3M Science. Applied to Life

3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series Filter Cartridges

For Bottled Water and Beverage Applications

Technical Support Guide

Introduction

This technical support guide provides information pertinent to 3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series 0.20 micron rated membrane filter cartridges. It contains information that supports the efficacy, performance and safety of 3M LifeASSURE BDA020, BGA020 and BNA020 Series Filter Cartridges in bottled water and other beverage applications.

3M LifeASSURE 0.20 µm rated filter cartridges help bottled water and other beverage processors meet the highest standards for microorganism control. 3M LifeASSURE BDA020, BGA020 and BNA020 Series Filter Cartridges offer bottlers a complete solution for rigorous contaminant control while maintaining long service life and low operating costs.

3M™ LifeASSURE™ BNA020 Grade Filter Cartridges

3M LifeASSURE BNA020 Series Filter Cartridges feature a single layer asymmetrical polyethersulfone membrane with proprietary Advanced Pleat Technology (APT) construction. This design results in a robust filter that is optimized for both long service life and fast flowing applications, while providing 0.2 µm rated filtration for superior removal of microorganisms.

3M™ LifeASSURE™ BDA020 Sterilizing Grade Filter Cartridges

3M LifeASSURE BDA020 Series Filter Cartridges combine two asymmetrical polyethersulfone membrane layers together with 3M Advanced Pleat Technology (APT) construction. This design results in a robust filter that is optimized for both long service life and fast flowing applications, while providing 0.2 µm absolute rated filtration for sterilizing grade performance.

3M™ LifeASSURE™ BGA020 Sterilizing Grade Filter Cartridges

3M LifeASSURE BGA020 Series Filter Cartridges combine two asymmetric polyethersulfone membrane layers matched to optimize performance in fine silt applications. BGA020 has been designed to handle pressure pulsations that occur in some bottling applications.

Durable Design

Both 3M LifeASSURE BDA020 and BNA020 Series Filter Cartridge designs result in a highly durable filter cartridge, capable of secure operation through numerous cycles of hot water sanitation and chemical based cleaning and sanitation. Additionally, BDA020 and BGA020 cartridges are capable of secure operation through numerous steam cycles.

This technical support guide has been prepared specifically for manufacturers requiring product documentation as part of their process qualification. It includes the following test data to support published performance claims:

Product Quality Assurance Information and Product Release Testing

- Materials of Construction
- Dimension Chart (heights and diameters)
- Surface Area Chart
- Part Number Overview
- Maximum Allowable Forward Differential Pressure
- Maximum Allowable Reverse Differential Pressure
- Wetting Procedure
- Integrity Test Values
- Water Flow Rate vs. Differential Pressure

Product Performance Test Results

- Bacteria Retention
- Basis of Tests (why we conduct them)
- Test Methods
- Results
- Product Robustness Testing
- Exposure to Multiple Hot Water Cycles
- Exposure to Multiple Steam Cycles
- Sanitization Agent Compatibility
- Cleaning Agent Compatibility (sodium hydroxide)

Safety and Regulatory Support

- ISO 9001:2015 Certification
- Article Information Sheet
- Food Contact Compliance Information
- USP Biological Test for Plastics — Class VI and Elution Test Results

Further technical data and product information can be found in the 3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series Filter Cartridges product literature.

3M would be pleased to supply you with any additional information you require. Further information may be obtained by contacting: 3M Application Engineering Services at (203) 237-5541.

Product Quality Assurance Information and Product Release Testing

A. Lot Number Identification and Traceability — Each 3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series Filter Cartridge is engraved with a unique and traceable lot number identification. This lot number allows for easy retrieval of all quality control data related to the production of this filter.

B. All 3M LifeASSURE BDA020, BGA020 and BNA020 Series Filter Cartridges are tested for integrity prior to shipment.

Product Specifications

Materials of Construction

3M LifeASSURE BDA020, BGA020 and BNA020 Series Filter Cartridges are fabricated in one of two different constructions: 1) a single-layer, highly asymmetric polyethersulfone membrane pleated with polypropylene upstream and downstream support materials and 2) a double-layer, highly asymmetric polyethersulfone membrane of two different porosities pleated with polypropylene upstream and downstream support materials. The core, cage and end cap adapters are made of polypropylene. No resin or binder compounds are added. Multiple length cartridges with industry standard connection styles are produced to fit the most widely used housing designs.

3M LifeASSURE BDA020, BGA020 and BNA020 Series Filter Cartridges are manufactured under an ISO 9001:2015 certified quality system 3M's most advanced manufacturing processes for filter integrity.

