

# AM3231 – Filter

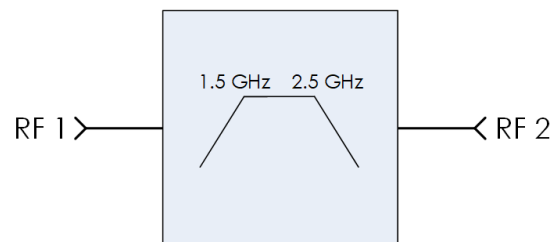
## 2 GHz Bandpass Filter

**AM3231 is a passive bandpass filter implemented on chip that provides low loss and high rejection in a small 3 mm package.** With a center frequency of 2.0 GHz, 1.9 GHz, or 1.8 GHz and a bandwidth of 1 GHz, AM3231 is useful as an IF filter in any RF system for image, LO, and spur rejection. AM3231 is AC coupled and matched to 50 ohms and operates over the -40C to +100C temperature range.

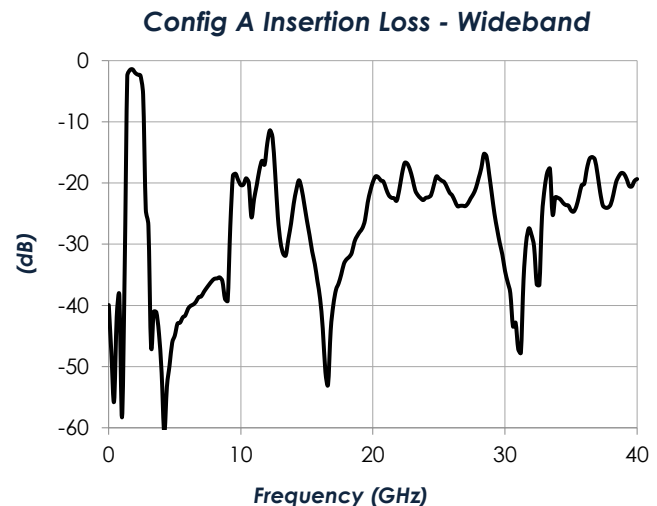
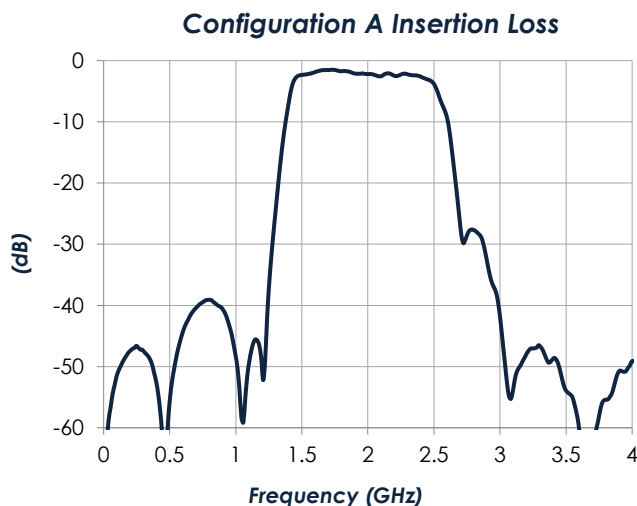
### FEATURES

- 2 GHz Center Frequency
- 1 GHz Bandwidth
- 2.2 dB Loss at 2 GHz typ.
- 40 dB Rejection in Stopband typ.
- 2.2 dB Passband Flatness typ.
- 1.0 W Power Handling
- 3 mm QFN Package
- -40C to +100C Operation

### FUNCTIONAL DIAGRAM



### CHARACTERISTIC PERFORMANCE



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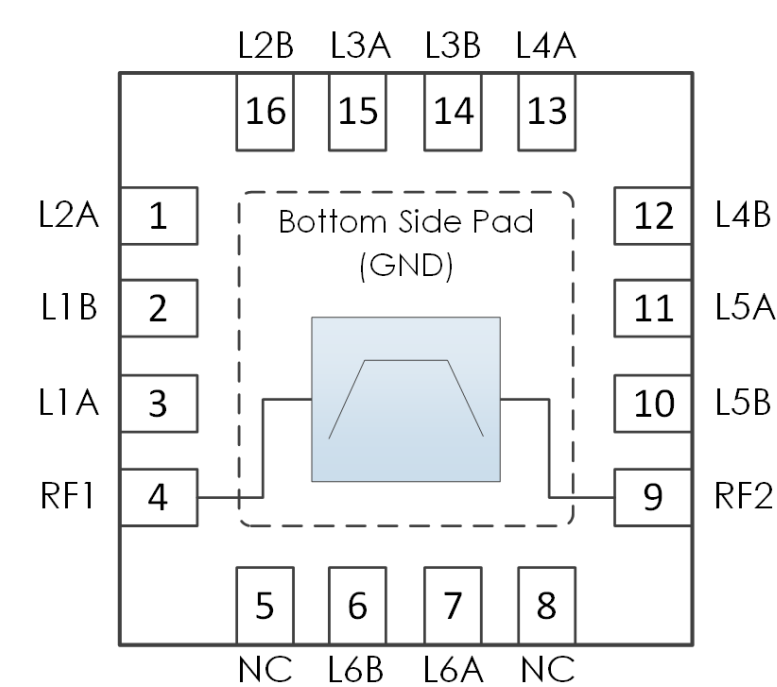
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REVISION HISTORY

