0.10 perm-in, there will be minimal long-term effects on the k-value.

	k-value (75°F mean)	wvt (perm-in) unjacketed
Closed Cell Elastomeric	0.25	0.05
Fibrous	0.23	25.00
Semi-Closed Cell Elastomeric	0.25	not published

Thermal k performance over time with moisture gain (10 years)

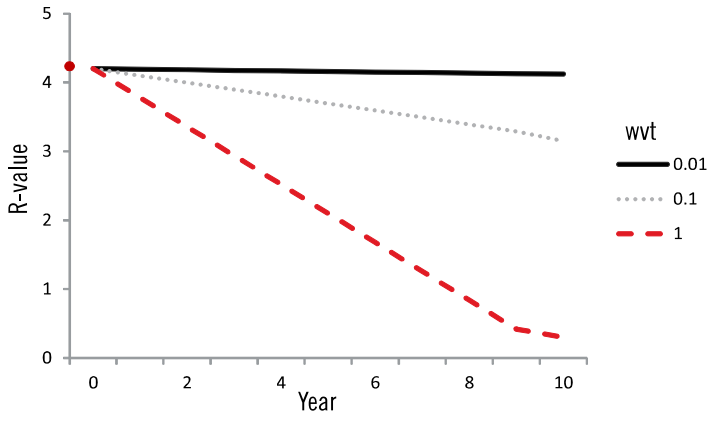
wvt (perm-in)	.01	.10	1.00
k-value (start)	.250	.250	.250
k-value (10 years)	.255	.310	1.88



R value performance over time with moisture gain (10 years)

An R-value of 4.2 is required by IECC, ASHRAE and nearly every state building code.

wvt (perm-in)	.01	.10	1.00
R-value (start)	4.2	4.2	4.2
R-value (10 years)	4.12	3.15	0.55



IAQ CONTROL MOLD RESISTANCE / LOW VOC / NON-FIBROUS

For an insulation material to defend against indoor air quality (IAQ) problems, it must resist condensation and moisture intrusion that can lead to mold, and ensure that the air passing over it does not contain fibers or dust. In ductwork that functions using conditioned air, the formation of condensation on the surface of the insulating material, within it, or on the outside of the metal is a negative factor.

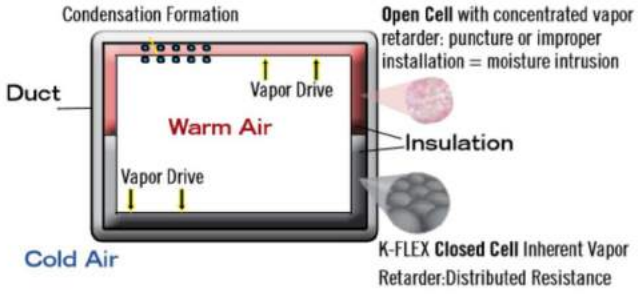
Condensation forms as a result of the direct contact of warm humid air with a cold surface if the temperature of the surface is lower than the Dew Point of the humid air. The surface temperature of a duct and of the insulation depends on the application conditions and the R-value of the insulation material. If the insulation material is vapor permeable, moisture can move inside the insulation to reach areas where the temperature is low enough to have condensation, even if the surface temperature of the insulation is high enough to prevent surface condensation. An insulation material with low wvt would prevent this situation from occuring.

K-FLEX Duct® Liner Gray has tested as being mold resistant to ASTM G 21 standards. This is a result of a closed cell structure that inherently resists moisture and wicking, an added anti-microbial agent, a smooth surface skin that resists dirt accumulation, and a fiber-free composition that makes it non-particulating and non-eroding. K-FLEX Duct® Liner Gray is **GREENGUARD® certified** as a low VOC material, meeting the requirements for the *"Children & Schools"* and *"Indoor Air Quality"* classifications.

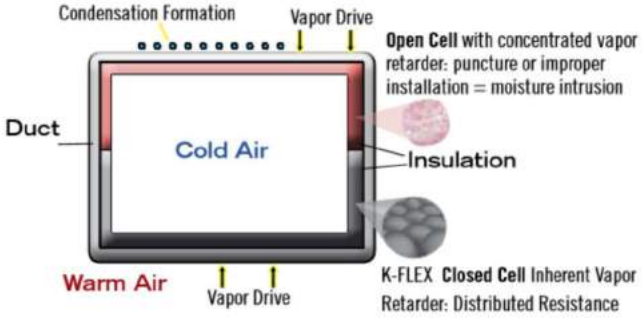
In contrast, fibrous or open cell materials rely on a concentrated moisture vapor barrier (foil jacket or surface-applied coating). If the barrier is damaged (even a pinhole) or the edges are not properly sealed, they are susceptible to moisture intrusion and subsequent mold growth. Once moisture penetrates, it can wick and involve large areas in the mold growth process. The *EPA & NAIMA* recommend the immediate removal of wet fiberglass to prevent mold, which means additional costs.

A study published in the April 2004 issue of *ASHRAE Journal* showed that an inspection of 150 office buildings with fiberglass duct liner revealed that 92% of them had fungal growth. Semi-closed cell elastomeric insulation would also be susceptible to moisture intrusion. Often times, the insulation can have moisture issues before the building is enclosed or commissioned.

Winter: Cold air outside duct, warm air inside duct



Summer: Warm air outside duct, cold air inside duct



Result w/ Fibrous: Mold growth on insulation

Result w/ Fibrous: Mold growth on ceiling from water drip (corrosion on duct also possible)

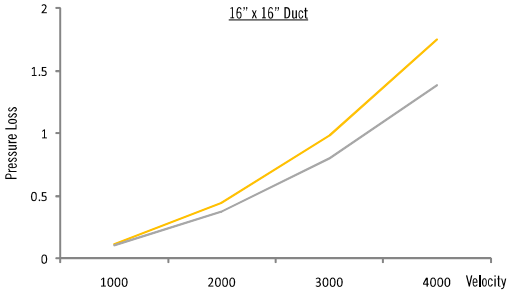
PERFORMANCE

- Reliable: Excellent thermal k after 10 years
- Temperature Range: -297°F to +220°F
- Low perm (<0.06 perm-in) without jacketing = No vapor barrier facing / edge treatment needed
- Available with or without factory-applied PSA
- Inherently high mold & mildew resistance
- Fiber-free & Low VOC = IAQ
- GREENGUARD® Certified - Children & Schools™ Classification for low VOC & Microbial Resistance Listing
- Contains an EPA-registered antimicrobial agent for added protection
- No erosion, cracking or delamination at high velocity air flow rates
- Low pressure loss (values comparable to fiberglass)**
- Sustainable: Lasts the life of the system

PROPERTY	RATING	CRITERIA
NRC 1"	0.50	ASTM C 423
STC 1.5" (insulation only)	16	ASTM E 90
wvp	<0.06 perm-in	ASTM E 96
Water Absorption	<.2%	ASTM C 209
Thermal k	0.25 (Btu-in/h-ft^2-°F)	ASTM C 177 & C 518
R-value	1" = 4.2, 2" = 8	
Fire Rating	25/50 up to 2" thick Pass	ASTM E 84 NFPA 90 A / 90 B
Air Erosion	Pass up to 10,000 fpm	UL 181
Mold	Pass	ASTM G 21
Energy Rating	Complies	ASHRAE 90.1
Elastomeric Duct Lining Requirements	Pass	ASTM C 1534

**PRESSURE LOSS (H_2O/100 ft):
K-FLEX DUCT® LINER GRAY vs. Fiberglass

Velocity (ft/m)	10" x 10"	16" x 16"	24" x 24"
1000	.311 / .207	.102 / .114	.052 / .068
2000	1.007 / .806	.377 / .443	.207 / .266
3000	2.021 / 1.797	.799 / .988	.473 / .594
4000	3.467 / 3.179	1.386 / 1.748	.849 / 1.050



SPECIFICATION COMPLIANCE

- ASTM C534 Type 2 (Sheet), Grade 1
- ASTM C1534
- ASTM D1056-00-2C1
- ASTM C423/E795 NRC=0.50 at 1" thickness
- New York City MEA 186-86-M Vol. V
- USDA & RoHS Compliant
- UL 94-5V Flammability Classification (Recognition No. E300774)
- ASTM E84: 25/50 at 2" and below
- Meets requirements of NFPA 90A Sect. 2.3.3 for Supplementary Materials for Air Distribution Systems up to 2" thickness
- Meets requirements of UL 181 Sections 11.0 and 16.0 (Mold Growth/Air Erosion)
- Meets requirements of ASTM C411 (Test Method for Hot Surface Performance of High Temperature Thermal Insulation)
- GREENGUARD certified under the "Children & Schools" and "Indoor Air Quality" classifications

INSTALLATION & MAINTENANCE

- No Double Wall required to prevent air erosion or airborne fibers
  On average, double wall is 60% more expensive than single wall
  No need to wrap in mylar
  No need to finish (seal) exposed edges
- Easy to fabricate & install (use SMACNA guidelines)
  No issues using weld pins or impact-applied fasteners
  (K-FLEX recommends pins & adhesives to fasten liner to metal)
  Easy to cut manually or with an automated machine
  Works well with automated, semi-automated, and handheld equipment
- Flexible: non-rigid, non-breakable
- No protective clothing required during installation
- Safe: Non-dusting, Non-wicking, Non-abrasive, Non-itching
- Low Maintenance
- Easy to Clean – Smooth and Durable Surface, Resists Tearing
- Available with factory-applied pressure sensitive adhesive (PSA)

PROJECT REFERENCE LIST

- Bellefonte High School, Pennsylvania
- City Of Doral Courthouse, Florida
- Washington State University Veterinary Science Building, Washington
- Finn Hill School, Washington
- Allegheny College, Pennsylvania
- Pine Richland High School, Pennsylvania
- Taunton Courthouse, Massachusetts
- University of Massachusetts, Massachusetts
- Massachusetts Department of Transportation, Massachusetts
- Kelowna General Hospital, British Columbia, Canada
- Bloomsburg University, Pennsylvania
- Woodward Elementary School, British Columbia

K-FLEX USA
INNOVATION IN INSULATION

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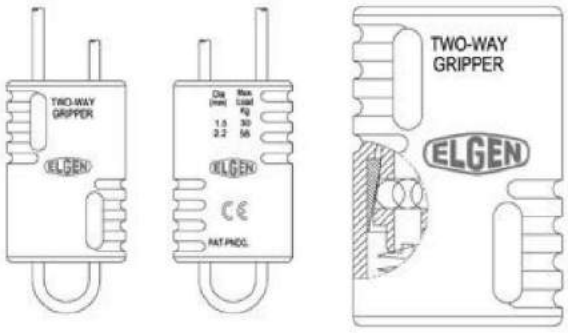
100 Nomaco Drive
Youngsville, NC 27596

KFAP-0001-0911

TWO WAY GRIPPER

Product Data Sheet



Description

Elgen's Two Way Gripper is a steel cable hanging system. It is intended to add a simpler way of suspending ductwork. With it's 5 to 1 safety factor and ease of use, the Two Way Gripper is the ideal hanging system for both the contractor and building owner.

Standard Construction

Size	Wire Rope	Working Load	Configuration
TWG 125	WR 10	125 lbs	7x7
TWG 250	WR 20	250 lbs	7x7
TWG 650	WR 30	650 lbs	7x19

CAUTION

* Never exceed the suggested working load weight limit
*Do not apply any lubricants or paint to wire or unit itself
*Do not install wire over abrasive edges or surfaces
*Do not use in corrosive environments

***Consult with your local Elgen Representative for any concerns

Features

ASTM E8 & A370 Approved
Complies with SMACNA Upper and Lower attachment standards if used in strict accordance with manufacturer's installation instructions
5 to 1 Safety Factor
Open Bore for ease of use
Extra hanging configurations and angles
Effortless hand adjustment
Extra wire holes provide clean aesthetics

Construction

Unit Body - Zinc (z-3)
Inner components - Steel
Wire - Electro galvanized steel

Packaging

Size	Pcs Per Bag	Pcs Per Bkt	Bkts Per Pallet
TWG 125	10	500	48
TWG 250	10	400	48
TWG 650	4	120	36

Wire Rope	Used With	Length	Configuration
WR 10	TWG 125	500'	7x7
WR 20	TWG 250	500'	7x7
WR 30	TWG 650	500'	7x19
WIRE ROPE WITH FIXED 3" LOOP			
WR10310	TWG 125	10'	7x7
WR10315	TWG 125	15'	7x7
WR10330	TWG 125	30'	7x7
WR20310	TWG 250	10'	7x7
WR20315	TWG 250	15'	7x7
WR20330	TWG 250	30'	7x7

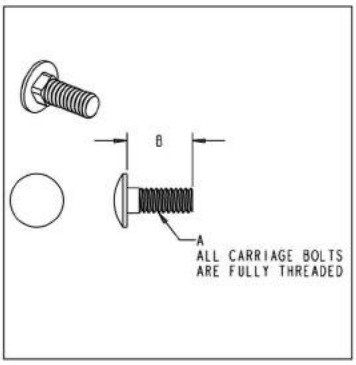
Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

Carriage Bolt

Product Data Sheet



Features

Material Meets ASTM A307 Grade A.
Zinc Plating meets ASTM F1941 FeZn3A
Typical Hardness: HRB 69-100
Tensile Strength: 60,000 PSI (4650 lbs) Min
Length Tolerances (up to and including 1"): +0.02/-0.03

Description

Elgen's Carriage Bolt is used in conjunction with all 4-bolt Flange systems.

