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DEF. Ar 11-24-58
Retyped 6-27-84 acb

**Product Engineering
Specification**

No: 8915-112

Date: 11-24-58

Approved By: D. Fry

TITLE:

Specification For Gasket Material

1.0 GENERAL

Asbestos Base, Neoprene Bonded Gasket

Q/B 51-1040-007

2.0 COMPOSITION

2.1 Asbestos Fibres

2.2 100% Neoprene Binder

2.3 Sulphur Free

3.0 TENSILE STRENGTH

3.1 1/64 2500 lbs. sq. in. - Typical Values 3500 lbs. sq. in.

3.2 1/32 and greater min - 3500 lbs. sq. in. Typical Values
4000 lbs. sq. in.

4.0 COMPRESSIBILITY

3500 lbs. sq. in. 1/12 - 3/16

5.0 SPEC

MIL-A-17472 and General Automotive Spec. G-1122-1 and G-1123-1

MIL-G-17809 (OED) G-1122 and G-1123

AMS 5522F

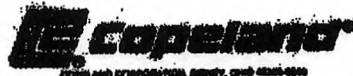
Goodrich 258

Nicoseal 375

Any changes on the above or on new material, must have Engineering Department approval.

Gasket thickness as specified per print to have a .0005 additional tolerance unless otherwise specified.

BJMcM:rab R/N 13-210-001
Retyped 7-3-84 acb



Product Engineering Specification

No: ES15-114

Date: 9-27-62

Approved By: R. King

TITLE: Gasket Material GP/Duroid 3102 and D3102

1.0 MATERIAL

1.1 Description

This material is a homogeneous blend of asbestos fibers and neoprene latex produced by the "beater addition" process which permits extremely uniform fiber treatment and encapsulation by the elastomer.

- 1.2 This material may be laminated to meet special dimensional tolerances with a neoprene latex as a binding agent.

2.0 GENERAL REQUIREMENTS

- 2.1 Resistance to mixtures of Freons and oil in refrigeration compressors.
- 2.2 Resistance to torque loss and embrittlement at processing temperature of $290 \pm 5^\circ\text{F}$. for a minimum of four (4) hours.

3.0 PHYSICAL PROPERTIES

Typical Test Values

3.1 As Received

Density	gm/cc	1.50
Tensile M.D.	psi	4800
Tensile CND	psi	2799 (2000 min.)
Compressibility, 5000 psi	%	19.1 (10-25)
Recovery	%	48 (40 min.)

3.2 Oven Aged - 16 Hours @ 212°F .

Compressibility, 5000 psi	%	15
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3.3 Water Immersion - 24 Hours @ 212°F .

Loss in Tensile	%	40
Thickness Increase	%	10
Compressibility, 5000 psi	%	25

Tests in accordance with ASTM D1170-62T.

3.4 Application Note

Gasket will shrink at approximately 6% of compressed gasket thickness after torque and oven temperature.

4.0 GASKET SIZING

4.1 General

The material, as received, is sized for thickness by compressing under a predetermined load which shall approximate the load applied by assembly of the head and valve plate in the actual model.

4.2 Sizing Procedure

The sizing equipment applies the required, evenly distributed, load with a block of approximately the same area as the nominal gasket area. It then measures the actual gasket material thickness while the material is under compression. The loads and block sizes are shown on the following chart:

<u>Drawing No.</u>	<u>Model</u>	<u>Nominal Gasket Area (Sq. In.)</u>	<u>Applied Load (lbs.)</u>	<u>Block Size (In.)</u>
020-0294-00	R	8.062	14,000-16,000	2.916
020-0403-00	R	7.896	14,000-16,000	2.795
020-0435-00	R	6.884	14,000-16,000	2.795
020-0413-00	S	14.444	22,000-24,000	3.858
020-0432-00	S	13.415	22,000-24,000	3.722
020-0448-00	Y	12.416	22,000-24,000	3.586
020-0444-00	J	4.514	14,000-16,000	2.200
020-0453-00	J	4.514	14,000-16,000	2.200

4.3 Classification

This is done with a class break off at the midpoint. For example:

<u>Measured Gasket Size (Thickness)</u>	<u>Marking Classification</u>
.0155/.0164	.016
.0165/.0174	.017
.0175/.0184	.018
.0185/.0194	.019
etc.	