Nominal Filter Cartridge Dimensions				
Filter Cartridge Diameter	2.75" (70 mm)	2.75" (70 mm)	2.75" (70 mm)	2.75" (70 mm)
Filter Cartridge Lengths	10" (254 mm)	20" (508 mm)	30" (762 mm)	40" (1016 mm)
3M™ LifeASSURE™ BDA020/BGA020 Nominal Effective Filtration Area (EFA)	7.2 ft.^{2} (0.67 m^2)	14.4 ft.^{2} (1.34 m^2)	21.6 ft.^{2} (2.01 m^2)	28.8 ft.^{2} (2.68 m^2)
3M™ LifeASSURE™ BNA020 Nominal Effective Filtration Area (EFA)	8.5 ft.^{2} (0.79 m^2)	17 ft.^{2} (1.58 m^2)	25.5 ft.^{2} (2.37 m^2)	34 ft.^{2} (3.16 m^2)

3M™ LifeASSURE™ BDA020 Filter Part Numbers[1]

Cartridge	Configuration	Length (Inches)	End-modification	O-Ring/Gasket Material
3M™ LifeASSURE™ BDA020 0.2 µm	**F**	**01** – 10 **03** – 30	**B** – 226 O-ring & Spear (Code 7) **F** – 222 O-ring & Flat Cap (Code 3)	**A** – Silicone **B** – Fluorocarbon **C** – EPR

Example; The part number for a 30 inch 3M LifeASSURE BDA020 Filter, 0.2 micron retention rating, 226 silicone O-ring connector with locating spear, would be: BDA020F03BA.

3M™ LifeASSURE™ BGA020 Filter Part Numbers[1]

Cartridge	Configuration	Length (Inches)	End-modification	O-Ring/Gasket Material
3M™ LifeASSURE™ BGA020 0.2 µm	**A**	**01** – 10 **03** – 30	**B** – 226 O-ring & Spear (Code 7) **C** – 222 O-ring & Spear (Code 8)	**B** – Fluorocarbon **C** – EPR

Example; The part number for a 30 inch 3M LifeASSURE BGA020 Filter, 0.2 micron retention rating, 226 silicone O-ring connector with locating spear, would be: BGA020F03BC.

3M™ LifeASSURE™ BNA020 Filter Part Numbers

Cartridge	Configuration	Length (Inches)	End-modification	O-Ring/Gasket Material
3M™ LifeASSURE™ BNA020 0.2 µm	**F**	**01** – 10 **02** – 20 **03** – 30 **04** – 40	**B** – 226 O-ring & Spear (Code 7) **C** – 222 O-ring & Spear (Code 8) **F** – 222 O-ring & Flat Cap (Code 3) **J** – 226 O-ring & Flat Cap	**A** – Silicone **B** – Fluorocarbon **C** – EPR **D** – Nitrile

Example; The part number for a 30 inch 3M LifeASSURE BDA020 Filter, 0.2 micron retention rating, 226 silicone O-ring connector with locating spear, would be: BNA020F03BA.

1. Additional configurations may be available upon request.

Maximum Allowable Forward and Reverse Differential Pressure	
Max. Differential Pressure (Forward)	80 psid @ 77°F (5.5 bar @ 25°C) 35 psid @ 194°F (2.4 bar @ 90°C)
Max. Differential Pressure (Reverse)	10 psid @ 77°F (0.69 bar @ 25°C)

Integrity Test Values

3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series Filter Cartridges can be integrity tested using a Forward Flow Integrity Test (FFIT) or the Pressure Hold Test (PHT). Bubble point information is included for reference.

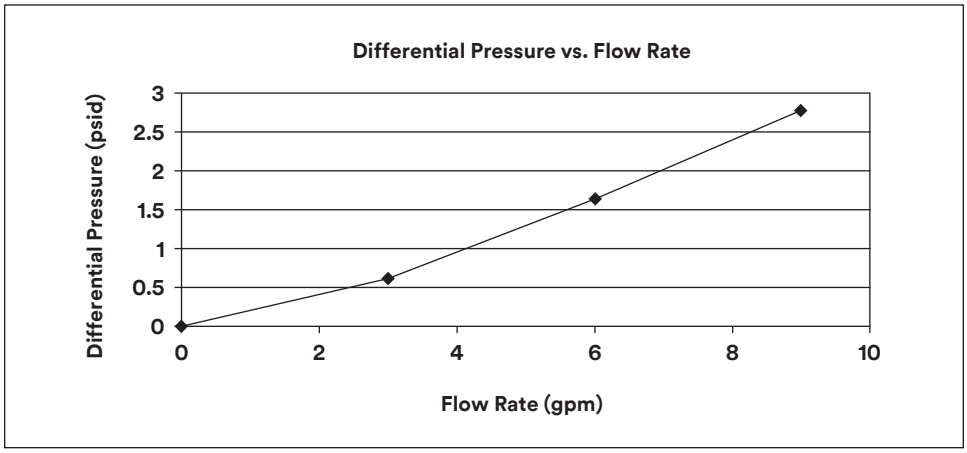
Grade ID	FFIT Pressure	FFIT Limits per 10"	Minimum Bubble Point	Pressure Hold Limits
3M™ LifeASSURE™ BNA020	35 psig/2.4 bar	<51.0 cc/min @ 25°C	40.0 psig (2.76 bar)	Consult 3M
3M™ LifeASSURE™ BDA020/BGA020	40 psig/2.76 bar	<33.0 cc/min @ 25°C	45.0 psig (3.1 bar)	Consult 3M

Please consult with 3M for detailed instructions on performing the integrity tests.