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum

Standard Construction

Made from Low Carbon steel - ASTM A307 - Grade A.

Size (in)	A (in)	B (in)
3/8 x 1	3/8	1
3/8 x 1-1/4	3/8	1-1/4

Packaging

Item	Size (in)	Box Qty	Skid Qty
Carriage Bolt	3/8 x 1	1,000	36,000
Carriage Bolt	3/8 x 1-1/4	1,000	36,000

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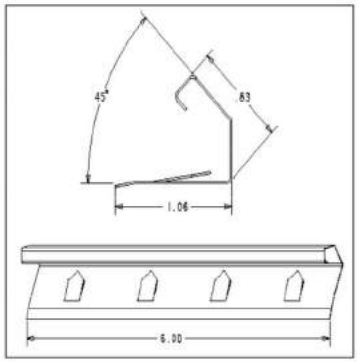
E-55 Cleat

Product Data Sheet



Features

Four "Teeth" provides a secure lock
Easy to install (no tool needed)
Meets SMACNA requirements (6" Length)
Union Made
Works with C, F, J Flange, and Elgen Flange

Description

Elgen's E-55 Cleat is compatible on all flange systems except H. The E-55 Cleat is used on the perimeter of the Flange, four bolt rectangular system. The use of the E-55 Cleat provides uniform compression for the 440 Butyl Gasket between the Flange's for an energy efficient seal.

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)

Standard Construction

Stamped from 22 and 20 Ga ASTM A-653 G60 material
Weight(per box)(22 GA): 28 lbs
Weight(per box)(20 GA): 34 lbs

Packaging

Gauge	Box Qty	Skid Qty
22	250	24,000
20	250	24,000

Guarantee

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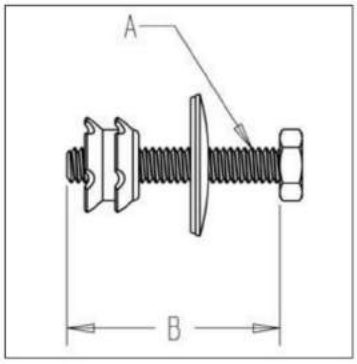
Conduit Inserts

Product Data Sheet



Features

Rf. SMACNA HVAC Duct Construction Standards, PG 1-29 FIG. 1 - 2, Fig "B"
Neoprene/Metal washer to create airtight seal

Optional Construction

Stainless Steel 304
Stainless Steel 316

Description

Elgen's Conduit Inserts are used in conjunction with metal EMT or conduit to provide internal rectangular duct support.

Please see Elgen's Rectangular Duct Construction Standards with use of Conduit inserts for selection of appropriate size.

Standard Construction

1/2" and 3/4":

1/2" conduit (for duct up to 36" in width)
3/4" conduit (for duct over 36" in width)

Hex Head Bolt- 1/4-20 x 1-1/4" Grade 2 zinc plated steel

1/4" Flat washer with neoprene gasket
1/4" "Star" Nut

1-1/4" and 1-1/2":

Hex Head Bolt- 5/16-20 x 2" Grade 2 zinc plated steel

5/16" Flat washer with neoprene gasket
5/16" "Star" Nut

Testing Results

Pull Out Test		
Tube Connector	Load to 1/16" Pull Out	Load to Failure
1/2"	1500 - 2000	2000 - 2200
3/4"	1900 - 2400	2300 - 2600

Torque Test	
Tube Connector	Maximum Torque
1/2"	70 in - lbs (nut spins)
3/4"	70 in - lbs (nut spins)

Packaging

Size A	Length B	Box Qty	Weight (lbs)
1/4"	1-1/4"	1,000	45
5/16"	2"	1,000	55

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SHRINK WRAP with PSA

Product Data Sheet

Features

No need to tape
No loose ends flapping
The product is easy to put on and easy to take off
Does not leave any residue
Resists tearing due to its high rubber content
No VOC's - Meets LEEDS® Requirements
UV Resistant
Waterproof

Description

Elgen's Shrink Wrap with PSA is a polyethylene film with adhesive. Elgen's Shrink Wrap with PSA is used as an alternative to a polyethylene film that is secured to the duct wall with tape.

Elgen's Shrink Wrap with PSA is used on any exposed sections of the duct work. It prevents outside debris from entering the ductwork and contaminating the duct work.

Optional Construction

Available Roll Sizes:
2′ - 3′ - 4′ - 5′

Available Thickness:
2mil - 3mil - 4.5 mil

Available Colors:
Blue - Clear - Black - Green - Orange - Red - Brown - Purple - Yellow

Standard Construction

Designed to adhere to the following metals:

Galvanized, stainless steel, aluminum , aluminized, galvaneal(paint grip), PCD coated, black iron.

Thickness (mil)	Minimum Elongation (%)
2	400
3	600
4.5	800

Packaging

Roll Sizes (ft)	Length per Roll (ft)	Skid Qty (roll)
2	200	300
3	200	200
4	200	150
5	200	125

Guarantee

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ELGEN DUCT SEAL-IT

Product Data Sheet

Description

A top quality, water based, high pressure/high velocity duct sealant for commercial and residential ductwork.

Features

LEED® V4 Qualified
Qualifies for LEED® Credit
Very User Friendly
Resists Mold and Mildew
For Outdoor and Indoor Use
Does Not Drip and Sag
Noncombustible
Nonflammable
Paintable
Tested in accordance with and meets requirements of NFPA 90A & 90B
Meets Requirements of UL 723
Meets Requirements of ASTM E-84(0 Flame/0 Smoke)
Tested in accordance with UL-181
When Dry, Adheres well to surface
Almost No Shrinkage
Excellent Resistance to Water and U.V.
Resists Cracking and Peeling
Made in the USA
Union made Yellow Label
Meets FDA Approval Requirements

Specifications

Properties	Value
Base	Water
Solid Content	70-75%
Application Temperature	40 °F - 110 °F
Freeze/Thaw Stability	5 cycles no deterioration (DPTM-20)
Flash Point	No flash to boiling
Clean Up	Use Warm water and soap - when wet
VOC	0 g/l
Pressure Classes	Meets al SMACNA pressure classes
Seal Classes	Meets all SMACNA seal classes
Cure Time	24-72 hours - depending on environment and application
Coverage	Dependent on application thickness - 75-110 sq. ft at 20-32 wet Mils
Chemical Family	Synthetic Latex
Viscosity	Approximately 200,000 - 300,000 cps
Storage	40 °F - 110 °F Do not freeze
Flammability	Non-flammable in wet or dry states
Shelf Life	24 months (unopened containers)
Shore A Hardness	Greater than 20
Max Static Pressure	15" WG
Substrate Applications	Metal, Flexible, PVC/Poly Coated Duct, and fiberglass ductboard

Packaging

Size (gallon)	Case Qty	Skid Qty
1/12	25	1600
1/2	8	200
1	4	240

Guarantee

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ELGEN DUCT SEAL-IT

Fiber Reinforced For Extra Strength

Product Data Sheet

Description

A top quality, water based, high pressure/high velocity duct sealant for commercial and residential ductwork.

Features

LEED® V4 Qualified
Qualifies for LEED® Credit
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Tested in accordance with UL-181
When Dry, Adheres well to surface
Almost No Shrinkage
Excellent Resistance to Water and U.V.
Resists Cracking and Peeling
Made in the USA
Union made Yellow Label

Specifications

Properties	Value
Base	Water
Solid Content	70-75%
Application Temperature	40 °F - 110 °F
Freeze/Thaw Stability	5 cycles no deterioration (DPTM-20)
Flash Point	No flash to boiling
Clean Up	Use Warm water and soap - when wet
VOC	0 g/l
Pressure Classes	Meets al SMACNA pressure classes
Seal Classes	Meets all SMACNA seal classes
Cure Time	24-72 hours - depending on environment and application
Coverage	Dependent on application thickness - 75-110 sq. ft at 20-32 wet Mils
Chemical Family	Synthetic Latex
Viscosity	Approximately 200,000 - 300,000 cps
Storage	40 °F - 110 °F Do not freeze
Flammability	Non-flammable in wet or dry states
Shelf Life	24 months (unopened containers)
Shore A Hardness	Greater than 20
Max Static Pressure	15" WG
Substrate Applications	Metal, Flexible, PVC/Poly Coated Duct, and fiberglass ductboard

Packaging

Size (gallon)	Case Qty	Skid Qty
1/12	25	1600
1/2	8	200
1	4	240

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

SAFETY DATA SHEET

1. Identification

Product number	1000012946
Product identifier	**14 OZ Elgen Manufacturing AE-88 BUTTER LT 12**
Distributed by	Elgen Manufacturing 10 Railroad Avenue Closter, NJ 07624 United States www.elgenmfg.com
Company phone	General Assistance 201-964-0008
Emergency telephone US	1-866-836-8855
Emergency telephone outside US	1-952-852-4646
Version #	02
Recommended use	ADHESIVE
Recommended restrictions	None known.

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Sensitization, skin	Category 1
	Germ cell mutagenicity	Category 1B
	Reproductive toxicity	Category 1A
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Extremely flammable aerosol. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause drowsiness or dizziness. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Pressurized container: Do not pierce or burn, even after use. Do not breathe gas. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Immediately call a poison center/doctor. If on skin: Wash with plenty of water. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor if you feel unwell. Specific treatment (see this label). Do NOT induce vomiting. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Propane		74-98-6	20 - 40
2-Methylpentane		107-83-5	10 - 20
Acetone		67-64-1	10 - 20
2,2-Dimethylbutane		75-83-2	2.5 - 10
2,3-Dimethylbutane		79-29-8	2.5 - 10
3-Methylpentane		96-14-0	2.5 - 10
Dimethyl Ether		115-10-6	2.5 - 10
Hydrocarbons, C9-unsaturated, Polymerized		71302-83-5	2.5 - 10
Toluene		108-88-3	2.5 - 10
Other components below reportable levels			10 - 20

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Remove contaminated clothing. Wash off with soap and plenty of water. If skin irritation occurs: Get medical advice/attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Aspiration may cause pulmonary edema and pneumonitis.
Most important symptoms/effects, acute and delayed	Irritation of eyes and mucous membranes. Prolonged exposure may cause chronic effects. May cause drowsiness or dizziness.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. IF exposed or concerned: Get medical advice/attention. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Powder. Alcohol resistant foam. Water. Carbon dioxide (CO2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Contents under pressure. Pressurized container may explode when exposed to heat or flame.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers. Containers should be cooled with water to prevent vapor pressure build up. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.

Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Move container from fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. In the event of fire and/or explosion do not breathe fumes.
General fire hazards	Extremely flammable aerosol.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Refer to attached safety data sheets and/or instructions for use. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Stop leak if you can do so without risk. Move the cylinder to a safe and open area if the leak is irreparable. Isolate area until gas has dispersed. Collect spillage. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Contact local authorities in case of spillage to drain/aquatic environment. Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. All equipment used when handling the product must be grounded. Ground and bond containers when transferring material. Do not re-use empty containers. Do not breathe gas. Avoid contact with skin. Avoid contact with eyes. Avoid contact during pregnancy/while nursing. Avoid prolonged exposure. Use only in well-ventilated areas. Use personal protective equipment as required. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Do not empty into drains.
Conditions for safe storage, including any incompatibilities	Store locked up. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Refrigeration recommended. Store away from incompatible materials (see Section 10 of the SDS). Level 3 Aerosol.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Acetone (CAS 67-64-1)	PEL	2400 mg/m3 1000 ppm
Propane (CAS 74-98-6)	PEL	1800 mg/m3 1000 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Toluene (CAS 108-88-3)	Ceiling	300 ppm
	TWA	200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
2,2-Dimethylbutane (CAS 75-83-2)	STEL	1000 ppm
	TWA	500 ppm
2,3-Dimethylbutane (CAS 79-29-8)	STEL	1000 ppm
	TWA	500 ppm
2-Methylpentane (CAS 107-83-5)	STEL	1000 ppm
	TWA	500 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
3-Methylpentane (CAS 96-14-0)	STEL	1000 ppm
	TWA	500 ppm
Acetone (CAS 67-64-1)	STEL	500 ppm
	TWA	250 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Acetone (CAS 67-64-1)	TWA	590 mg/m3 250 ppm
Propane (CAS 74-98-6)	TWA	1800 mg/m3 1000 ppm
Toluene (CAS 108-88-3)	STEL	560 mg/m3 150 ppm
	TWA	375 mg/m3 100 ppm

US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value
Dimethyl Ether (CAS 115-10-6)	TWA	1880 mg/m3 1000 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Acetone (CAS 67-64-1)	25 mg/l	Acetone	Urine	*
Toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Toluene (CAS 108-88-3) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Toluene (CAS 108-88-3) Skin designation applies.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear eye/face protection. Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If permissible levels are exceeded use NIOSH mechanical filter / organic vapor cartridge or an air-supplied respirator.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Aerosol.
Color	Not available.
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	76.35 °F (24.64 °C) estimated
Flash point	-54.4 °F (-48.0 °C) estimated
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	2.2 % estimated
Flammability limit - upper (%)	9.5 % estimated
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	320.86 psig @70F estimated
Vapor density	Not available.
Relative density	0.533 g/cm3 estimated
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	662 °F (350 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	0.53 g/cm3 estimated
Flammability class	Flammable IA estimated
Heat of combustion	34.89 kJ/g estimated
Heat of combustion (NFPA 30B)	34.89 kJ/g estimated
Percent volatile	75.29 % estimated
Specific gravity	0.533 estimated
VOC (Weight %)	55.92 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid temperatures exceeding the flash point.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May be fatal if swallowed and enters airways. Prolonged inhalation may be harmful. Narcotic effects. May cause damage to organs by inhalation.

Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	May be fatal if swallowed and enters airways.
Symptoms related to the physical, chemical and toxicological characteristics	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Irritant effects.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Narcotic effects.

Components	Species	Test Results
Acetone (CAS 67-64-1)		
Acute		
Dermal		
LD50	Guinea pig	> 7426 mg/kg, 24 Hours
		> 9.4 ml/kg, 24 Hours
	Rabbit	> 7426 mg/kg, 24 Hours
		> 9.4 ml/kg, 24 Hours
Inhalation		
LC50	Rat	55700 ppm, 3 Hours
		132 mg/l, 3 Hours
		50.1 mg/l
Oral		
LD50	Rat	5800 mg/kg
		2.2 ml/kg
Dimethyl Ether (CAS 115-10-6)		
Acute		
Inhalation		
NOEL	Rat	2 ppm, 6 Hours
Oral		
LD50	Rat	460 mg/kg
Hydrocarbons, C9-unsaturated, Polymerized (CAS 71302-83-5)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
LC50	Rat	> 5.14 mg/l, 4 Hours
Oral		
LD50	Rat	> 16 ml/kg
Propane (CAS 74-98-6)		
Acute		
Inhalation		
LC50	Mouse	1237 mg/l, 120 Minutes
		52 %, 120 Minutes
	Rat	1355 mg/l
		658 mg/l/4h
Toluene (CAS 108-88-3)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg, 24 Hours
Inhalation		
LC50	Mouse	6405 - 7436 ppm, 6 Hours

Components	Species	Test Results
		5320 ppm, 8 Hours
	Rat	5879 - 6281 ppm, 6 Hours
		25.7 mg/l, 4 Hours
Oral		
LD50	Rat	> 5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization Not available.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Risk of cancer cannot be excluded with prolonged exposure.

IARC Monographs. Overall Evaluation of Carcinogenicity

Toluene (CAS 108-88-3) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

Reproductive toxicity May damage fertility or the unborn child.

Specific target organ toxicity - single exposure Narcotic effects.

Specific target organ toxicity - repeated exposure Respiratory system. Skin. Kidneys. Central nervous system. Eyes. Liver. May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects. May cause damage to organs through prolonged or repeated exposure.

12. Ecological information

Ecotoxicity Toxic to aquatic life with long lasting effects. Accumulation in aquatic organisms is expected.

Components		Species	Test Results
Acetone (CAS 67-64-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	21.6 - 23.9 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	4740 - 6330 mg/l, 96 hours
Dimethyl Ether (CAS 115-10-6)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia pulex)	4.3 - 7.8 mg/l, 48 hours
Fish	LC50	Striped bass (Morone saxatilis)	10.302 - 16.743 mg/l, 96 hours
Toluene (CAS 108-88-3)			
Aquatic			
Algae	IC50	Algae	433.0001 mg/L, 72 Hours
Crustacea	EC50	Daphnia	7.645 mg/L, 48 Hours
		Water flea (Daphnia magna)	5.46 - 9.83 mg/l, 48 hours
Fish	LC50	Coho salmon,silver salmon (Oncorhynchus kisutch)	8.11 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Partition coefficient n-octanol / water (log Kow)

2,2-Dimethylbutane	3.82
2,3-Dimethylbutane	3.42
2-Methylpentane	3.74
3-Methylpentane	3.6
Acetone	-0.24
Dimethyl Ether	0.1
Propane	2.36
Toluene	2.73

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate or crush. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied. Do not re-use empty containers.

14. Transport information

DOT

UN number UN1950

UN proper shipping name Aerosols, flammable

Transport hazard class(es)

Class 2.1

Subsidiary risk -

Label(s) 2.1

Packing group Not applicable.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling. Read safety instructions, SDS and emergency procedures before handling.

Special provisions N82

Packaging exceptions 306

Packaging non bulk None

Packaging bulk None

This product meets the exception requirements of section 173.306 as a limited quantity and may be shipped as a limited quantity. Until 12/31/2020, the "Consumer Commodity - ORM-D" marking may still be used in place of the new limited quantity diamond mark for packages of UN 1950 Aerosols. Limited quantities require the limited quantity diamond mark on cartons after 12/31/20 and may be used now in place of the "Consumer Commodity ORM-D" marking and both may be displayed concurrently.

IATA

UN number UN1950

UN proper shipping name Aerosols, flammable

Transport hazard class(es)

Class 2.1

Subsidiary risk -

Label(s) 2.1

Packing group Not applicable.

Environmental hazards Yes

ERG Code 10L

Special precautions for user Read safety instructions, SDS and emergency procedures before handling. Read safety instructions, SDS and emergency procedures before handling.

Other information

Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.
Packaging Exceptions	LTD QTY

IMDG

UN number	UN1950
UN proper shipping name	AEROSOLS
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Label(s)	2.1
Packing group	Not applicable.
Environmental hazards	
Marine pollutant	Yes
EmS	F-D, S-U
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling. Read safety instructions, SDS and emergency procedures before handling.
Packaging Exceptions	LTD QTY
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

DOT

IATA; IMDG

Marine pollutant

General information	IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Acetone (CAS 67-64-1)	Listed.
Toluene (CAS 108-88-3)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Toluene	108-88-3	2.5 - 10

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Toluene (CAS 108-88-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Dimethyl Ether (CAS 115-10-6)
Propane (CAS 74-98-6)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Acetone (CAS 67-64-1)	6532
Toluene (CAS 108-88-3)	6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Acetone (CAS 67-64-1)	35 %WV
Toluene (CAS 108-88-3)	35 %WV

DEA Exempt Chemical Mixtures Code Number

Acetone (CAS 67-64-1)	6532
Toluene (CAS 108-88-3)	594

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Acetone (CAS 67-64-1)
Toluene (CAS 108-88-3)

US. Massachusetts RTK - Substance List

2,2-Dimethylbutane (CAS 75-83-2)
2,3-Dimethylbutane (CAS 79-29-8)
2-Methylpentane (CAS 107-83-5)
3-Methylpentane (CAS 96-14-0)
Acetone (CAS 67-64-1)
Dimethyl Ether (CAS 115-10-6)
Propane (CAS 74-98-6)
Toluene (CAS 108-88-3)

US. New Jersey Worker and Community Right-to-Know Act

2,2-Dimethylbutane (CAS 75-83-2)

2,3-Dimethylbutane (CAS 79-29-8)
2-Methylpentane (CAS 107-83-5)
Acetone (CAS 67-64-1)
Dimethyl Ether (CAS 115-10-6)
Propane (CAS 74-98-6)
Toluene (CAS 108-88-3)

US. Pennsylvania Worker and Community Right-to-Know Law

2,2-Dimethylbutane (CAS 75-83-2)
2,3-Dimethylbutane (CAS 79-29-8)
2-Methylpentane (CAS 107-83-5)
3-Methylpentane (CAS 96-14-0)
Acetone (CAS 67-64-1)
Dimethyl Ether (CAS 115-10-6)
Propane (CAS 74-98-6)
Toluene (CAS 108-88-3)

US. Rhode Island RTK

Acetone (CAS 67-64-1)
Dimethyl Ether (CAS 115-10-6)
Propane (CAS 74-98-6)
Toluene (CAS 108-88-3)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Ethyl Benzene (CAS 100-41-4)	Listed: June 11, 2004
Naphthalene (CAS 91-20-3)	Listed: April 19, 2002

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Toluene (CAS 108-88-3)	Listed: January 1, 1991

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

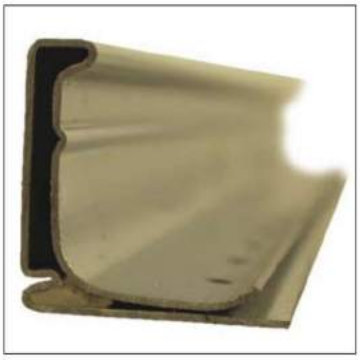
*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

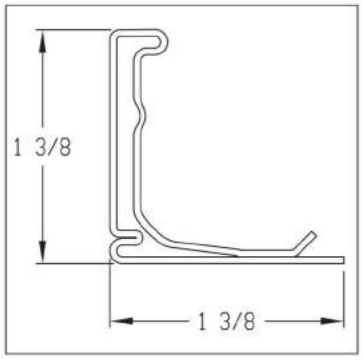
16. Other information, including date of preparation or last revision

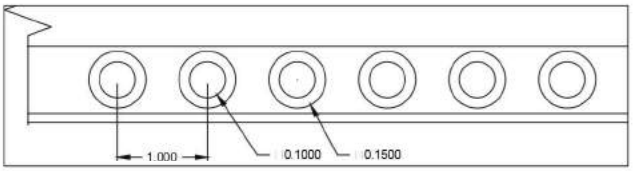
Issue date	06-02-2014
Version #	02
Disclaimer	The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

ELGEN FLANGE

Product Data Sheet







Description

The Elgen Flange is designed with two purposes in mind. The first is to provide external duct reinforcement, and the second is to provide a joining system between two similar size joints of duct.

Please refer to Elgen's 4-Corner Connection System document for fabrication, and assembly instructions.

U.S. Patent 9,212,770;
Canadian Patent 2,638,806;
U.S. Patent Pending - Application No. 14/947,743

Standard Construction

Roll formed 20GA galvanized steel that comes with a butyl sealant inside of the pocket to ensure an energy efficient seal.

Product comes standard in 10 and 20 foot lengths.

Duct Wall Size (in)	Pressure (in WG)	
	0-4	6-10
0-24	1 Screw each corner and center	1 Screw each corner and center
25-48	1 Scew each corner, pluse 1 at center	2 Screws each corner, plus 1 screw every 12"
49 & over	1 Screw each corner, plus 1 every 12"	2 Screws each corner, plus 1 screw every 8"

Features

Union Made Yellow Label
Butyl in pocket for an energy efficient seal.
Sealing Materials meet NFPA 90A & B Class 1 requirements.

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Technical Information

The Elgen Flange is tested in accordance with SMACNA testing procedures.

No external sealant was employed and the test results reveal: The Elgen Flange System is comparable to the SMACNA Class "J" transverse joint.

The Elgen Flange in stainless steel exhibits the same performance as galvanized.

The Elgen Flange in Aluminum is comparable to a SMACNA H connection.

Do not notch the corners when fabricating duct work for the Elgen Flange System.

Packaging

Bundled in 10 and 20 foot lengths protected on 4 sides with corner board. Every bundle is banded using spring steel securing it to wooden blocks.

Length (ft)	Bundle Qty (ft)	Weight (lbs)
10	750	530
20	1,500	1060

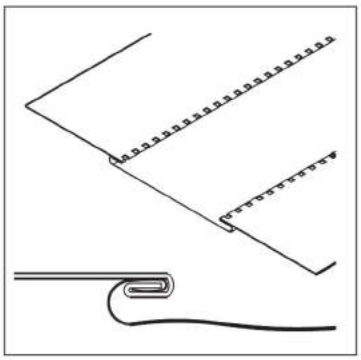
Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

NOTCH LOCK

Product Data Sheet



Description

Elgen's Notch Lock eliminates duct system noises and vibrations. This is done with an airtight flexible connection consisting of a fabric that attaches to sheet metal on both sides.
Elgen's Notch Lock Flexible Connector attaches to a fan source on one side and ductwork on the other.