4.4 Identification Before Punching

The strip shall be bundled and marked with size classification and part number. The thickness must be within the limits per product drawing. For example:

<u>Part No.</u>	<u>Thickness</u>
020-0294-01	.013 - .019
020-0432-03	.014 - .024
020-0412-00	.020 - .027

5.0 THICKNESS TOLERANCE PER ASTM D1170-62T

<u>Thickness</u>	<u>Tolerance Range</u>
.015" and under:	plus .005" minus .002"
.016" to .063"	plus .005" minus .003"
.064" and over:	plus .008" minus .008"

5.2 Tolerance for a particular gasket shall be indicated on the part drawing.

6.0 DIMENSIONAL VARIATIONS (length and width only)

Gasket may be subject to dimensional change after cutting. (Approximately .0025" per inch). This variation is in addition to the tolerance indicated on each drawing.

7.0 STORAGE LIFE

Maximum stock storage life 12 months after date of vendor receipt of material.

If the finished gaskets are packaged in air tight containers the storage life may be increased to 3 years.

Unless otherwise specified on gasket drawing, vendor shall bundle and tag gaskets to identify with correct part number and thickness.

8.0 APPROVED SUPPLIERS

Rogers Corporation, Rogers, Conn. (GP/Duroid 3102)

E.A. Chamberlain LTD., Nailsworth, Stroud
Gloucestershire GL6 0AN, England (D3102)

SPEC17

WJF:rab R/N 13-309-001
Retyped 7-3-84 ac5



Product Engineering Specification

No: KS15-11

Date: 9-10-63

Approved By: J. E. Egan

TITLE:

Gasket Material - Copelametic Models

1.0 MATERIAL

1.1 Description

These materials are homogenous blends of asbestos fibers and nitrile butadiene latex (NBR) (Duna N) produced by the "beater addition process" which permits extremely uniform fiber treatment and encapsulation by the elastomer.

1.2 Approved Suppliers

Item 1. Accopac AN892. Armstrong Cork Co., Lancaster, PA

2.0 GENERAL REQUIREMENTS

2.1 Resistance to mixtures of Freons and oil in refrigeration compressors.

2.2 Resistance to torque loss and embrittlement at processing temperature of $290 \pm 5^\circ\text{F}$. for a minimum of (4) hours.

3.0 COPELAND APPLICATIONS

Gaskets for end covers, bottom plates, housing covers, valve pads and terminal plates on Copelametic models.

4.0 PHYSICAL PROPERTIES

Tensile strength	MD	psi	4000
Tensile strength	CMD	psi	(min) 2500
Compressibility	5000	psi	10-17
Recovery			2 (min) 40
Density			lbs./cu. ft. (min) 100

5.0 TEST METHODS

ASTM F104 P-129940M5

6.0 THICKNESS TOLERANCES

under .015 : plus .005", minus .002"
.015" to .061"; plus .005", minus .005"
.061" and over; plus .008", minus .008"

Unless otherwise stated on the drawing where close control and/or selective thickness are required.

7.0 These materials are equally acceptable when this specification is called for on the drawing unless the drawing specifically states a particular item as outlined in Paragraph 1, in which case that part will be limited to the material per that item only.

SPEC17

12-20-79, IS EN50-0179-019



PRODUCT ENGINEERING
SPECIFICATION

NO. 2515-149

DATE: 2-9-79

APPROVED BY: J. Hoge

TITLE:

GASKET MATERIAL CP/DURIO 3102C

OBSOLETE

1. MATERIAL (Refer to ES81-133 for Processing Specification)

1.1 Description

This material is a homogeneous blend of asbestos fibers and acrylic binder produced by the "beater addition" process which permits extremely uniform fiber treatment and encapsulation by the elastomer.

3102C is a variation in binder for high temperature (about pump applications).