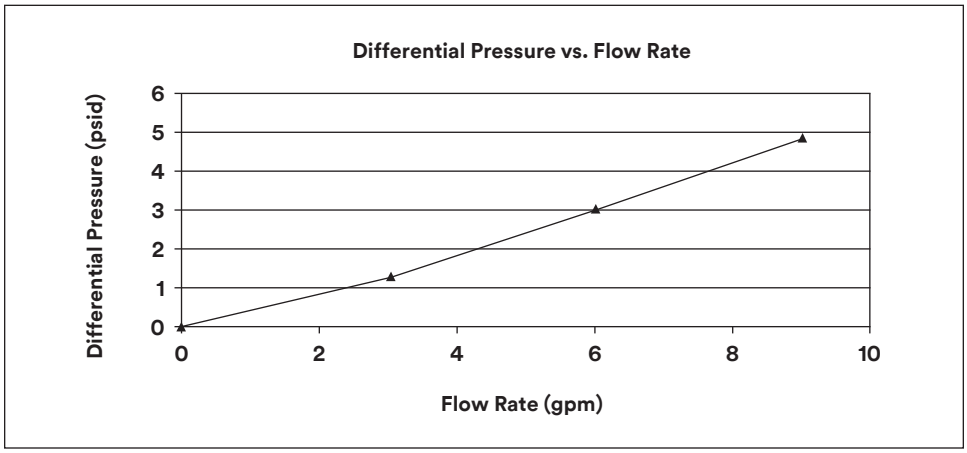
The Pressure Hold Test requires calculation of the housing and system volume upstream of the filter assembly. Consult with 3M for assistance in calculating this volume and the correct Pressure Hold Test values for your system.

Water Flow Rate vs. Differential Pressure

3M™ LifeASSURE™ BNA020 Series Filter Cartridge



3M™ LifeASSURE™ BDA020 and BGA020 Series Filter Cartridges



Product Performance Test Results

Bacteria Retention

Basis of Tests

The primary purpose of a membrane filter installed in a pharmaceutical, food or beverage process is to effectively control spoilage microorganisms. Microorganisms specific to the food and beverage industries were selected to demonstrate the retention capabilities of 3M™ LifeASSURE™ BDA020, BGA020 and BNA020 Series Filter Cartridges. *Brevundimonas diminuta* was chosen because this small organism is the standard challenge organism to confirm a filter is recognized as a sterilizing grade filter by the U.S. Food & Drug Administration. *Pseudomonas aeruginosa* is a small water-borne organism frequently found in contaminated water supplies.

Brevundimonas diminuta Retention

3M LifeASSURE BNA020, BDA020 and BGA020 10 inch Cartridges from three different production lots were flushed with water at 3 gpm for 5 minutes with a 5 psi backpressure and forward flow integrity tested. The cartridges were then challenged with a suspension of b. diminuta in sterile deionized water at a concentration of 1×10^7 CFU/mL. The filtrate from each cartridge was assayed to determine the log reduction ratio value (LRV) for each cartridge. Post-challenge, the cartridges were flushed with deionized water and forward flow integrity tested to confirm they were still integral after the bacteria challenge.

3M™ LifeASSURE™ BNA020 Series Filter Cartridges

Cartridge #	Forward Flow Integrity @ 35 psi and 25°C	LRV
06N017-0001	53.2*	8.6
06N017-0021	41.6	8.9
06N017-0042	36.2	8.4
07N017-0029	51.2	8.5
07N017-0030	48.6	6.9
07N017-0041	33.6	9.7
07N018-0041	29.0	8.7
07N018-0042	34.4	8.5
07N018-0010	27.0	9.7

*Cartridge #06N017-0001 demonstrated the ability to retain the challenge organism at an FFIT value that slightly exceeded the upper FFIT value limit for BNA020.

Results: The tested 3M LifeASSURE 0.2 µm rated BNA020 cartridges retained *Brevundimonas diminuta* at an average LRV = 8.66 when challenged with an average microorganism concentration of 3.5×10^7 CFU/cm^2.