Features

All Elgen fabrics are designed to meet NFPA-701 (formerly UL-214)
22 GA With 40 oz Neoprene Tested At 23" Positive Static Pressure
Elgen Vinlon fabric meets UL-723 and NFPA-701
All Elgen fabrics are designed to meet NFPA-90A and 90B
All fabrics are water proof and airtight to +/- 10"w.g.
All fabrics have flame retardant coatings
All items are Flame Resistant
Tested in accordance with LEEDS®
Requirements Meets SMACNA
Made with Domestic Galvanized Steel
Union Made

Standard Construction

Formed with ASTM A-653 G60 material

	Vinlon (ZLL)	Neoprene (ZLN)	Hypalon (ZLH)
Temp Range	-40 F to 180 F	-40 F to 200 F	-50 F to 300 F
Color	Black	Black	White
Weight SQ/YD	22	32	24
Tear Strength	100/100	25/25	20/20
Tensile Strength	300/300	500/500	350/250
Features	High Tear Strength, High Abrasion, Low Smoke, Extremely Flexible	Airtight Resistance to Acids, Gasoline & Grease, General Purpose	Excellent Acid, Weather, UV, Mildew & Ozone Resistance, High Abrasion, Resistant to Grease

	Silguard (ZLSG)	Teflon (ZLTF)	40oz Neoprene (ZLN)	Super High Temp
Temp Range	-75 F to 500 F	-75 F to 500 F	-40 F to 285 F	-40 F to 1800 F
Color	White	Gray	Black	Gray/White
Weight SQ/YD	18	18	40	36
Tear Strength	50/40	60/40	17/12	60/60
Tensile Strength	200/150	400/300	630/465	480/330
Features	High Temp, Very Low Smoke, Flame, Water & Oil Resistant	High Temp & Acid Resistant, Best Overall Fabric		

Optional Construction

G90
Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Packaging

Size	Gauge	FT Per Box
All Sizes	24-26	100'

Guarantee

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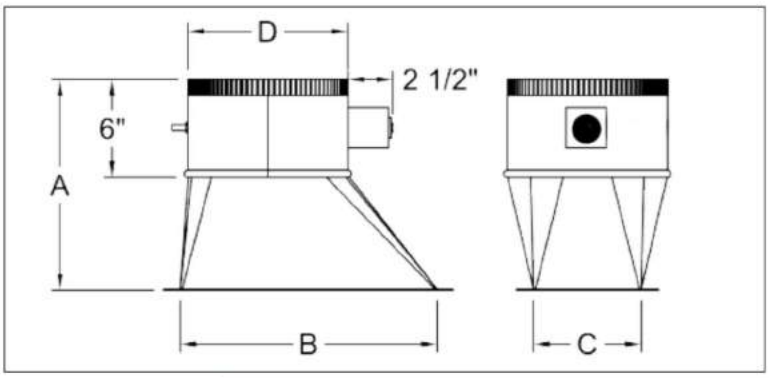
HET
with Elgen Super Standoff and 3/8" Square Rod

Product Data Sheet



Description

Elgen's HET (High Efficiency Take Off) with heavy duty standoff is used for low & medium pressure applications.
Elgen HET (High Efficiency Take Off) with heavy duty standoff can be used for high pressure application (up to 10" W.G.) as a low-leakage fitting due to its welded construction.

Standard Construction

Collar - formed from 24 GA ASTM A-653 G60 material
Body - formed from 26 GA ASTM A-653 G60 material
1/8" x 1" Polyethylene "High Density" Gasket
20 GA Heavy Duty Damper Blade for 10" and larger
22 GA Heavy Duty Damper Blade for 6"- 8"
Heavy-duty standoff
3/8" aluminum square rod
Super snap-in bushing

D	B X C	A
4" Round	10"x 5"	11.75"
5" Round	10"x 5"	11.75"
6" Round	12"x 6"	11.75"
7" Round	12"x 6"	11.75"
8" Round	12"x 6"	11.75"
9" Round	15"x 6"	12.75"
10" Round	16"x 6.75"	12.75"
12" Round	18"x 8.5"	12.75"
14" Round	20"x 9.5"	12.75"
16" Round	22"x 14"	13.75"
18" Round	22"x 16"	13.75"
20" Round	24"x 18"	14"

B and C dimensions are "I.D." hole size dimensions
All dimensions +/- 0.25"

Features

Welded Seams For Added Strength
Welded Seams Provide Low Leakage
Many Damper Hardware Options
Pressure Rating – Designed Per SMACNA 3rd Edition 2005 Section 4.8 4-6 Brand Connections
Union Made Yellow Label

Optional Construction

Insulation Guard
Deep manual bead

24 GA Galvanized
G90 Galvanized
Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Packaging

Size	Skid Qty	Size	Skid Qty
4"	MTO	10"	72
5"	MTO	12"	54
6"	140	14"	48
7"	MTO	16"	30
8"	140	18"	MTO
9"	MTO	20"	MTO

Guarantee

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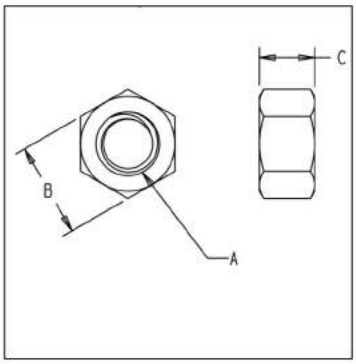
Hex Nut

Product Data Sheet



Features

Material Meets ASTM A563 Grade A.
Dimensions: ASME/ANSI B18.2.2
Zinc Plating meets ASTM F1941 FeZn3A
Typical Hardness: HRB 68- HRC32
Proof Load Strength: 90,000 PSI Min
(Proof load is defined as an axially-applied load using a bolt or mandrel that must be supported by a nut without evidence of thread stripping or rupture.)

Description

Elgen's Hex nut is used in conjunction with all 4-bolt Flange systems.

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum

Standard Construction

Made from Low Carbon steel - ASTM A307 - Grade A.

Nut Size (A)	Socket Size (B)	Thickness (C)	Nut Size (A)	Socket Size (B)	Thick-ness (C)
1/4	7/16	7/32	9/16	13/16	31/64
5/16	1/2	17/64	5/8	15/16	35/64
3/8	9/16	21/64	3/4	1-1/8	61/64
7/16	5/8	3/8	7/8	1-5/16	3/4
1/2	3/4	7/16	1	1-1/2	55/64

Packaging

Item	Size (in)	Box Qty	Skid Qty
Hex Nut	3/8	4,000	144,000
Hex Nut	1/4	9,000	324,000

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

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QuietR® Rotary Duct Liner

Description

Owens Corning® QuietR® Rotary Duct Liner absorbs noise within sheet metal ducts, and contributes to indoor comfort by lowering heat loss or gain through duct walls.

Features

- Absorbs fan and air turbulence noise and reduces popping noises within sheet metal ducts
- Outstanding thermal and acoustical performance
- Bacterial and fungal growth resistant with an EPA registered biocide that helps protect the airstream surface from microbial growth

Physical Properties

Property	Test Method	Value
Operating Temperature	ASTM C411	250°F (121°C)
Maximum Air Velocity	UL 181 Erosion Test ASTM C1071	6,000 fpm (30.5 m/sec)
Water Vapor Sorption (by weight)	ASTM C1104	<3% at 120°F (49°C), 95% R.H.
Fungi Resistance	ASTM C1338	Meets requirements
Fungi Resistance	ASTM G21	Meets requirements
Bacteria Resistance	ASTM G22	Meets requirements
Corrosiveness[1]	ASTM C665 (Corrosiveness Test)	Will not cause corrosion greater than caused by sterile cotton on aluminum or steel*
Thermal Conductivity k at 75°F (λ at 24°C mean)	ASTM C518	Btu▪in/hr▪ft²▪°F / W/m▪°C
R-2.2		0.23 / 0.034
R-4.2		0.24 / 0.035
R-6.3		0.24 / 0.035
R-8		0.24 / 0.035
Surface Burning Characteristics[2]	ASTM E84, UL 723, CAN/ULC S102	
Flame Spread		25
Smoke Developed		50

1. When wet, coated surfaces of QuietR® Rotary Duct Liner in contact with galvanized steel may cause discoloration of the sheet metal.
2. The surface burning characteristics of these products have been determined in accordance with UL 723 or CAN/ULC-S102. This standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest 5 rating. UL 723 and ASTM E84 are the same test methods.

Availability

Thickness		Roll Length		R-Value	
in	mm	ft	m	(hr▪ft²▪°F)/Btu	(m²▪°C)/W
½	13	100	31	2.2	0.38
1	25	100, 150*	31, 45*	4.2	0.74
1½	38	50, 100	15, 31	6.3	1.11
2	51	50	15	8.0	1.41

*150[1] (45m) roll is available in select sizes 56" and wider. Ask your area sales manager for more details.

Applications

Limitations

Use of QuietR® Rotary Duct Liner is not recommended for the following applications:

- With wood or coal fired equipment, or equipment of any type which does not include automatic maximum temperature controls and where operating temperatures of 250°F (121°C) may be exceeded
- In kitchen or fume exhaust ducts, or ducts conveying solids or corrosive gases
- In any application where the duct liner may come in direct contact with liquid water (such as cooling coils, humidifiers, and evaporative coolers) unless protected from the water source
- Inside fire damper sleeves
- Immediately adjacent to high temperature heating coils without radiation protection

Acoustic Performance

Tested Values—QuietR® Duct Liner							
Sound absorption coefficients at octave band center frequencies (Hz)							
Thickness in (mm)	125	250	500	1000	2000	4000	NRC
½ (13)	0.04	0.12	0.39	0.64	0.78	0.74	0.50
1 (25)	0.05	0.30	0.60	0.87	0.98	1.05	0.70
1½ (38)	0.05	0.47	0.85	1.01	1.01	1.01	0.85
2 (51)	0.12	0.66	1.04	1.08	1.04	1.07	0.95

These data were collected using a limited sample size and are not absolute values. Reasonable tolerances must therefore be applied. All tests were conducted in accordance with ASTM C423, Mounting A (material placed against a solid backing such as a block wall). For more information, call your Owens Corning Representative.

Insertion Loss, dB per ft of Lined Duct

	1" Liner						2" Liner					
	Octave band center frequencies, Hz						Octave band center frequencies, Hz					
P/A, ft/ft²	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
8	0.6	1.5	2.7	5.8	7.4	4.3	0.8	2.9	4.9	7.2	7.4	4.3
6	0.5	1.2	2.3	5.0	5.8	3.6	0.6	2.3	4.2	6.2	5.8	3.6
4	0.4	0.8	1.9	4.0	4.1	2.8	0.5	1.6	3.5	5.0	4.1	2.8
2	0.2	0.5	1.4	2.8	2.2	1.8	0.3	0.8	2.3	3.3	2.0	1.7
1	0.1	0.1	1.0	2.0	1.2	1.2	0.2	0.5	1.8	2.3	1.1	1.1

Duct Liner Insertion Loss—Data extracted from ASHRAE Handbook, HVAC Applications, Chapter 43, 1999 P/A = duct perimeter, ft/duct cross sectional area (ft2). Example: 12" x 12", P/A = 4 (1/ft.). For more information, call your Owens Corning Representative.

Standards, Codes Compliance

- ASTM C1071, Type I, Flexible (replaces obsolete Federal Specification HH-1-545B.)
- NFPA 90A/90B
- ICC Compliant
- California Title 24
- SMACNA Application Standard for Duct Liners
- NAIMA Fibrous Glass Duct Liner Installation Standard
- Conforms to ASHRAE 62-2001

Environmental and Sustainability

Owens Corning is a worldwide leader in building material systems, insulation and composite solutions, delivering a broad range of high-quality products and services. Owens Corning is committed to driving sustainability by delivering solutions, transforming markets and enhancing lives. More information can be found at www.owenscorning.com.

Notes

For additional information, refer to the Safe Use Instruction Sheet (SUIS) found in the SDS Database via http://sds.owenscorning.com

Certifications and Sustainable Features

- Certified by SCS Global Services to contain a minimum of 53% recycled glass content, 31% pre-consumer and 22% post-consumer
- GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg*
- Bronze Level Material Health Certificate from Cradle to Cradle Products Innovation Institute

GREENGUARD GOLD

*Duct Liner up to and including 1".

CERTIFIED RECYCLED CONTENT

AVERAGE 53% RECYCLED CONTENT
31% PRE-CONSUMER
22% POST-CONSUMER

Disclaimer of Liability

SCS Global Services provides independent verification of recycled content in building materials and verifies recycled content claims made by manufacturers. For more information, visit www.SCSglobalservices.com.

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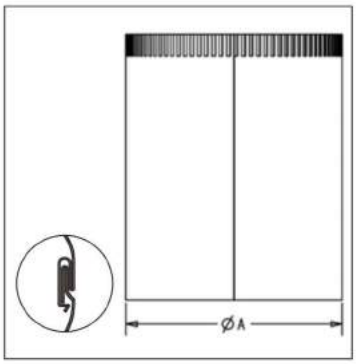
Snap Lock Pipe

Product Data Sheet



Description

Elgen's Snap Lock Pipe is used for low pressure applications.