2. GENERAL REQUIREMENT

- 2.1 Resistant to mixtures of Freon and oil in refrigeration compressor
- 2.2 Resistant to torque loss and abrasion at processing temperature of $350 \pm 5^\circ\text{F}$ for a minimum of four (4) hours

3. PHYSICAL PROPERTIES

A. Properties

TYPICAL TEST VALUES

MIN

Density	1.48 g/cc	92.4 lb/ft ³	92.4
Tensile	14.1 psi	200 psi	F104
Compression, 5000 psi	15.44		F36
Recovery	53.82 % (454 min.)		F36

Oil Immersion - 5 hrs. @ 150°C

Avg.

Max.

F104

Loss of Tensile

14.65

200

Increase in Length

3.57

10

Compressibility, 5000 psi

14.74

250

4. THICKNESS TOLERANCE PER ASTM B1170-62T

<u>Thickness</u>	<u>Tolerance Range</u>
.015" and under;	plus .005", minus .002"
.016" to .061";	plus .005", minus .005"
.062 and over;	plus .008", minus .008"

5. DIMENSIONAL VARIATIONS (length and width only)

Gasket may be subject to dimensional change after cutting. (approximately .0025" per inch). This variation is in addition to the tolerance indicated on each drawing.

6. STORAGE LIFE

Maximum stock storage life 12 months after date of receipt of material at Copeland.

If the gaskets are packaged in air tight containers the storage life may be increased to 3 years.

7. APPROVED SUPPLIERS

Rogers Corporation, Rogers Conn. (GP/Inroid 3192C)

TO: Mr. J. Eng
From: [illegible]

MODEL #

DESCRIPTION

IN CHARGE
AND

H. ASUN

TESTS

N/A

MATERIAL
DISPOSITION

N/A

Completed EN
Date

CO-11017-10

1. INTRODUCTION

This specification covers the requirements for the design, construction, and testing of a certain type of compressor. The material shall be of the highest quality and the workmanship shall be of the best.

2. REFERENCES

ASTM A-276, 304 and 316 stainless steel.
ASTM A-276, 304 and 316 stainless steel.

3. GENERAL REQUIREMENTS

- a. The compressor shall be of the design and construction specified in the drawing.
- b. The compressor shall be capable of operating at a pressure of 150 psig and a temperature of 250°F.
- c. The compressor shall be capable of operating at a pressure of 150 psig and a temperature of 250°F.

4. MATERIALS

The materials shall be of the highest quality and the workmanship shall be of the best. The materials shall be of the highest quality and the workmanship shall be of the best.

5. PHYSICAL PROPERTIES

Compressive strength	3000 psi	(min) 2500
Compressibility		2 15-25
Recovery		2 (min) 45
Permeability		2 (min) 95
Thickness increase when immersed in ASTM No. 3 oil (5 hrs./300°F)		0-15%

6. TEST METHODS

ASTM F104, F1299008546, ASTM F-38

7. DIMENSIONS/TOLERANCES

3/16" (.015-.019)	5/16" (.041-.051)
1/32" (.008-.012)	1/16" (.015-.021)

Unless otherwise stated on the drawing, all dimensions are to be held to the nearest .001 inch.

1-61 R/DSG-0081-010
Revised 1-61



Product Engineering Specification

No. ESE-110

Date 5-11-61

Approved By K. W. Ziegler

TITLE Gasket Material - Copelametic Models (Compressed Asbestos Fiber)

1.0 SCOPE

This specification covers the material requirements for gaskets used on Copelametic models. This material is a homogenous blend of highly compressed asbestos fiber and nitrile butadiene (NBR) binder produced by the "beater addition" process which permits extremely uniform fiber treatment and encapsulation by the binder.

2.0 APPLICABLE DOCUMENTS

The following documents apply as referenced elsewhere in this specification. Unless otherwise stated, the latest revision of each document in effect on the date of the associated purchase order shall apply.

- a. ASTM F38, Test for Creep Relaxation of Gasket Materials.
- b. ASTM F36, Standard Method of Test for Compressibility and Recovery of Gasket Materials.
- c. ASTM F152, Tension Testing of Nonmetallic Gasket Materials.
- d. ASTM F146, Test for Fluid Resistance of Gasket Materials.

3.0 REQUIREMENTS

Unless otherwise specified on the associated purchase order or engineering drawing, all material purchased in accordance with this specification shall meet the requirements of ASTM F36A, ASTM F152, ASTM F38 and ASTM F146.