| Date              | Revision | Notes                                            |
|-------------------|----------|--------------------------------------------------|
| January 3, 2024   | 1        | Initial Release                                  |
| January 10, 2024  | 1.1      | Added Wideband Insertion Loss Plot               |
| February 18, 2025 | 2        | Changed to Mercury branding. No content changes. |

PORT LAYOUT AND DEFINITIONS



| Pin Number                                         | Pin Name | Pin Function                    |
|----------------------------------------------------|----------|---------------------------------|
| 1                                                  | L2A      | External inductor L2 connection |
| 2                                                  | L1B      | External inductor L1 connection |
| 3                                                  | L1A      | External inductor L1 connection |
| 4                                                  | RF1      | RF Port 1 - 50 ohms, AC coupled |
| 5                                                  | NC       | Not Connected*                  |
| 6                                                  | L6B      | External inductor L6 connection |
| 7                                                  | L6A      | External inductor L6 connection |
| 8                                                  | NC       | Not Connected*                  |
| 9                                                  | RF2      | RF Port 2 - 50 ohms, AC coupled |
| 10                                                 | L5B      | External inductor L5 connection |
| 11                                                 | L5A      | External inductor L5 connection |
| 12                                                 | L4B      | External inductor L4 connection |
| 13                                                 | L4A      | External inductor L4 connection |
| 14                                                 | L3B      | External inductor L3 connection |
| 15                                                 | L3A      | External inductor L3 connection |
| 16                                                 | L2B      | External inductor L2 connection |
| * NC pins may be left open or connected to ground. |          |                                 |

## SPECIFICATIONS

## Absolute Maximum Ratings

|                            | Minimum | Maximum |
|----------------------------|---------|---------|
| RF Input Power             |         | +27 dBm |
| Operating Case Temperature | -40 C   | +150 C  |
| Storage Temperature Range  | -55C    | +150 C  |

**Note:** Any device operation beyond the Absolute Maximum Ratings may result in permanent damage to the device. The values listed in this table are extremes and do not imply functional operation of the device at these or any other conditions beyond what is listed under Recommended Operating Conditions. Devices subjected to conditions outside of what is recommended for extended periods may affect device reliability.

## Handling Information

|                                         | Minimum | Maximum |
|-----------------------------------------|---------|---------|
| Storage Temperature Range (Recommended) | -50 C   | +125 C  |
| Moisture Sensitivity Level              | MSL 3   |         |



Mercury products are electrostatic sensitive.  
Follow safe handling practices to avoid damage.

## Recommended Operating Conditions

| Param                      | Min   | Typical | Maximum |
|----------------------------|-------|---------|---------|
| Operating Case Temperature | -40 C |         | +100 C  |

## RF Performance – Configuration A: 2.0 GHz Center

(T = 25 °C unless otherwise specified)

| Param              | Testing Conditions | Min     | Typical | Max     |
|--------------------|--------------------|---------|---------|---------|
| Passband Range     |                    | 1.5 GHz |         | 2.5 GHz |
| Bandwidth          |                    |         | 1 GHz   |         |
| Passband Flatness  |                    |         | 2.2 dB  |         |
| Stopband Rejection | f < 1.25 GHz       |         | 40 dB   |         |
|                    | f > 3.0 GHz        |         | 40 dB   |         |
| Insertion Loss     | f = 1.5 GHz        |         | 2.4 dB  |         |
|                    | f = 2.0 GHz        |         | 2.2 dB  |         |
|                    | f = 2.5 GHz        |         | 3.6 dB  |         |
| Return Loss        | f = 1.5 GHz        |         | 14 dB   |         |
|                    | f = 2.0 GHz        |         | 8.5 dB  |         |
|                    | f = 2.5 GHz        |         | 12 dB   |         |

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**RF Performance – Configuration B: 1.9 GHz Center**