Standard Construction

Manufactured from 26 GA ASTM A-653 & ASTM A-924 G60 material.
60" length

Features

Meets SMACNA RL-8 Longitudial Seam-page 3.5 figure 3-2 in 2005 3rd edition
Reeves Lock and Button Lock come standard on every piece.
Pressure rating (-1" to +2" water gauge)
Union Made Yellow Label

Optional Construction

30 GA & 24 GA Galvanized
G90 Galvanized
48" & 24" lengths
Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Packaging

Size (in) A	Length (in)	Bundle Qty	Skid Qty	Weight per Skid (lbs)
3	60	10	640	3,100
4	60	10	640	3,900
5	60	10	300	2,300
6	60	10	300	2,700
7	60	10	200	2,100
8	60	10	200	2,300
9	60	10	160	2,100
10	60	5	80	1,200
12	60	5	80	1,400
14	60	5	45	900
16	60	5	45	1,000

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
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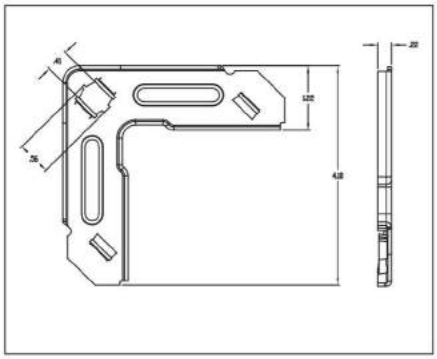
info@elgenmfg.com :: www.elgenmfg.com

STACKABLE C CORNER

Product Data Sheet



Description

Corner pieces are used to add rigidity to the flange, hold duct work together and provide a sealing surface for the gasket.

Standard Construction

Stamped 16 GA ASTM A-653 G60 material
Used with Auto Corner Insertion Machinery
Can also be inserted manually
Accepts a 3/8" carriage bolt
Weight(per box): 38 lbs

Features

Add rigidity to the Transverse Duct Flange
Hold ductwork together
Provides a sealing surface for the Elgen 440 Butyl Gasket
Tabs on the legs allow for the corners to stack
Union Made

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum
Galvanneal (Paint Grip)

Packaging

Box Qty	Skid Qty
250	28,000

Stacked in box

Guarantee

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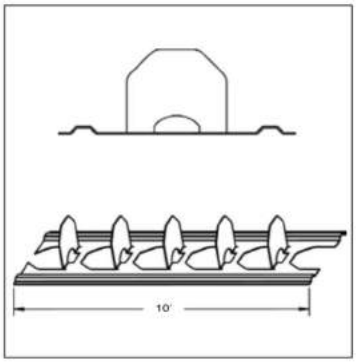
Vane Rail (2" & 4")

Product Data Sheet



Features

Conforms to SMACNA spacing requirements.
Refer to 2005 SMACNA-Figure 4-3.
Holes provide for easy alignment
Can be used with other vane systems
Union Made Yellow Label

Description

Elgen's 2" & 4" Double Wall Turning Vane Rail is used in conjunction with Elgen's 2" & 4" Double Wall Turning Vane.
Elgen's 2" & 4" Double Wall Turning Vane Rail is used for securing and aligning Elgen's 2" & 4" Turning Vanes. This process directs the airflow through rectangular elbows.

Optional Construction

Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Standard Construction

Stamped using 22 GA ASTM A-653 G60/G90 Material
10' length

Packaging

Size (in)	GA	Box Qty (ft)	Skid Qty (ft)	Weight (lbs)
2	22	200	7000	3100
4	22	100	3500	2300

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

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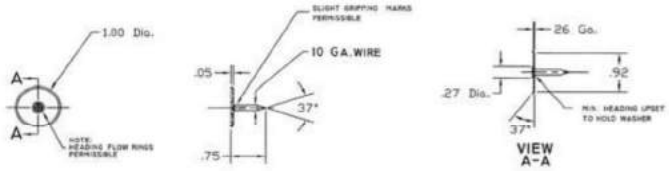
Elgen Superpoint Weld Pins

Product Data Sheet



Description

Elgen Superpoint Weld Pins are used for fastening Fiberglass Duct Liner to the inside of the Duct Wall.

Standard Construction

The pin is made from 10 GA Electroplated Galvanized Steel
The washer is made from 28 gauge Full Hard Galvanized Steel

Features

Raised Head which allows better movement through the hopper
Can be used in any Insulation Weld Pin Machine
Rings in the nail head provide more consistent welds
Superior strength (Average test is over 145 lbs of force)
Beveled edge prevents tearing of the fiberglass liner
Hardened washer provided added strength
Meets SMACNA Standards
(Refer to Chapter 7 figure 7-11 & 7-12)

Packaging

Size (in)	Liner Thickness (in)	Density (lbs)	Bucket Qty	Weight (lbs)
1/2	1/2	All	6000	31
3/4	1	1-1/2	5000	33
1	1	3	4000	40
1-1/8	1-1/2	All	4000	34
1-1/4	1-1/2	All	4000	34
1-1/2	2	1-1/2 - 2	3500	35

Guarantee

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QuietR® Spiral Duct Liner

Description

Owens Corning® QuietR® Spiral Duct Liner is tailored to fit your specific duct size, compression at grooves and joints is kept to a minimum, providing consistent thermal performance throughout the entire duct system.

Features

- Outstanding thermal and acoustical performance
- Economical, cost effective alternative to round double-wall configuration air ducts
- Cleanable surface with a black mat facing that provides a smooth, durable surface making it easier to clean the duct liners using methods and equipment described in North American Insulation Manufacturers Association (NAIMA) Publication AH122, Cleaning Fibrous Glass Insulated Duct Systems: Recommended Practice
- Bacterial and fungal growth resistant with an EPA registered biocide that protects the airstream surface from microbial growth

Physical Properties

Property	Test Method	Value
Maximum Temperature Limits Internal External	UL 181	 250°F (121°C) 150°F (66°C)
Maximum Air Velocity	UL 181 Erosion Test	6,000 fpm (30.5 m/s)
Water Vapor Sorption	ASTM C1104	<3% by weight at 120°F (49°C), 95% R.H.
Mold Growth	UL 181	Meets Requirements
Mold Growth	ASTM C1338	Meets Requirements
Fungi Resistance	ASTM G21	Meets Requirements
Bacteria Resistance	ASTM G22	Meets Requirements
Surface Burning Characteristics Flame Spread Smoke Developed	UL 723[1]	 <25 <50

1. The surface burning characteristics of these products have been determined in accordance with UL 723. This standard should be used to measure and describe the properties of materials, products or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest 5 rating. ASTM E84, UL 723, and NFPA 255 are considered by most officials to be synonymous surface burning test methods.

Applications

Limitations

QuietR® Spiral Duct Liner is not recommended for the following applications:

- Ducts which will be subjected to operating temperatures exceeding 250°F (inside surface)
- Ducts which will be subjected to temperatures exceeding 150°F on the outside surface
- Kitchen or fume exhaust ducts or to convey solids or corrosive gases
- Burying in concrete or buried below grade
- Installation immediately adjacent to high-temperature electric heating coils without radiation protection and to equipment such as evaporative coolers, humidifiers, cooling coils and outside intakes
- With coal or wood-fueled equipment, or with equipment of any type which does not include automatic maximum temperature controls
- Ducts which will be subject to liquid water, liner should be protected with a sheet metal sleeve and drip pan adjacent
- Inside fire damper sleeves
- When duct systems run through unconditioned space and are used for cooling only (when heating is from another source), register openings must be tightly sealed to prevent accumulation of water vapor in the duct system during the heating season

Installation

See Owens Corning® "QuietR® Spiral Duct Liner publication Installation Guide" (Pub. No. 61262) for more information installation of the liner.

Availability

Thickness
48" x 120" x 1" thickness (1,220mm x 3,048mm x 25mm)
48" x 120" x 1½" thickness (1,220mm x 3,048mm x 38mm)
48" x 120" x 2" thickness (1,220mm x 3,048mm x 51mm)

Thermal Performance

at 75°F (24°C) Mean Temperature	1" (25mm)	1½" (38mm)	2" (51mm)
R-value: ft²·°F/BTU (RSI: m²·°C/W)	4.3 (0.76)	6.5 (1.15)	8.70 (1.53)
k-value: BTU·in/hr·ft²·°F (I W/m²·°C)	0.23 (0.033)	0.23 (0.033)	0.23 (0.033)

Acoustical Performance

Sound absorption coefficients at octave band center frequencies, Hz.

Thickness	125	250	500	1000	2000	4000	NRC
1"	0.08	0.19	0.69	0.94	0.99	0.98	0.70
1½"	0.12	0.33	0.92	1.04	1.03	1.02	0.85
2"	0.14	0.72	1.15	1.12	1.06	1.07	1.00

This data was collected using a limited sample size and are not absolute values. Therefore, reasonable tolerances must be applied. Tests were conducted in accordance with ASTM C423, Mounting A (material applied against a solid backing.)

Standards, Codes Compliance

- ASTM C1071; Type II Ridge Board
- National Fire Protection Association Standards NFPA 90A/90B
- ICC International Mechanical Code
- Meets requirements of ASTM C1338, UL 181, ASTM G21, (fungi test) and ASTM G22 (bacteria test)

Technical Information

Tips to Avoid Mold Growth in Ducts

Mold in duct systems occurs when moisture comes into contact with dirt or dust collected on the duct system surfaces. Proper filters will minimize the collection of dust and dirt, but care needs to be exercised to prevent water formation in the duct. A properly sized, installed and operated air conditioning unit will minimize the likelihood of water formation. The system must be maintained and operated to ensure that sufficient dehumidification is occurring and that filters are installed and changed as recommended by the equipment manufacturer.

Environmental and Sustainability

Owens Corning is a worldwide leader in building material systems, insulation and composite solutions, delivering a broad range of high-quality products and services. Owens Corning is committed to driving sustainability by delivering solutions, transforming markets and enhancing lives. More information can be found at www.owenscorning.com.

Notes

For additional information, refer to the Safe Use Instruction Sheet (SUIS) found in the SDS Database via http://sds.owenscorning.com.

This product is supplied by fabricators across North America. Please consult Owens Corning for a list of fabricators who can supply QuietR® Spiral Duct Liner.

Certifications and Sustainable Features

- Certified by SCS Global Services to contain a minimum of 53% recycled glass content, 31% pre-consumer and 22% post-consumer
- GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg*
- Material Health Certificate from Cradle to Cradle Products Innovation Institute

*Duct Liner up to and including 1".

AVERAGE 53% RECYCLED CONTENT
31% PRE-CONSUMER
22% POST-CONSUMER

Disclaimer of Liability

SCS Global Services provides independent verification of recycled content in building materials and verifies recycled content claims made by manufacturers. For more information, visit www.SCSglobalservices.com.

OWENS CORNING INSULATING SYSTEMS, LLC
ONE OWENS CORNING PARKWAY
TOLEDO, OHIO, USA 43659

1-800-GET-PINK®
www.owenscorning.com

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2” Ultra Vane

Product Data Sheet

Features

Patented- Made from one piece of metal
Meets SMACNA requirements
One Dimple per inch
Can be used with other rail systems
Union Made Yellow Label

Description

Elgen’s 2” Ultra Vane (Double Wall Turning Vane) is used, in conjunction with Elgen’s 2” Double Wall Vane Rail, for directing air flow through a rectangular elbow.

Optional Construction

22 or 24 GA ASTM A-653 G60/G90 Material

Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Standard Construction

Rollformed using 26 GA ASTM A-653 G60 Material
10’ length

Packaging

GA	Length (ft)	Bundle Qty (ft)	Skid Qty (ft)	Weight (lbs)
26	10	100	8500	3600

Guarantee

All Elgen products are guaranteed by Elgen Manufacturing against defective material.

Elgen Manufacturing
10 Railroad Ave, Closter NJ 07624
Tel: 800.503.9805 :: Fax: 201.964.9030
info@elgenmfg.com :: www.elgenmfg.com

4" Turning Vane

Product Data Sheet

Features

Meets SMACNA requirements
One Dimple per inch
Can be used with other rail systems
Union Made Yellow Label

Description

Elgen's 4" Turning Vane (Double Wall) is used, in conjunction with Elgen's 4" Double Wall Vane Rail, for directing air flow through a rectangular elbow.

Optional Construction

20 or 22 GA ASTM A-653 G60/G90 Material

Stainless Steel 304
Stainless Steel 316
Aluminum
PCD
Galvanneal (Paint Grip)
Agion (Antimicrobial Coating)

Standard Construction

Rollformed using 24 GA ASTM A-653 G60 Material
10' length

Packaging

GA	Length (ft)	Bundle Qty (ft)	Skid Qty (ft)	Weight (lbs)
24	10	50	2100	2400

Guarantee

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info@elgenmfg.com :: www.elgenmfg.com

440 Butyl Gasket

Product Data Sheet

Description

Elgen's UL 723 listed 440 Butyl Gasket is a high quality gray butyl gasket tape. It is designed for use with 4 bolt duct connection systems. It is non-curing and adheres extremely well to metal surfaces.