Resistance to mixtures of freon and oil in refrigeration compressors.

Resistance to torque loss and embrittlement.

No anti-stick coatings are to be applied to the gasket material.

3.1 Physical Properties

<u>Property</u>	<u>Value</u>	<u>Test Method</u>
a. Compressibility @ 5000 PSI	5-15%	ASTM F36A
b. Recovery (Minimum)	35%	ASTM F36A
c. Tensile Strength (Minimum)	2500 PSI	ASTM F152
d. Density (Minimum)	100 lb./cu. ft.	
e. Creep Relaxation 1/32 Material	17 max.	ASTM F-38 Method B
f. Thickness Increase when immersed in ASTM oil #3 for 3-1/2 hours @ 300°F	0-20%	ASTM F146

3.2 Gauges/Thickness Tolerances

1/64 (.013 - .018)
1/32 (.028 - .034)
1/16 (.057 - .067)

4.0 QUALITY ASSURANCE

All items purchased in accordance with this specification shall meet the general requirements of the associated purchase order and requirements of ASTM F146, F38, F36 and F152.

5.0 PACKING AND DELIVERY

All items purchased in accordance with this specification shall meet the packaging and delivery requirements of the associated purchase order.

6.0 COPELAND APPLICATIONS

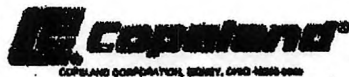
This material is suitable for use as gaskets for cylinder heads, bottom plates, housing covers, terminal plates, stator covers and oil pumps on Copeland models.

7.0 APPROVED SOURCES

Material - Armstrong Cork Co., Lancaster, PA
Fabricator - Industry Products Co., Piqua, OH

SPEC18

lw 2/17/81RW50-0281-025
R/R 7-21-81EN50-0681-016
Rev. 2-16-83lwEN51-0283-011



Product Engineering Specification

No: ES15-161

Date: 2-17-81

Approved By: K.W. Yun

TITLE: GASKET MATERIAL - (KLINGER OILIT)

1. SCOPE

This specification covers the material requirements for gaskets. This material is a homogenous blend of highly compressed asbestos fiber and Nitrile binder produced by the "Mill Mixing" process which permits uniform fiber treatment and encapsulation by the binder.

2. APPLICABLE DOCUMENTS

The following documents apply as referenced elsewhere in this specification. Unless otherwise stated, the latest revision of each document in effect on the date of the associated purchase order shall apply.

- 2.1 ASTM F36, Standard Method of Test for Compressibility and Recovery of Gasket Materials.
- 2.2 ASTM F152, Tension Testing of Nonmetallic Gasket Materials.
- 2.3 ASTM F146, Test for Fluid Resistance of Gasket Materials.

3. REQUIREMENTS

Unless otherwise specified on the associated purchase order or engineering drawing, all material purchased in accordance with this specification shall meet the requirements of ASTM F36A, ASTM F152, and ASTM F146.

Resistance to mixtures of freon and oil in refrigeration compressors.

Resistance to torque loss and embrittlement.

No anti-stick coatings are to be applied to the gasket material.

3.1 PHYSICAL PROPERTIES

<u>Property</u>	<u>Value</u>	<u>Test Method</u>
3.1.1 Compressibility @ 5000 PSI	7-17%	ASTM F36A
3.1.2 Recovery (Minimum)	55%	ASTM F36A
3.1.3 Tensile Strength (Minimum)	4200 PSI	ASTM F152
3.1.4 Density (Minimum)	120 lb/cu ft	
3.1.5 Thickness Increase when immersed in ASTM oil #3 for 3-1/2 hours @ 300°F	6%	ASTM F146
3.1.6 Maximum Operating Conditions	+900°F	

3.2 GAUGES/THICKNESS TOLERANCES

1/64 (.014-.018)	3/64 (.045-.049)	1/4 (.246-.254)
1/32 (.029-.033)	3/32 (.091-.097)	
1/16 (.060-.066)	1/8 (.121-.129)	

4. STORAGE LIFE

Maximum stock storage life 12 months after date of vendor receipt of material.

If the finished gaskets are packaged in air tight containers the storage life may be increased to 3 years.