3M™ LifeASSURE™ BDA020 Series Filter Cartridges

Cartridge #	Forward Flow Integrity @ 40 psi and 25°C	LRV
07N015-0496	16.1	>11.3
07N015-0497	17.7	>11.2
07N015-0498	17.5	>11.2
07N003-1628	15.9	>11.5
07N003-1656	15.9	>11.5
07N003-1658	16.5	>11.3
07N014-0087	16.5	>11.5
07N014-0088	15.9	>11.5
07N014-0086	15.8	>11.3

Results: The tested 3M™ LifeASSURE™ 0.2 µm rated BDA020 cartridges demonstrated 100% retention of *Brevundimonas diminuta* when challenged with an average microorganism concentration of 2.4×10^7 CFU/cm^2.

3M™ LifeASSURE™ BGA020 Series Filter Cartridges

Cartridge #	Forward Flow Integrity @ 40 psi and 25°C	Organism in Effluent CFU
14N021-0011	14.8	0
14N021-0016	15.4	0
14N021-0001	16.8	0
14N021-0023	17.3	0
14N021-0003	17.7	0
14N021-0013	18.0	0
14N021-0019	18.9	0
14N021-0009	19.3	0
15N019-4450	20.6	0
14N021-0006	22.1	0
15N019-4393	22.3	0
15N019-4394	27.8	0
15N019-4405	27.9	0
15N052-1597	35.3	0
15N052-1586	37.4	0
15N052-1631	46.2	0
15N052-1620	53.2	0

Results: The tested 3M LifeASSURE 0.2 µm rated BGA020 cartridges demonstrated 100% retention of *Brevundimonas diminuta* when challenged with an average microorganism concentration of 2.4×10^7 CFU/cm^2.

Pseudomonas aeruginosa (p. aeruginosa) Retention

3M LifeASSURE BNA020, BDA020 and BGA020 10 inch cartridges from three different production lots of each grade were flushed with water at 5 gpm for 3 minutes and forward flow integrity tested. The cartridges were then challenged with a suspension of *Pseudomonus aeruginosa* in sterile deionized water at a concentration of 1×10^7 CFU/mL. The filtrate from each cartridge was assayed to determine the log reduction ratio value (LRV) for each cartridge. Post-challenge, the cartridges were flushed with deionized water and forward flow integrity tested to confirm they were still integral after the bacteria challenge.

3M™ LifeASSURE™ BNA020 Series Filter Cartridges

Cartridge #	Forward Flow Integrity @ 35 psi	LRV
06N017-0022	32.4	9.6
06N017-0031	39.5	10.6
06N017-0015	30.4	11.1
07N017-0031	43.0	7.3
07N017-0039	33.4	7.5
07N017-0043	28.0	>11.5
07N018-0045	33.8	7.4
07N018-0047	27.5	7.5
07N018-0049	26.4	7.5

Results: The tested 3M™ LifeASSURE™ BNA020 cartridges retained *Pseudmonas aeruginosa* at an average LRV = 8.9 when challenged with an average microorganism concentration of 5.2×10^7 CFU/cm^2.

3M™ LifeASSURE™ BDA020 Series Filter Cartridges

Cartridge #	Forward flow integrity at 40 psi and 25°C	LRV
07N015-0510	15.9	>11.2
07N015-0511	14.9	>11.3
07N015-0512	14.9	>11.3
07N003-1634	16.3	>11.2
07N003-1637	16.9	>11.2
07N003-1638	17.1	>11.2
07N014-0099	15.1	>11.2
07N014-0100	13.7	>11.1
07N014-0101	16.0	>11.2

Results: The tested 3M LifeASSURE BDA020 cartridges demonstrated 100% retention of *Pseudmonas aeruginosa* when challenged with an average microorganism concentration of 1.6×10^7 CFU/cm^2.

3M™ LifeASSURE™ BGA020 Series Filter Cartridges

Cartridge #	Forward Flow Integrity @ 40 psi and 25°C	Organism in Effluent CFU
14N038-3216	20.1	0
14N038-3222	21.5	0
15N009-5341	25.0	0
15N009-5342	22.6	0
15N019-4320	18.3	0
15N019-4399	23.3	0

Results: The tested 3M LifeASSURE BGA020 cartridges demonstrated 100% retention of *Pseudmonas aeruginosa* when challenged with an average microorganism concentration of 1.6×10^7 CFU/cm^2.

Product Robustness Testing

Exposure to Hot Water and Steam

In order to evaluate the effects of thermal stress, 3M™ LifeASSURE™ BNA020, BGA020 and BDA020 10 inch cartridges from different production lots of each grade were subjected to repetitive hot water (90°C) and the BDA020 was additionally subjected to *in-situ* steam cycles at 126°C. The hot water and *in-situ* steam cycles were 30 minutes each with cooling between cycles. Test filters were evaluated for integrity by Forward Flow Integrity Testing (FFIT) at a test pressure of 35 psig or 40 psig for BNA020 and BDA020, respectively, initially and at various intervals following the thermal cycles.