Standard Construction

3/16" x 5/8" x 25' of gray butyl tape extruded onto smooth silicone release paper and rolled onto a cardboard core.

Basic Use

Apply in normal dry working conditions. All surfaces need be free of dust, dirt, oil, moisture, grease, etc.

Apply directly from roll or cut to size with knife or scissors. Press 440 Butyl Gasket firmly into place with hand. Intimate contact must be made between tape and subsurface to assure a air-tight seal. Gently peel off silicone release paper. When lapping tape, allow at least 1/4" (6.4 mm) overlap.

Features

UL 723 Listed - **R27308**
Meets USDA and FDA Regulations and Standards.
Superior Adhesion
Provides Air-Tight Seal
Shelf And Service Life: 20 Years Minimum
Application Temp: Above 40° F
Minimum 30% recycled material, which meets LEEDS requirements
Contains no Solvent- Zero VOC's

Test Results

Test Method	Test	Typical Results
GSTM 10*	Color	Grey
ASTM C-771-74	Nonvolatile, % Weight @ 212± 3°F/100±-2°C	99+
ASTM D-217	Needle Penetration @ 7 7°F/25°C, 100 g/5 sec, 1/10 mm	60
ASTM D 792-66	Weight/Gallon @ 77°F Weight/Liter @ 25°C	14 lbs 1.68 kg
ASTM D 792-66	Specific Gravity @ 7 7°F/25°C	1.65
GSTM 11*	Service Temperature - Range	-30° to +180°F 34° to +82°C
ASTM D1833	Odor	No Unpleasant Odor
GSTM 13*	Elongation, % @ 7 7°F/25°C	400%+
GSTM 7*	Staining	No Migratory Staining
GSTM 16*	Sag (3 weeks @ 160°F/71°C)	None
ASTM C-765-73	Cold Temperature Flexibility 1/2" (12.7 mm) Mandel Bend @ -60°F/-51°C	No Cracking Or Loss Of Adhesion
GSTM 21*	Water Absorption, % Wt. Gain, 7 Days @ 160°F/71°C	0.75

UL 723 Listed (ASTM-E84)
Flame Spread 0/Smoke Density 1.8

Packaging

Box Qty(ft)	Skid Qty(ft)	Weight per Skid(lbs)
500	30,000	2800

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DRAFTING/FABRICATION/ESTIMATING

LEED SHEET CONSTRUCTION

558 Federal Rd Brookfield, CT 06804
Phone 203-885-0627 Fax 203-740-2441
www.MyWinair.com

CLIENT	JOB	MEP/FAB PERSON

SPEC		DESCRIPTION	CHECK BOX	
		1" WG PRESSURE CLASS		
		2" WG PRESSURE CLASS		
		4" WG PRESSURE CLASS		
		6" WG PRESSURE CLASS		
		10" WG PRESSURE CLASS		
		ALUMINUM 22GA		
		STAINLESS STEEL 24GA		
		STAINLESS STEEL WEILDED		
		BLACK IRON 10GA WEILDED		
		BLACK IRON 16GA WEILDED		
		ACOUSTIC LINER 1"		
		ACOUSTIC LINER 1 ½		
		ACOUSTIC LINER 2"		
		ACOUSTIC LINER 3"		
		ARMACELL ACOUSTIC LINER		
		DOUBLE WALL DUCT		
		SHEET METAL NOSING FOR LINER		
		BLUE PLASTIC WRAPED ENDS		
		DUCT SEALED PITTSBURGS		
		2" SFK WRAPED DUCT SILVER TAP		

THANK YOU FOR YOUR BUSINESS!

The SPIRO® system

The SPIRO-system

The SPIRO-system incorporates a sealing strip of age-resistant EPDM rubber, ensuring an air tight and lasting joint seal, immune to variations in temperature.
Meeting the requirements of air tightness, Class C, the range extends from composnents with a diameter of 80 mm up to those with a diameter of 1250 mm.

Because of the totally dependable quality of the factory-mounted sealing strips, SPIRO-system installation is quick and easy. Each application is fully sealed at the outset, no additional sealing is necessary.

The spirally wound tubes produced by our tubeformers features a patented seam cavity, which both stabilises the tubes and locks the seams into place, ensuring that tolerances are maintained even during handling and transport. This "bubble" guarantees the high quality performance of SPIRO-systems.

The tubes are also stamped with the registered trademark "SPIRO-system". Both the trademark and "bubble" guarantee teh high-quality performance of SPIRO-system.

Benefits of the SPIRO-system

- Fast and easy installation.
- Factory fitted gasket without any loose parts.
- Adjustable - twisting and fine adjustment mean there's no risk of leakage.
- Environmentally friendly - the system is fitted with solvent-free sealant.
- Can be installed in all kinds of weather.
- Temperature resistant from -30 to +100 C
- Withstands positive pressure up to 3000 Pa.

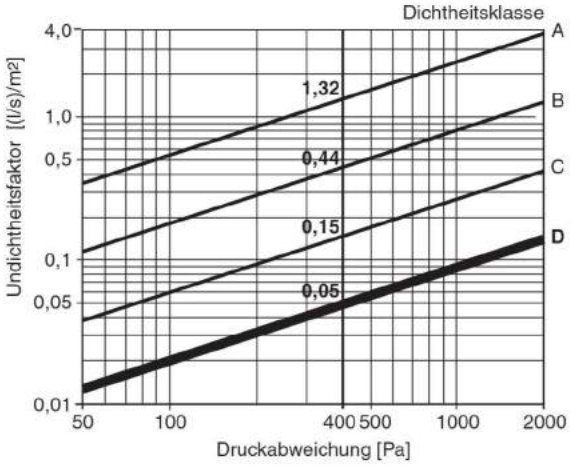
Type approval

Approval no 1358/88 means that the SPIRO-system complies with the requirements for tightness class D without any demand for pressure testing after installation.
The approval is only valid on condition that all fittings are marked by us in accordance with the example and are installed in accordance with the accompanying installation instruction.

Tightness

A duct system will never be "completely tight". The system will normally have some leaks at joints between ducts and fittings. The leakage will also increase as the pressure difference between the in- and outside of the duct sides increases.

The leakage factor in (l/s)/m^2 is always specified in relation to the pressure difference in Pa. (The unit (l/s)/m^2 denotes the leakage flow in l/s in or out of the system in relation to its duct area in m^2.) The graph below shows the leakage factor for the sealing classes A–D as a function of the pressure difference.



The graph shows that sealing class D is 3 times better than class C, which in turn is 3 times better than class B etc. Class D thus entails demands on not only the seal moulding but also the fittings and how well the system is installed.

This is one reason why we have given all fittings a turned-over edge and have given still more fittings a stop bead. This gives us stable products which are better suited to withstand handling on site at the same time as the risk of skewed assembly falls.

Economy – Tightness

Present-day stringent demands for interior climate entail expensive air treatment. Leakage leads to uneconomical operation, adjustment difficulties and over-dimensioned equipment. For this reason, it is important that ventilation systems are very well sealed, to keep overall costs down. This is why official requirements for sealing vary with the size and use of systems.

Inspection/Testing

In order to make SPIRO comply with the requirements of sealing class D, we have constant inspection procedures where we do daily sampling. Inspection is done on goods received from sub-contractors and our own production of ducts and fittings.

Goods reception inspection complies with European Standard for testing methods and batch acceptance levels. The inspection points include:

1. Inspection of seal moulding inner diameter. This is particularly important for ageing resistance of the rubber. The greater the load on the rubber, either stretching or pressure, the faster the rubber ages, causing brittleness and cracking.
2. The seal moulding profile is measured in a profile projector, where the dimensions of the seal moulding are checked against agreed tolerances.
3. The seal moulding material is tested by accelerated ageing in heat oven.

Manufacturing inspection is logged. The inspection includes a diameter check of ducts and fittings, a check of the groove where the seal moulding has been fixed, and a check of its fixing. Pressure testing is done in our air laboratory, to check the leakage flow from our products. This does not give the whole picture, however, so the best inspection of the SPIRO system is the pressure testing that The Swedish National and Testing Institute undertakes on randomly sampled products. In all these pressure tests, the SPIRO system has always exceeded the relevant sealing requirements.

Fittings

Products under the SPIRO insert and fittings with SPIRO seals under the Silencer, Dampers and measure units, and Isol inserts are included in the type approval for sealing class D. In addition, some fittings, under the Other circular products insert, are included.

A handful of fittings with the SPIRO seal can only manage up to tightness class C. This is marked on each of these products.

Fittings in this catalogue with a "L" in their designations have SPIRO seals, with only a few exceptions.

Degreased

Fittings can be supplied degreased on the inside, to order.

Dimensions

Almost all products in the SPIRO-programme can also be delivered in intermediate dimentions. For further informations see page 5.

Negative pressure

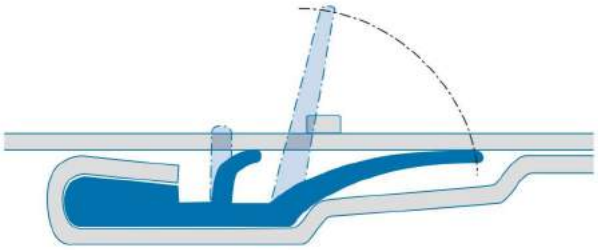
At big negative pressure there is a risk for a ventilation system to collapse. This risk is greater the bigger dimensions you have.

In order to increase the strength of *the ducts* you can e.g. increase their sheet metal thickness. This is a simple way but the effect is rather small. It exists other ways with higher result. For bigger dimensions then the ducts may be stronger than the fittings.

In order to increase the strength of *the fittings* other ways than thicker sheet metal thickness are more suitable.

SPIRO has experience and knowledge about this and is willing to offer help at special cases. We can, as special, deliver duct systems that can withstand at least 5 000 Pa negative pressure.

The sealing gasket



The SPIRO® system sealing system is based on a profile of homogeneous EPDM rubber. The rubber gasket is located in a groove at the end of the fitting and is securely attached by means of an return edge. This design ensures that the rubber gasket is always held in its correct position.

The sealing gasket must comply to our strict quality reqire-ments, so we have chosen EPDM rubber. This material is very resistant to ozone and UV rays, and at the same time unaffected by temperature fluctuations.

Economical air conditioning

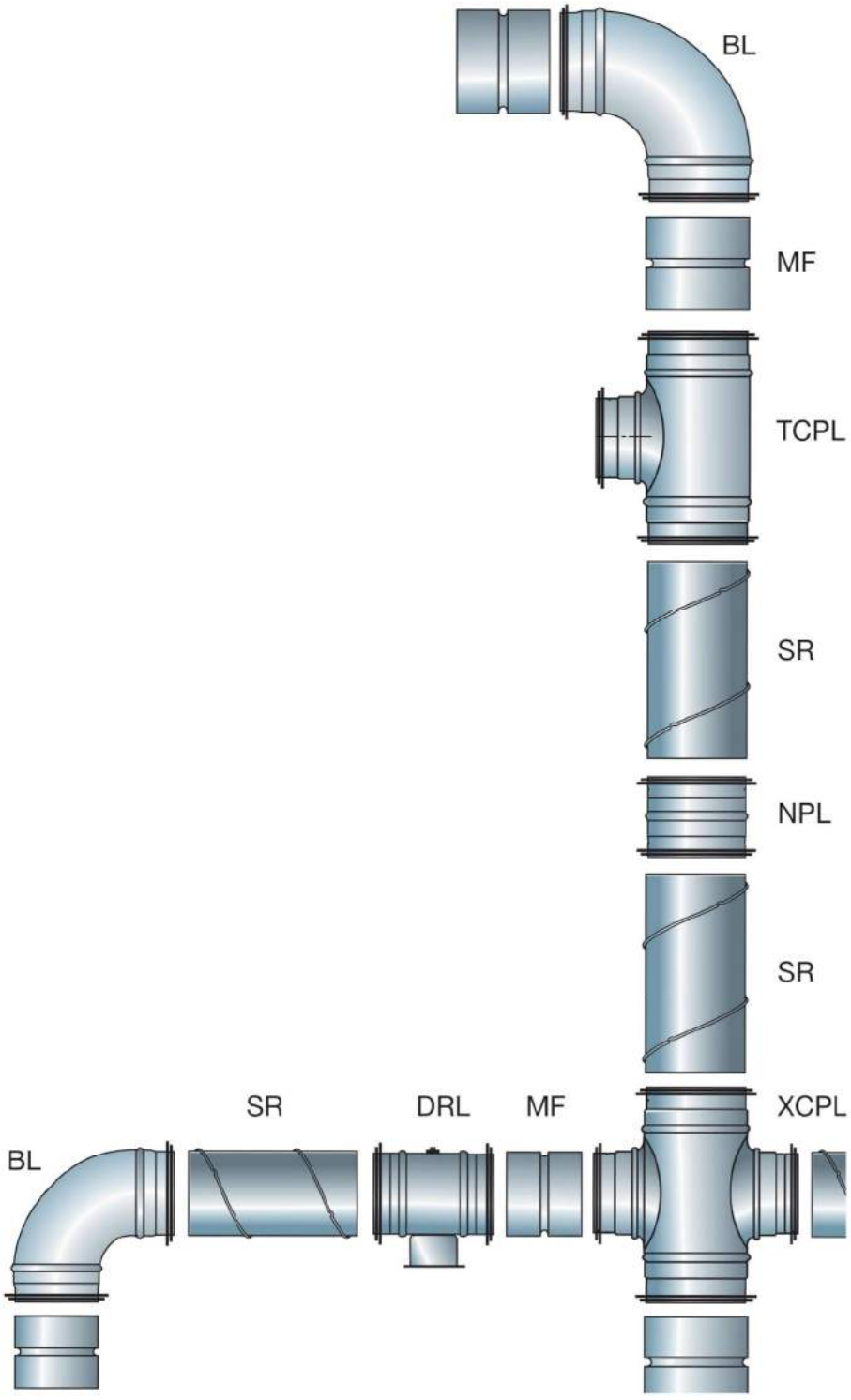
Great demands are made on air-conditioning systems these days, and it is expensive to process air. So it is vital that the duct systems used must be tightly sealed to keep operating costs and overall economy at a reasonable level. Leaks mean higher operating costs, adjustment problems and over-dimensioned units and duct systems. To deal with these risks, SPIRO INTERNATIONAL S.A. has developed its complete SPIRO® system range.

