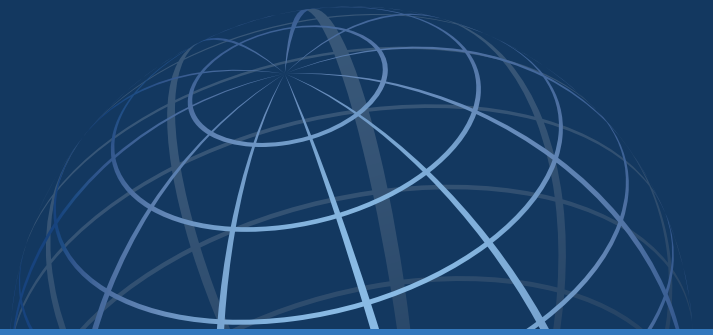




An INTEGRATED POLYMER SOLUTIONS Company



Essential innovation; **Advanced Materials for a Safer Nuclear Future**



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List of Compounds and Applications



Applications

Since its inception in 1983 NES, now part of the Integrated Polymer Solutions Group (IPS) has established a history in supply to various sectors of the nuclear industry, including Nuclear New Build, Nuclear Decommissioning, and the Defence sector.

Specific sealing applications have included:

- Static seals for nuclear fuel and waste transportation flasks
- Inflatable seals for blast doors in safety critical working environments
- Static and dynamic seals for extreme working environments in reactor cooling system intake and outfall tunnels

Compound Trials Program (CTP)

As part of our ongoing client and project support NES, undertook a comprehensive Compound Trials Program

(CTP) to better understand our sealing compound's behaviour after exposure to varying levels of ionising radiation.

In conjunction with the University of Manchester Dalton Cumbrian Facility (DCF) using the Gamma C60 Irradiator Facility at the West Lakes Science Park, NES conducted a series of trials.

The four selected compounds were subject to Ionising radiation doses, at a maximum dose rate of 1 KGy per Hr. up to a total dose of 600 KGy.

Representative sections of seal material, configured as dumbbell, compression buttons and representative sections of O-Ring cord, were trialled to quantify the mechanical effects of exposure to ionising radiation.

The results of the CTP demonstrated that the compound formulations as trialled exceed the industry standard of no more than 50% reduction in sealing performance over the anticipated lifetime of the seals, in fact the seal compound trials indicate performance more than the standard industry guidelines and requirements.

List of Compounds and Applications

Compound Data Table

Table Key:

SA - Standard Application

NSA - Non-Standard Application

COMPOUND	APPLICATION		
	RAM Transport Flask Seals	Inflatable Door Seals	Glove Box Seals
MC152 (Viton™ 75 Shore A)	SA	NSA	NSA
MC179 (Viton™ GLT 75 Shore A)	SA	NSA	NSA
MC130 (EPDM 75 Shore A)	SA	SA	SA
MC265 (Silicone 60 Shore A)	SA	SA	SA

MC 152 - Viton™ 75 Shore FDA and 3 A Class 1 Black - ASTM D 2000 M2HK 710 B38 C12 Z1 75° +/-5 ShA

- Low compression set Viton™ O ring grade Copolymer with 66% fluorine content Cure system is Bisphenol
- FDA compliant to CFR 21 177-2600 E & F & European regulations EC1935/2004
- Low temperature service limit -4°F (-20°C)
- Upper temperature continuous service limit +400°F (+204°C)

Basic Physical properties

ORIGINAL	STANDARD	TYPICAL VALUES
Durometer shore A (slab)	ASTM D2240	79
Tensile strength PSI (Mpa) (Dumbbell)	ASTM D412	1672 (11.52)
Compression set % 22h 347°F (175°C) (slab) 22h 400°F (200°C)	ASTM D395B	4.6 7.0

MC179 FKM GLT 75 Shore Black - ASTM D2000 M2HK 7515 A1-10 B37 C12

- FKM GLT O Ring grade 64% fluorine content. Cure system is peroxide. Low temperature characteristics.
- Low temperature service limit -40°F (-40°C)
- Upper temperature continuous service limit +400°F (+204°C)

Basic Physical properties

ORIGINAL	STANDARD	TYPICAL VALUES
Durometer shore A (slab)	ASTM D2240	74
Tensile strength PSI (Mpa) (Dumbbell)	ASTM D412	2813 (19.4)
Compression set % 22h 347°F (175°C) (slab)	ASTM D395B	14.5

MC130 - EPDM 75 Shore Black - ASTM D 2000 M1 CA 708 A25

- EPDM is a polymer of ethylene, propylene and a small amount of diene - Cure system is sulphur.
- Low temperature service limit -40°F (-40°C)
- Upper temperature continuous service limit +212°F (+100°C)

Basic Physical properties

ORIGINAL	STANDARD	TYPICAL VALUES
Durometer shore A (slab)	ASTM D2240	75
Tensile strength PSI (Mpa) (Dumbbell)	ASTM D412	1508 (10.4)
Compression set % 22h 167°F (75°C) (slab)	ASTM D395B	27

MC265 -Silicone 60 Shore FDA Red - ASTM D 2000 M2GE 610 A19B37E036

- Low compression set Silicone O ring material -Extrusion grade - FDA compliant to CFR 21 177-2600
- Low temperature service limit -76°F (-60°C)
- Upper temperature continuous service limit +446°F (+230°C)

Basic Physical properties

ORIGINAL	STANDARD	TYPICAL VALUES
Durometer shore A (slab)	ASTM D2240	61
Tensile strength PSI (Mpa) (Dumbbell)	ASTM D412	1494 (10.3)
Compression set % 22h 347°F (175°C) (slab)	ASTM D395B	32.89

“ Collaborating with our client base NES, as part of the IPS Group, continues to support the exacting demands of the nuclear sector.

We strive to partner with our clients from project inception through to execution and decommissioning to bring enhanced levels of material performance & safety. ”



Client Base

Since its inception in 1983 NES has established a history in supply to various sectors of the nuclear industry, including Nuclear New Build, Nuclear Decommissioning, and the Defence sector.

The NES-IPS client base includes:

- Westinghouse Electric Company – Box Encapsulation Plant
- Ansaldo Nuclear – Transport Flask Seals
- AWE Burghfield – MENSA Project
- EDF Energy – Hinkley Point C

Accreditations

List of NES Quality Accreditations:

- IS9001 RevC and AS9100 Rev D
- NES supply into:
 - EDF for Hinkley Point