Hot Water (90°C) Sanitation Cycles

3M™ LifeASSURE™ BNA020 Series Filter Cartridges (FFIT values at a test pressure of 35 psig at 25°C)

Cartridge #	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
06N017-0002	38.8	39.9	42.0	41.6	33.9	40.5	34.0
06N017-0011	42.8	40.6	46.6	39.8	33.6	38.2	31.8
06N017-0029	39.0	37.2	49.2	39.0	33.2	39.9	29.9
06N017-0026	40.4	47.2	39.0	31.7	38.5	31.7	32.0
07N017-0007	34.5	13.2	14.6	13.7	14.2	14.2	13.5
07N017-0008	30.6	14.2	14.1	13.2	13.5	13.7	13.3
07N017-0010	36.4	13.9	13.6	12.8	13.4	13.4	14.5
07N018-0018	34.3	28.3	27.4	27.4	25.6	30.6	24.7
07N018-0019	35.3	33.1	27.7	25.9	24.7	31.9	27.1
07N018-0020	33.5	31.4	27.2	25.9	24.0	31.0	23.3

Results: The results show that the tested 3M LifeASSURE BNA020 Series filters withstood up to 150, 30 minute hot water (90°C) cycles.

3M™ LifeASSURE™ BDA020 Series Filter Cartridges (FFIT values at a test pressure of 40 psig at 25°C)

Cartridge #	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
07N015-0486	19.7	14.7	14.8	16.1	20.8	16.1	16.2
07N015-0487	16.9	14.6	15.1	15.9	21.2	14.9	15.5
07N015-0488	18.3	15.5	16.7	15.0	17.8	14.8	14.4
07N003-1646	16.6	13.2	14.6	13.7	14.2	14.2	13.5
07N003-1647	15.8	14.2	14.1	13.2	13.5	13.7	13.3
07N003-1648	15.6	13.9	13.6	12.8	13.4	13.4	14.5
07N014-0076	21.6	12.8	13.3	12.9	13.6	13.5	12.8
07N014-0077	20.4	13.7	13.1	14.5	13.0	13.1	12.5
07N014-0078	20.1	12.8	12.9	12.2	12.7	12.7	13.6

Results: The results show that the tested 3M LifeASSURE BDA020 Cartridges withstood up to 150, 30 minute hot water (90°C) cycles.

In-situ Steam Sterilization Cycles

Sanitation Agent Compatibility — Vortexx

In order to evaluate the compatibility of 3M™ LifeASSURE™ BDA020 and BNA020 Series Filter Cartridges with peracetic acid/ hydrogen peroxide sanitation agents typically used in the Food and Beverage industry, 3M LifeASSURE BDA020 and BNA020 Series Filters 10 inch Cartridges from different production lots were subjected to repetitive exposures to a 1% aqueous solution of Vortexx at ambient temperature. Initially, and prior to each exposure interval, the cartridges were Forward Flow Integrity tested at a test pressure of 35 psig or 40 psig for BNA020 and BDA020, respectively. After each exposure interval, the cartridges were Forward Flow Integrity tested to confirm the cartridges remained integral after exposure to the Vortexx solution. Following the Forward Flow Integrity Test, each cartridge was brought above it's bubble point to release as much water as possible from the pores of the membrane and then exposed to a fresh 1% aqueous Vortexx solution for the next exposure interval.

3M™ LifeASSURE™ BNA020 Series Filter Cartridges — Cumulative Exposure to Vortexx Solution (FFIT values at a test pressure of 35 psig at 25°C)

Cartridge #	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
06N017-0006	38.7	42.3	40.1	42.9	40.8	44.2	39.7
06N017-0009	34.6	33.0	35.8	37.0	34.1	35.6	34.7
06N017-0034	37.3	36.3	34.4	38.0	35.0	35.8	33.2
06N017-0037	37.5	37.2	34.7	37.4	34.4	34.7	36.8
07N017-0001	35.4	34.4	35.0	35.6	33.6	33.7	33.5
07N017-0002	37.4	33.8	37.9	35.2	35.2	35.1	35.3
07N017-0003	35.7	34.7	33.9	32.4	32.8	33.7	32.6
07N018-0012	31.4	31.8	32.5	31.5	30.2	29.0	28.8
07N018-0013	29.3	30.1	30.4	30.1	28.8	27.3	27.6
07N018-0014	29.4	30.3	30.3	27.7	28.4	27.3	30.2

Results: The results indicate that the tested 3M LifeASSURE BNA020 cartridges were compatible with 1% Vortexx for up to a total exposure of 150 cumulative hours.