Unless otherwise specified on gasket drawing; vendor shall bundle & tag gaskets to identify with correct part number & thickness.

5. QUALITY ASSURANCE

All items purchased in accordance with this specification shall meet the general requirements of the associated purchase order and requirements of ASTM F146, F36 and F152.

6. PACKING AND DELIVERY

All items purchased in accordance with this specification shall meet the packaging and delivery requirements of the associated purchase order.

7. COPELAND APPLICATIONS

This material is suitable for use as gaskets for cylinder heads, bottom plates, housing covers, terminal plates, stator covers and oil pumps on Copelametic models. Also suitable for valve plate and head gaskets on both Copelametic and Copelaweld models.

ES15-161
SHEET 3

8. APPROVED SOURCES

Material - Klinger Inc.
Sidney, Ohio

Fabricator - Industry Products Co.
Piqua, Ohio

SPR

1w 1-81 EN50-0481-026
Rev 2-21-83 1wEN51-0283-011
mcb 1-11-83 EN51-0483-007



Product Engineering Specification

ES15-162

No. _____
Date 2-17-81
Approved By K.W. Vign

TITLE: Gasket Material - Copelametic Models (Reinz Thermolit K)

1. SCOPE

This specification covers the material requirements for gaskets used on Copelametic models. This material is a homogenous blend of highly compressed asbestos fiber and neoprene binder produced by the "Mill Mixing" process which permits uniform fiber treatment and encapsulation by the binder.

2. APPLICABLE DOCUMENTS

The following documents apply as referenced elsewhere in this specification. Unless otherwise stated, the latest revision of each document in effect on the date of the associated purchase order shall apply.

- 2.1 ASTM F38, Test for Creep Relaxation of a Gasket Material.
- 2.2 ASTM F36, Standard Method of test for Compressibility and Recovery of Gasket Materials.
- 2.3 ASTM F152, Tension Testing of Non-Metallic Gasket Materials.
- 2.4 ASTM F146, Test for Fluid Resistance of Gasket Materials.

3. REQUIREMENTS

Unless otherwise specified on the associated purchase order or engineering drawing, all material purchased in accordance with this specification shall meet the requirements of ASTM F36A, ASTM F152, and ASTM F38 and ASTM F146.

Resistance to mixtures of freon and oil in refrigeration compressors.

Resistance to torque loss and embrittlement.

No anti-stick coatings are to be applied to the gasket material.

3.1 PHYSICAL PROPERTIES

Property	Value	Test Method
3.1.1 Compressibility @ 5000 PSI	6-10 %	ASTM F36A
3.1.2 Recovery (Minimum)	552	ASTM F36A
3.1.3 Tensile Strength (Minimum)	5000 PSI	ASTM F152
3.1.4 Density (Minimum)	118 lb/cu ft	
3.1.5 Creep Relaxation 1/32 Material	27 Max.	ASTM F-38 Method B
3.1.6 Maximum Operating Conditions	-112°F to 842°F	

3.2 GAUGES/THICKNESS TOLERANCES

.010 (±.004)	.059 (±.005)
.020 (±.004)	.079 (±.008)
.030 (±.004)	.118 (±.012)
.039 (±.004)	.157 (±.016)

4. STORAGE LIFE

Maximum stock storage life 12 months after date of vendor receipt of material.

If the finished gaskets are packaged in air tight containers the storage life may be increased to 3 years.

Unless otherwise specified on gasket drawing, vendor shall bundle and tag gaskets to identify with correct part number and thickness.

5. QUALITY ASSURANCE

All items purchased in accordance with this specification shall meet the general requirements of the associated purchase order and requirements of ASTM F146, F38, F36 and F152.

6. PACKING AND DELIVERY

All items purchased in accordance with this specification shall meet the packaging and delivery requirements of the associated purchase order.

7. COPLAND APPLICATIONS

This material is suitable for use as gaskets for cylinder heads, bottom plates, housing covers, terminal plates, stator covers and oil pumps on Copeland models.

8. APPROVED SOURCES

Material - Reine Dichtungs, GmbH, Neu-ULM, Germany
Fabricator - Industry Products Co., Piquette, OH