

ENGINEERING PRACTICE STUDY

TITLE: Development of new specification (s) to support
Form In Place Gasket Technology.

25 June 2026

STUDY PROJECT (SEE ATTACHMENT 1)

FINAL REPORT

Study Conducted By: DLA Land and Maritime

Project Number: 5999-2026-002

Prepared by:

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ATTACH 1

I.OBJECTIVES:

Determine the acceptability of a Form In Place (FIP) Gasket fulfilling material and function requirements, as well as considering an Original Equipment Manufacturer's (OEM) capability to support product's storage and application.

II.BACKGROUND:

Currently, FSC 5999 does not offer a FIP Gasket. Today's gasket offering is limited to shapes D, O, P or cured extrusion. As a result, the gasket catalog is pre-defined to certain shapes and dimensions. Inclusion of FIP gaskets would allow a more robust product offering to support applications beyond previously defined shapes and sizes. Since the FIP Gasket molds to its applied shape- application is versatile and is independent of shape. Use of this product would support smaller products and intricate shapes. As electronic components decrease in size, and swiftly evolve in form and fit there must be consideration of newly introduced practices to meet market demands

III. RESULTS:

1. Are materials typically used in FIP Gaskets - base materials (Silicone, Synthetic rubber and Fluorosilicone) and conductive filler materials (Nickel, Copper, Aluminum, Silver, Graphite, and Ferrite) - acceptable for application?
Yes, Silicone, Synthetic rubber, Fluorosilicone, Nickel, Copper, Aluminum, Silver, Graphite, and Ferrite are acceptable materials for Form-in-Place (FIP) gaskets
2. How likely are Manufacturers able to support the storage environment and dispensing machines needed for Form In Place Gaskets?
Manufacturers are most likely able to support the storage requirement of a cool, dark, and dry environment as these are similar parameters for other materials. An automated robotic dispensing machine is required to create gaskets. While some manufacturers may currently house the machine, the purchase ranges from \$6,000 to \$150,000.
3. Can FIP gaskets fulfill the characteristics of MIL-DTL-83528? See ATTACHMENT 1.
While most inspection characteristics of MIL-DTL-83528 can be fulfilled, FIP gaskets are unable to meet stated inspection requirements of Specific gravity, Electrical stability during vibration, Volume resistivity after electromagnetic pulse (EMP) exposure, and Fluid immersion.

IV. CONCLUSIONS:

The concept of creating a document to support FIP gaskets was supported by Air Force Life Cycle Management Center and US Army Combat Capabilities Development Command. However, the material composition used to form FIP gaskets are unable to fulfill state requirements.

V. RECOMMENDATIONS:

Due to the inability to fulfill all characteristic requirements, it is recommended not to create a document for FIP Gaskets.

ATTACHMENT 1

TABLE I. Characteristics.

Item No.	Inspection		Units	Tolerance	Material type											
					A	B	C	D	E	F	G	H	J	K	L	M
1.	Operating temperature range	°C	N/A	-55	-55	-55	-55	-55	-65	-45	-55	-55	-45	-55	-55	
				+125	+160	+125	+160	+160	+160	+125	+160	+160	+125	+125	+160	
2.	Specific gravity	Sp gr 23/23°C	±13%	3.5	2.0	4.0	2.0	3.5	4.0	4.75 1/	4.0	1.7	3.5	4.0	1.9	
3.	Hardness	Shore A units	±7	65	65	75	70	65	75	80	80	45	85	75	65	
4.	Compression/deflection	Percent	Min	3.5	3.5	3.5	3.5	2.5	3.5	2.5	2.5	8.0	2.5	3.5	3.5	
5.	Tensile strength	Pounds per square inch	Min	200	200	180	180	300	250	600	400	150	400	200	200	
6.	Elongation	Percent	Min	100	100	100	60	200	100	20	90	50	100	100	100	
			Max	300	300	300	260	500	300	N/A	290	250	300	300	300	
7.	Compression set	Percent	Max	32.0	32.0	35.0	30.0	45.0	60.0	N/A	60.0	35.0	35.0	32.0	30.0	
8.	Tear strength	Pounds per inch	Min	25	30	35	35	50	40	70	60	20	40	30	30	
9.	Volume resistivity (as received)	Ohm-cm	Max	.004	.008	.010	.012	.002	.002	.007	.005	.010	.005	.005	.006	
10.	Shielding effectiveness 20 MHz-10 GHz (E-Field)	dB	Min	110	100	110	90	110	110	110	110	80	110	100	100	
11.	Electrical stability during vibration	During	Ohm-cm	Max	.006	.012	.015	.015	.010	.010	.010	.006	.015	.010	.010	.009
		After			.004	.008	.010	.012	.002	.002	.007	.005	.010	.005	.005	.006
12.	Electrical stability after break	Ohm-cm	Max	.008	.015	.015	.015	.010	.010	N/A	.006	.020	.010	.010	.009	
13.	Low temperature flex	TR10	°C	Max	-55	-55	-55	-55	-55	-65	N/A	-55	-55	-45	-55	-55
		TR70			-55	-55	-40	-40	-40	-40	N/A	-40	-55	-35	-55	-55
14.	Volume resistivity (after life testing)	Ohm-cm	Max	.010	.010	.015	.015	.010	.010	.010	.008	.015	.010	.010	.015	
15.	Volume resistivity after electromagnetic pulse (EMP) exposure 2/	Ohm-cm	Max	.010	.010	.015	.015	.010	.010	.010	.008	.015	.010	.010	.015	
16.	Fluid immersion 3/ 4/	---	---	N/S	N/S	SUR	SUR	N/S	SUR	N/S	N/S	N/S	N/S	N/S	N/S	

1/ Tolerance on material G only is ±0.75 sp gr 23/23°C.

2/ 0.9 kA per linear inch of perimeter.

3/ N/S = Not survivable; SUR = Survivable.

4/ Maximum volume swell of 25 percent and maximum change in hardness of 15 shore A units.