3M™ LifeASSURE™ BDA020 Series Filter Cartridges — Cumulative Exposure to Vortexx Solution (FFIT values at a test pressure of 40 psig at 25°C)

Cartridge#	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
07N015-0479	19.8	21.3	19.7	19.7	17.3	17.8	17.7
07N015-0480	20.5	20.5	19.2	19.4	16.5	17.4	18.0
07N015-0481	20.6	20.0	18.6	18.9	16.2	17.2	18.3
07N003-1655	15.9	16.7	16.9	16.1	15.6	16.7	17.6
07N003-1640	15.9	16.1	16.4	15.8	15.8	17.0	17.6
07N003-1641	16.4	17.1	16.1	17.1	16.6	15.9	17.5
07N014-0068	19.6	17.2	17.7	17.1	17.4	17.0	17.5
07N014-0070	20.2	18.4	18.2	18.0	18.1	17.6	18.4
07N014-0071	19.3	17.4	17.2	17.3	19.2	18.0	17.4

Results: The results indicate that tested 3M LifeASSURE BDA020 Cartridges were compatible with 1% Vortexx for up to a total exposure of 150 cumulative hours.

Cleaning Agent Compatibility — Sodium Hydroxide

In order to evaluate the compatibility of 3M™ LifeASSURE™ BDA020 and BNA020 Series Filter Cartridges with caustic cleaning solutions, 3M LifeASSURE BDA020 and BNA020 10 inch Cartridges from different production lots were subjected to repetitive exposures to 1 M aqueous sodium hydroxide (NaOH) solution at 65°C. Initially, and prior to each exposure interval, the cartridges were Forward Flow Integrity tested at a test pressure of 35 psig or 40 psig for BNA020 and BDA020, respectively. After each exposure interval, the cartridges were Forward Flow Integrity Tested to confirm the cartridges remained integral after exposure to the 1 M NaOH solution. Following the Forward Flow Integrity Test, each cartridge was forward flow bubble point tested to release as much water as possible from the pores of the membrane and then exposed to a fresh 1 M NaOH solution for the next exposure interval.

3M™ LifeASSURE™ BNA020 Series Filter Cartridges — Cumulative Exposure to 1 M NaOH at 65°C (FFIT values at a test pressure of 35 psig at 25°C)

Cartridge #	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
06N017-0017	39.0	31.5	31.1	39.7	29.2	33.6	32.3
06N017-0025	39.0	31.7	39.6	40.9	31.9	31.0	33.6
06N017-0030	40.3	37.3	34.9	41.3	28.0	30.4	30.6
06N017-0041	42.6	34.7	39.6	40.8	32.3	32.9	34.6
07N017-0011	34.8	28.5	29.6	29.1	29.2	29.2	29.3
07N017-0012	39.9	31.0	33.4	31.4	34.0	31.3	31.5
07N017-0013	33.9	29.2	40.4	30.4	31.4	31.1	31.5
07N018-0023	29.0	26.6	33.8	28.4	26.3	27.0	28.1
07N018-0024	33.3	29.7	36.3	31.5	29.0	29.6	31.6
07N018-0006	33.0	25.0	23.9	24.9	27.0	26.2	27.0

Results: The results indicate that 3M LifeASSURE BNA020 cartridges were compatible with 1 M NaOH at 65°C for up to a total exposure of 150 cumulative hours.

3M™ LifeASSURE™ BDA020 Series Filter Cartridges — Cumulative Exposure to 1 M NaOH at 65°C (FFIT values at a test pressure of 40 psig at 25°C)

Cartridge #	Initial	Cycle 25	Cycle 50	Cycle 75	Cycle 100	Cycle 125	Cycle 150
07N015-0489	20.7	16.3	15.6	15.5	15.7	15.7	16.2
07N015-0490	21.6	15.7	15.8	16.0	15.8	15.5	16.4
07N015-0491	21.2	15.8	16.3	15.4	16.3	16.2	16.0
07N003-1649	18.4	16.6	16.3	16.3	16.1	16.2	16.3
07N003-1650	19.2	15.9	15.8	16.3	15.4	15.7	15.6
07N003-1651	18.2	15.8	15.5	15.8	15.4	15.3	15.5
07N014-0079	20.8	15.5	15.6	15.8	15.5	15.6	14.9
07N014-0082	20.0	14.9	14.9	15.1	14.8	15.0	14.6
07N014-0083	18.8	14.5	14.6	14.9	14.6	14.7	15.9

Results: The results indicate that 3M LifeASSURE BDA020 cartridges were compatible with 1 M NaOH at 65°C for up to a total exposure of 150 cumulative hours.

Safety and Regulatory Support

In addition to product performance test results, the following safety and regulatory support information is provided:

- ISO 9001:2015 Certification
- Material Safety Data Sheet
- Food Contact Compliance Information
- USP Biological Test for Plastics — Class VI and Elution Test Results

CERTIFICATE

TÜVRheinland®

TUV Rheinland of North America, Inc.