SPIRO® system - the leakproof duct system

SPIRO system is an approved range of quick-fitting sealing gasket of EPDM rubber. The sealing gasket provides a tight and reliable joint.
SPIRO® system is available as a complete range with dimensions Ø80 up to and including Ø 1250 mm.

SPIRO® system complies with DW 142 Class C (Eurovent 2.2 =IV (DIN 24194)) specification.

The high, uniform quality and the effective factory-fitted sealing system means that installation is fast and easy. SPIRO® system is leakproof when fitted and does not require any additional sealing.



Resistance of seal mouldings to various substances

The table below gives a basic guide to how the rubber is affected by various substances.
A figure for each type of rubber indicates its suitability.

4	Scarcely affected	Recommended
3	Lightly affected	Normally usable
2	Strongly affected	Only useable in certain cases
1	Badly affected	Unsuitable
–	No information	

		EPDM	Silicone
A			
Acetaldehyde		4	4
Acetic acid	dilute 30%	4	3
	crystalline acetic acid	4	3
Acetic anhydride		3	2
Acetone		4	3
Acetylene		3	3
Aluminium salts (non-oxidizing)		4	4
Alun		4	4
Ammonia, liquid		4	1
Ammonia gas, cold		4	4
Ammonia gas, hot 65 °C		3	3
Ammonium hydroxide, dil. ammonia		3	3
Ammonium salts (non-oxidising)		4	3
Amyl acetate		4	1
Aniline		3	–
Aniline dyes		4	–
Animal fats		2	3
Arsenic acid		4	4
Asphalt		1	1
B			
Barium salts (non-oxidizing)		4	4
Beer		4	4
Benzene, bensol		1	1
Black liquor		1	–
Black water, waste water		4	3
Bleaching liquor, see Potassium hypochlorite			
Borax		4	3
Boric acid		4	4
Bromide, liquid		–	1
Bromic acid		4	1
Butane		1	4
Butanol, butyl alcohol		4	3
Butter oils		1	1
Butyl acetate		4	1
C			
Caustic soda, sodium hydroxide		4	2
Calcium salts (non-oxidizing)		4	3
Cellosolve, ethylene glycol		3	–
Cellosolve acetate		3	–
Chlorine gas	dry	2	–
	damp	2	–
Chlorine solutions	0,1 g/l free chlorine	4	–
	0,1-1 g/l free chlorine	4	–
	1-10 g/l free chlorine	3	–
	over 10 g/l free chlorine	2	–
Chlorine sulphonate acid		1	1
Chromic acid		2	2
CFC (e.g. Freon)	11	1	1
	12	3	1
	13	4	–
	21	1	–
	22	4	1
	31	4	–
	32	4	–
	112	1	–
	113	1	1
	114	4	1
	115	4	–
Copper salts (non-oxidizing)		4	4
Citric acid		4	4
D			
Detergent		4	4
Diesel oil		1	2
Dilutin (White spirit)		1	1
Developing solutions		3	–
E			
Ethanol, ethyl alcohol		4	4
"Ether", diethyl ether, ethyl ether		2	–
Ethyl acetate		3	2
Ethylene glycol		4	3
Ethylene chloride		1	–
Ethyl glycol, cellosolve		3	–
Ethyl chloride		4	1
Ethane, ethylene		1	–
F			
Fluoric silicate		4	2
Formic acid		4	2
Formaldehyde, formalin		4	–
Freon, see CFC			
Furan, furfuran		2	–
Furfural		3	–
G			
Glucose		4	4
Glycerine, glycerol		4	4
Green liquor, white liquor		4	3
H			
Heating oil		1	2
Hydraulic oil, mineral oil based		1	3
Hydraulic oil, phosphate ester based		4	4
Hydrogen		4	4
Hydrogen peroxide	3%	4	4
	30% 20 °C	4	4
	90% 20 °C	2	4
Hydrochloric acid	dilute	4	1
	conc 37% room temp	4	1
	conc 37% 70 °C	2	1
Hydrogen sulphide	dry, room temp	4	4
	damp, room temp	4	2
	damp, hot	3	1
Hydrofluosilicic acid		4	1
Hydrofluoric acid 50%		4	1
Hydrofluoric acid, conc.		4	1
I			
Iodine		–	–
Iron salts (non-oxidizing)		4	3
L			
Lactic acid		4	4
Lead salts (non-oxidizing)		4	2
Linseed oil		3	4
Liquid manure		4	3
LPG (Propane/butane)		1	1
M			
Magnesium salts (non-oxidizing)		4	4
Manganese salts (non-oxidizing)		4	4
Mercury		4	4
Mercury salts (non-oxidizing)		4	4
Methanol, methyl alcohol, wood alcohol		4	4
Methylene chloride		1	1
Methyl chloride		2	1
Methyl ethyl ketone MEK		4	–
Methyl isobutyl ketone		3	2
Methyl isopropyl ketone		3	2
Milk		4	4
N			
Natural gas		1	4
Nickel salts (non-oxidizing)		4	4
Nitrobenzene, Nitrobenzol		2	1
Nitric acid	20% room temp.	4	–
	20% 50 °C	3	1
	40% 50 °C	3	1
	50% 50 °C	2	1
	60% room temp.	2	1
	70% room temp.	1	1
	red fuming	1	1
Nitrogen		4	4
Nitrous gases		2	2
O			
Olive oil		3	3
Oleic acid		4	–
Oxalic acid		4	3
Ozone		4	4
Oxygen		4	4
P			
Palmitinic acid		3	–
Paraffin (kerosine)		1	1
Perchlorethylene		1	3
Perchloric acid		3	1
Petrol (gasoline), 65 octane		1	1
Petrol (gasoline), 100 octane		1	1
Petroleum ether		1	1
Petroleum oils	high aromatic content	1	1
	low aromatic content	1	3
Phenol		3	2
Phosphoric acid 45%		4	1
Phosphoric acid 85%		4	1
Plating solutions without chromium		4	3
Potassium hypochlorite,			
	pH 7 below 10 g/l	4	1
	over 10 g/l	3	1
Potassium hydroxide, potash		4	3
Potassium salts (non-oxidizing)		4	3
Propane, LPG		1	1
Propanol, Propyl alcohol		4	4
R			
Radioactive radiation		3	2
Rape seed oil (canola oil)		4	4
Rosin oil		1	1
S			
Salicylic acid		4	4
Sodium salts (non-oxidizing)		4	4
Sodium hydroxide, sodium hydrate		4	2
Sodium hypochlorite max 10 g/l free Cl		4	–
	over 10 g/l free Cl	3	–
Sugar solutions		4	4
Styrene		1	1
Sulphur, melted		4	4
Sulphur dioxide, dry gas		4	3
Sulphur chloride		1	–
Sulphuric acid	60% room temp.	4	1
	60% 50 °C	4	1
	60-75% 50 °C	3	1
	75-80% 50 °C	2	1
	85-96% 50 °C	1	1
	fuming, Oleum	1	1
Sulphurous acid		4	1
Sulphur trioxide, dry gas		3	2
T			
Tar		1	2
Tannic acid		4	1
Terpentine, terpenes		1	1
Toluene, toluol		1	1
Trichloretane, "thinner"		1	2
Transformer oil	mineral oil based	1	3
	chlorated hydrocarbon	1	1
V			
Vegetable oils		4	4
W			
Water	fresh	4	4
	distilled	4	4
	salt	4	4
	fresh & dist. 100 °C	4	2
White spirit (Dilutin)		1	1
Wine		4	4
X			
Xylene, xylol		1	1
Z			
Zinc salts (non-oxidizing)		4	4

The SPIRO-system

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Meeting the requirements of air tightness, Class C, the range extends from composnents with a diameter of 80 mm up to those with a diameter of 1250 mm.

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Benefits of the SPIRO-system

- Fast and easy installation.
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- Environmentally friendly - the system is fitted with solvent-free sealant.
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- Temperature resistant from -30 to +100 C
- Withstands positive pressure up to 3000 Pa.

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Tightness

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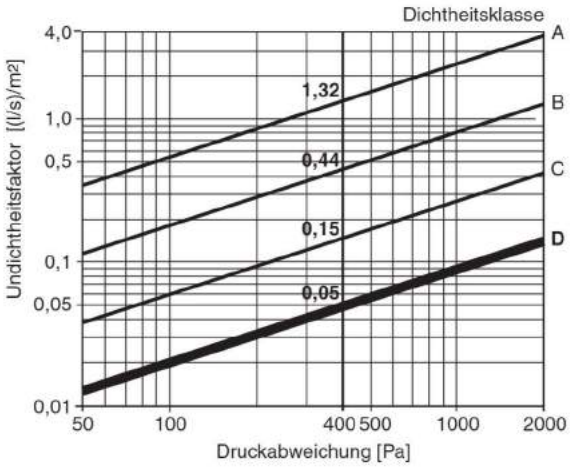

The graph shows that sealing class D is 3 times better than class C, which in turn is 3 times better than class B etc. Class D thus entails demands on not only the seal moulding but also the fittings and how well the system is installed.

This is one reason why we have given all fittings a turned-over edge and have given still more fittings a stop bead. This gives us stable products which are better suited to withstand handling on site at the same time as the risk of skewed assembly falls.

Economy – Tightness

Present-day stringent demands for interior climate entail expensive air treatment. Leakage leads to uneconomical operation, adjustment difficulties and over-dimensioned equipment. For this reason, it is important that ventilation systems are very well sealed, to keep overall costs down. This is why official requirements for sealing vary with the size and use of systems.

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2. The seal moulding profile is measured in a profile projector, where the dimensions of the seal moulding are checked against agreed tolerances.
3. The seal moulding material is tested by accelerated ageing in heat oven.

Manufacturing inspection is logged. The inspection includes a diameter check of ducts and fittings, a check of the groove where the seal moulding has been fixed, and a check of its fixing. Pressure testing is done in our air laboratory, to check the leakage flow from our products. This does not give the whole picture, however, so the best inspection of the SPIRO system is the pressure testing that The Swedish National and Testing Institute undertakes on randomly sampled products. In all these pressure tests, the SPIRO system has always exceeded the relevant sealing requirements.

Fittings

Products under the SPIRO insert and fittings with SPIRO seals under the Silencer, Dampers and measure units, and Isol inserts are included in the type approval for sealing class D. In addition, some fittings, under the Other circular products insert, are included.

A handful of fittings with the SPIRO seal can only manage up to tightness class C. This is marked on each of these products.

Fittings in this catalogue with a "L" in their designations have SPIRO seals, with only a few exceptions.

Degreased

Fittings can be supplied degreased on the inside, to order.

Dimensions

Almost all products in the SPIRO-programme can also be delivered in intermediate dimentions. For further informations see page 5.

Negative pressure

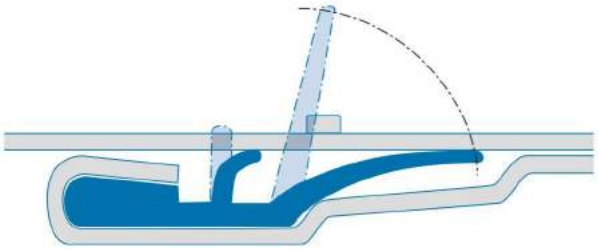
At big negative pressure there is a risk for a ventilation system to collapse. This risk is greater the bigger dimensions you have.