295 Foster Street, Suite 100, Littleton, MA 01460

Hereby certifies that

3M Purification, Inc.

400 Research Parkway Meriden, CT	32 River Road Stafford Springs, CT	3M Separation and Purification Sciences Division, 3M Center St Paul, MN

Sales, Human Resources, Customer Service, Quality, Laboratory, Manufacturing, Maintenance, Shipping & Receiving, Purchasing, Warehouse

has established and maintains a quality management system for the

Design, Development and Manufacture of Products for Filtration, Ultrafiltration and Other Media Platforms for the Potable Water, Industrial Processing, and Food and Beverage Applications

An audit was performed and documented in Report No 9519.
Proof has been furnished that the requirements according to

ISO 9001:2015

are fulfilled.
Further clarification regarding the scope of this certificate and the applicability of ISO 9001:2015 requirements may be obtained by contacting TRNA.

Certificate Registration No.

74 300 9519

Certificate Issue Date
August 10, 2017

Reissue Date: 8/15/2018

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

Certificate Expiration Date
August 09, 2020

Certification of Management Systems

Article Information Sheet

This Article Information Sheet is provided as a courtesy in response to a customer request. A Safety Data Sheet (SDS) has not been prepared for these product(s) because they are articles. Articles are not subject to the Occupational Safety and Health Administration's Hazard Communication Standard (29 CFR 1910.1200(b)(6)(v)). As defined in this standard: "Article" means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Document Group: 36-2891-4

Version Number: 1.01

Issue Date: 02/17/17

Supersedes Date: 06/13/16

Section 1: Identification

1.1. Product Identifier

3M™ LifeASSURE™ BDA BNA Series Filter Cartridges with Fluorocarbon O-Ring

Product Identification Numbers

BDA020F03BB, BNA020F03BB, BNA020F04BB, 70-0201-3078-0, 70-0202-1342-0, 70-0202-2827-9

1.2. Recommended Use and Restrictions on Use

Recommended Use: Water Filtration

1.3. Supplier's Details

Manufacturer: 3M Purification Inc.

Division: 3M Separation and Purification Sciences Division

Address: 400 Research Parkway, Meriden, CT 06450-1018, USA

Telephone: 1-888-3M HELPS (1-888-364-3577)

1.4. Emergency Telephone Number

1-800-364-3577 or (651) 737-6501 (24 hours)

Section 2: Hazard Identification

This product is exempt from hazard classification according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Section 3: Composition/Information on Ingredients

3M™ LifeASSURE™ BDA BNA Series Filter Cartridges with Fluorocarbon O-Ring

Ingredient	C.A.S. No.	% by Wt
Polypropylene	9003-07-0	40–100
Phenol polymer	Trade Secret*	<10 Trade Secret*
Polyphenylene polymer	Trade Secret*	<3 Trade Secret*

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

Any remaining components do not contribute to the hazards of this material.

Section 4: First Aid Measures

4.1. Description of First Aid Measures

Inhalation: No need for first aid is anticipated

Skin Contact: No need for first aid is anticipated

Eye Contact: No need for first aid is anticipated

If Swallowed: No need for first aid is anticipated

Section 5: Fire-Fighting Measures

In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam.

Section 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Not applicable.

6.2. Environmental Precautions

Not applicable.

6.3. Methods and Material for Containment and Cleaning Up

Not applicable.

Section 7: Handling and Storage

7.1. Precautions for Safe Handling

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

7.2. Conditions for Safe Storage Including Any Incompatibilities

No special storage requirements.

Section 8: Exposure Controls/Personal Protection

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions. No engineering controls or personal protective equipment (PPE) are necessary.

Section 9: Physical and Chemical Properties

9.1. Information on Basic Physical and Chemical Properties

General Physical Form: Solid

Odor, Color, Grade: Clear to white cylinder; No odor

Odor Threshold: Not Applicable

pH: Not Applicable

Melting Point: Not Applicable

Boiling Point: Not Applicable

Flash Point: Not Applicable

Flammability (solid, gas): Not Classified

Flammable Limits (LEL): No Data Available

Flammable Limits (UEL): No Data Available

Vapor Pressure: Not Applicable

Vapor Density: Not Applicable

Density: Not Applicable

Specific Gravity: >=1

Solubility In Water: Not Applicable

Solubility — Non-water: Not Applicable

Autoignition Temperature: Not Applicable

Decomposition Temperature: Not Applicable

Section 10: Stability and Reactivity

This material is considered to be non reactive under normal use conditions.

Section 11: Toxicological Information

Inhalation: No health effects are expected

Skin Contact: No health effects are expected

Eye Contact: No health effects are expected

Ingestion: No health effects are expected

Additional Information: This product, when used under reasonable conditions and in accordance with the directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

Section 12: Ecological Information

This article is expected to present a low environmental risk either because use and disposal are unlikely to result in a significant release of components to the environment or because those components that may be released are expected to have insignificant environmental impact.

Section 13: Disposal considerations

Dispose of contents/container in accordance with the local/regional/national/international regulations.

Section 14: Transport Information

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

Section 15: Regulatory information

Chemical Inventories

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory requirements.

Section 16: Other information

NFPA Hazard Classification

Health: 0

Flammability: 1

Instability: 0

Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Document Group: 36-2891-4

Version Number: 1.01

Issue Date: 02/17/17

Supersedes Date: 06/13/16

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Article Information Sheet

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Document Group: 34-857-3

Version Number: 1.00

Issue Date: 06/04/15

Supersedes Date: Initial Issue

Section 1: Identification

1.1. Product Identifier

3M™ LifeASSURE™ BGA Series Filter (20 inch, 30 inch and 40 inch)

Product Identification Numbers

BGA020A02BB, BGA020A02BC, BGA020A03BB, BGA020A03BC, BGA020A04BB, BGA020A04BC

1.2. Recommended Use and Restrictions on Use

Recommended Use: Water Filtration

1.3. Supplier's Details

Manufacturer: 3M Purification Inc.

Division: 3M Separation and Purification Sciences Division

Address: 400 Research Parkway, Meriden, CT 06450-1018, USA

Telephone: (203) 238-8965

1.4. Emergency Telephone Number

1-800-364-3577 or (651) 737-6501 (24 hours)

Section 2: Hazard Identification

This product is exempt from hazard classification according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Section 3: Composition/Information on Ingredients

3M™ LifeASSURE™ BDA BNA Series Filter Cartridges

Ingredient	C.A.S. No.	% by Wt
Polypropylene	9003-07-0	55–75
Filtration Components	Trade Secret*	25–45
Stainless Steel Components	65977-19-5	<5
Other Polymers	Trade Secret*	<2
Bisphenol AF	1478-61-1	0.5–1.2

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

Any remaining components do not contribute to the hazards of this material.

Section 4: First Aid Measures

4.1. Description of First Aid Measures

Inhalation: No need for first aid is anticipated

Skin Contact: No need for first aid is anticipated

Eye Contact: No need for first aid is anticipated

If Swallowed: No need for first aid is anticipated

Section 5: Fire-Fighting Measures

In Case of Fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam

Section 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Not applicable.

6.2. Environmental Precautions

Not applicable.

6.3. Methods and Material for Containment and Cleaning Up

Not applicable.

Section 7: Handling and Storage

7.1. Precautions for Safe Handling

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

7.2. Conditions for Safe Storage Including Any Incompatibilities

No special storage requirements.

Section 8: Exposure Controls/Personal Protection

This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions. No engineering controls or personal protective equipment (PPE) are necessary.

Section 9: Physical and Chemical Properties

9.1. Information on Basic Physical and Chemical Properties

General Physical Form: Solid

Odor, Color, Grade: Water Filter Cartridge

Melting Point: >=260°F

Flammability (solid, gas): Not Classified

Specific Gravity: >=1

Solubility In Water: Nil

Autoignition temperature: Not Applicable

Section 10: Stability and Reactivity

This material is considered to be non reactive under normal use conditions.

Section 11: Toxicological Information

Inhalation: No health effects are expected

Skin Contact: No health effects are expected

Eye Contact: No health effects are expected

Ingestion: No health effects are expected

Additional Information: This product, when used under reasonable conditions and in accordance with the directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

Section 12: Ecological Information

This article is expected to present a low environmental risk either because use and disposal are unlikely to result in a significant release of components to the environment or because those components that may be released are expected to have insignificant environmental impact.

Section 13: Disposal Considerations

Dispose of contents/container in accordance with the local/regional/national/international regulations.

Section 14: Transport Information

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

Section 15: Regulatory Information

Chemical Inventories

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory requirements.

Section 16: Other Information

NFPA Hazard Classification

Health: 0

Flammability: 1

Instability: 0

Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

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Issue Date: 06/04/15

Supersedes Date: Initial Issue

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3M USA AISs are available at 3M.com

Food Contact Compliance

Designated filtration products comply with applicable U.S. regulations for food and beverage use.

The product is compliant with the requirements of Regulation (EC) 1935/2004 for food contact for use in aqueous, acidic, alcoholic and dairy products.

Consult 3M for detailed regulatory compliance information.

USP Biological Test for Plastics

3M™ LifeASSURE™ BDA020 and BNA020 Series Filter Cartridge materials of construction meet the USP Biological Reactivity for Class VI Plastics and Elution test results.

Technical Information
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Your local distributor:

3M Purification Inc.
3M Separation and Purification Sciences Division
400 Research Parkway
Meriden, CT 06450 USA

Phone **1-800-243-6894**
1-203-237-5541
Web **3MPurification.com**

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