In order to increase the strength of *the ducts* you can e.g. increase their sheet metal thickness. This is a simple way but the effect is rather small. It exists other ways with higher result. For bigger dimensions then the ducts may be stronger than the fittings.

In order to increase the strength of *the fittings* other ways than thicker sheet metal thickness are more suitable.

SPIRO has experience and knowledge about this and is willing to offer help at special cases. We can, as special, deliver duct systems that can withstand at least 5 000 Pa negative pressure.

The sealing gasket



The SPIRO® system sealing system is based on a profile of homogeneous EPDM rubber. The rubber gasket is located in a groove at the end of the fitting and is securely attached by means of an return edge. This design ensures that the rubber gasket is always held in its correct position.

The sealing gasket must comply to our strict quality reqire-ments, so we have chosen EPDM rubber. This material is very resistant to ozone and UV rays, and at the same time unaffected by temperature fluctuations.

Economical air conditioning

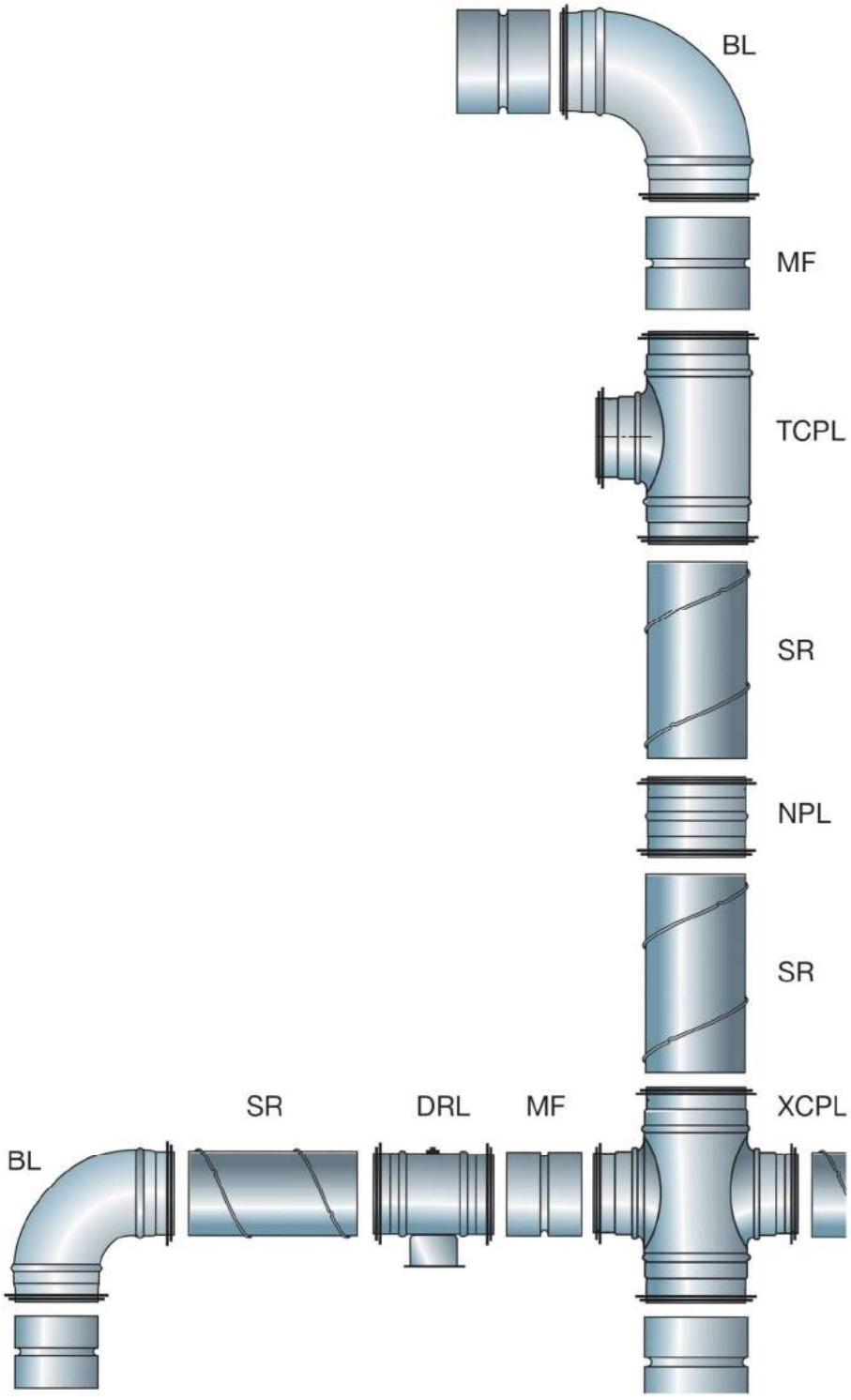
Great demands are made on air-conditioning systems these days, and it is expensive to process air. So it is vital that the duct systems used must be tightly sealed to keep operating costs and overall economy at a reasonable level. Leaks mean higher operating costs, adjustment problems and over-dimensioned units and duct systems. To deal with these risks, SPIRO INTERNATIONAL S.A. has developed its complete SPIRO® system range.

SPIRO® system - the leakproof duct system

SPIRO system is an approved range of quick-fitting sealing gasket of EPDM rubber. The sealing gasket provides a tight and reliable joint.
SPIRO® system is available as a complete range with dimensions Ø80 up to and including Ø 1250 mm.

SPIRO® system complies with DW 142 Class C (Eurovent 2.2 =IV (DIN 24194)) specification.

The high, uniform quality and the effective factory-fitted sealing system means that installation is fast and easy. SPIRO® system is leakproof when fitted and does not require any additional sealing.



Resistance of seal mouldings to various substances

The table below gives a basic guide to how the rubber is affected by various substances.
A figure for each type of rubber indicates its suitability.

4	Scarcely affected	Recommended
3	Lightly affected	Normally usable
2	Strongly affected	Only useable in certain cases
1	Badly affected	Unsuitable
–	No information	

		EPDM	Silicone
A			
Acetaldehyde		4	4
Acetic acid	dilute 30%	4	3
	crystalline acetic acid	4	3
Acetic anhydride		3	2
Acetone		4	3
Acetylene		3	3
Aluminium salts (non-oxidizing)		4	4
Alun		4	4
Ammonia, liquid		4	1
Ammonia gas, cold		4	4
Ammonia gas, hot 65 °C		3	3
Ammonium hydroxide, dil. ammonia		3	3
Ammonium salts (non-oxidising)		4	3
Amyl acetate		4	1
Aniline		3	–
Aniline dyes		4	–
Animal fats		2	3
Arsenic acid		4	4
Asphalt		1	1
B			
Barium salts (non-oxidizing)		4	4
Beer		4	4
Benzene, bensol		1	1
Black liquor		1	–
Black water, waste water		4	3
Bleaching liquor, see Potassium hypochlorite			
Borax		4	3
Boric acid		4	4
Bromide, liquid		–	1
Bromic acid		4	1
Butane		1	4
Butanol, butyl alcohol		4	3
Butter oils		1	1
Butyl acetate		4	1
C			
Caustic soda, sodium hydroxide		4	2
Calcium salts (non-oxidizing)		4	3
Cellosolve, ethylene glycol		3	–
Cellosolve acetate		3	–
Chlorine gas	dry	2	–
	damp	2	–
Chlorine solutions	0,1 g/l free chlorine	4	–
	0,1-1 g/l free chlorine	4	–
	1-10 g/l free chlorine	3	–
	over 10 g/l free chlorine	2	–
Chlorine sulphonate acid		1	1
Chromic acid		2	2
CFC (e.g. Freon)	11	1	1
	12	3	1
	13	4	–
	21	1	–
	22	4	1
	31	4	–
	32	4	–
	112	1	–
	113	1	1
	114	4	1
	115	4	–
Copper salts (non-oxidizing)		4	4
Citric acid		4	4
D			
Detergent		4	4
Diesel oil		1	2
Dilutin (White spirit)		1	1
Developing solutions		3	–
E			
Ethanol, ethyl alcohol		4	4
"Ether", diethyl ether, ethyl ether		2	–
Ethyl acetate		3	2
Ethylene glycol		4	3
Ethylene chloride		1	–
Ethyl glycol, cellosolve		3	–
Ethyl chloride		4	1
Ethane, ethylene		1	–
F			
Fluoric silicate		4	2
Formic acid		4	2
Formaldehyde, formalin		4	–
Freon, see CFC			
Furan, furfuran		2	–
Furfural		3	–
G			
Glucose		4	4
Glycerine, glycerol		4	4
Green liquor, white liquor		4	3
H			
Heating oil		1	2
Hydraulic oil, mineral oil based		1	3
Hydraulic oil, phosphate ester based		4	4
Hydrogen		4	4
Hydrogen peroxide	3%	4	4
	30% 20 °C	4	4
	90% 20 °C	2	4
Hydrochloric acid	dilute	4	1
	conc 37% room temp	4	1
	conc 37% 70 °C	2	1
Hydrogen sulphide	dry, room temp	4	4
	damp, room temp	4	2
	damp, hot	3	1
Hydrofluosilicic acid		4	1
Hydrofluoric acid 50%		4	1
Hydrofluoric acid, conc.		4	1
I			
Iodine		–	–
Iron salts (non-oxidizing)		4	3
L			
Lactic acid		4	4
Lead salts (non-oxidizing)		4	2
Linseed oil		3	4
Liquid manure		4	3
LPG (Propane/butane)		1	1
M			
Magnesium salts (non-oxidizing)		4	4
Manganese salts (non-oxidizing)		4	4
Mercury		4	4
Mercury salts (non-oxidizing)		4	4
Methanol, methyl alcohol, wood alcohol		4	4
Methylene chloride		1	1
Methyl chloride		2	1
Methyl ethyl ketone MEK		4	–
Methyl isobutyl ketone		3	2
Methyl isopropyl ketone		3	2
Milk		4	4
N			
Natural gas		1	4
Nickel salts (non-oxidizing)		4	4
Nitrobenzene, Nitrobenzol		2	1
Nitric acid	20% room temp.	4	–
	20% 50 °C	3	1
	40% 50 °C	3	1
	50% 50 °C	2	1
	60% room temp.	2	1
	70% room temp.	1	1
	red fuming	1	1
Nitrogen		4	4
Nitrous gases		2	2
O			
Olive oil		3	3
Oleic acid		4	–
Oxalic acid		4	3
Ozone		4	4
Oxygen		4	4
P			
Palmitinic acid		3	–
Paraffin (kerosine)		1	1
Perchlorethylene		1	3
Perchloric acid		3	1
Petrol (gasoline), 65 octane		1	1
Petrol (gasoline), 100 octane		1	1
Petroleum ether		1	1
Petroleum oils	high aromatic content	1	1
	low aromatic content	1	3
Phenol		3	2
Phosphoric acid 45%		4	1
Phosphoric acid 85%		4	1
Plating solutions without chromium		4	3
Potassium hypochlorite,			
	pH 7 below 10 g/l	4	1
	over 10 g/l	3	1
Potassium hydroxide, potash		4	3
Potassium salts (non-oxidizing)		4	3
Propane, LPG		1	1
Propanol, Propyl alcohol		4	4
R			
Radioactive radiation		3	2
Rape seed oil (canola oil)		4	4
Rosin oil		1	1
S			
Salicylic acid		4	4
Sodium salts (non-oxidizing)		4	4
Sodium hydroxide, sodium hydrate		4	2
Sodium hypochlorite max 10 g/l free Cl		4	–
	over 10 g/l free Cl	3	–
Sugar solutions		4	4
Styrene		1	1
Sulphur, melted		4	4
Sulphur dioxide, dry gas		4	3
Sulphur chloride		1	–
Sulphuric acid	60% room temp.	4	1
	60% 50 °C	4	1
	60-75% 50 °C	3	1
	75-80% 50 °C	2	1
	85-96% 50 °C	1	1
	fuming, Oleum	1	1
Sulphurous acid		4	1
Sulphur trioxide, dry gas		3	2
T			
Tar		1	2
Tannic acid		4	1
Terpentine, terpenes		1	1
Toluene, toluol		1	1
Trichloretane, "thinner"		1	2
Transformer oil	mineral oil based	1	3
	chlorated hydrocarbon	1	1
V			
Vegetable oils		4	4
W			
Water	fresh	4	4
	distilled	4	4
	salt	4	4
	fresh & dist. 100 °C	4	2
White spirit (Dilutin)		1	1
Wine		4	4
X			
Xylene, xylol		1	1
Z			
Zinc salts (non-oxidizing)		4	4