(T = 25 °C unless otherwise specified)

| Param              | Testing Conditions | Min     | Typical | Max     |
|--------------------|--------------------|---------|---------|---------|
| Passband Range     |                    | 1.4 GHz |         | 2.4 GHz |
| Bandwidth          |                    |         | 1.0 GHz |         |
| Passband Flatness  |                    |         | 1.8 dB  |         |
| Stopband Rejection | f < 1.1 GHz        |         | 40 dB   |         |
|                    | f > 2.8 GHz        |         | 40 dB   |         |
| Insertion Loss     | f = 1.4 GHz        |         | 2.2 dB  |         |
|                    | f = 1.9 GHz        |         | 2.4 dB  |         |
|                    | f = 2.4 GHz        |         | 3.3 dB  |         |
| Return Loss        | f = 1.4 GHz        |         | 22 dB   |         |
|                    | f = 1.9 GHz        |         | 8.3 dB  |         |
|                    | f = 2.4 GHz        |         | 18 dB   |         |

**RF Performance – Configuration C: 1.8 GHz Center**

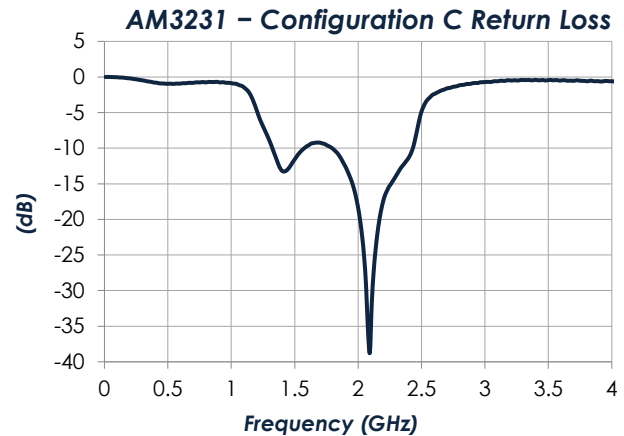
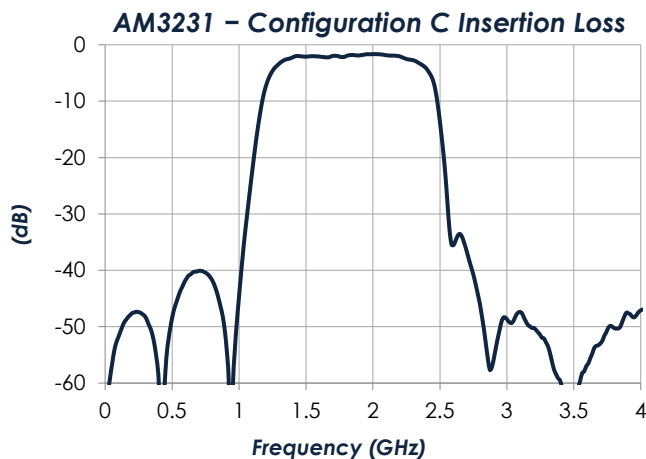
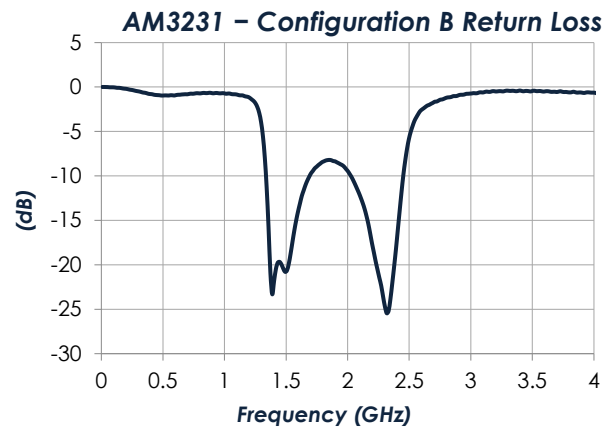
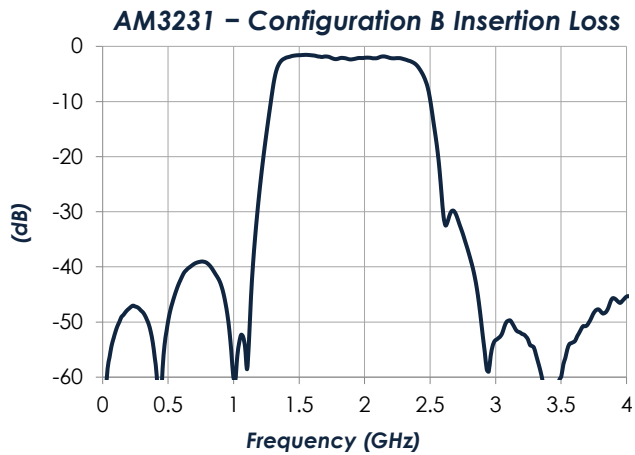
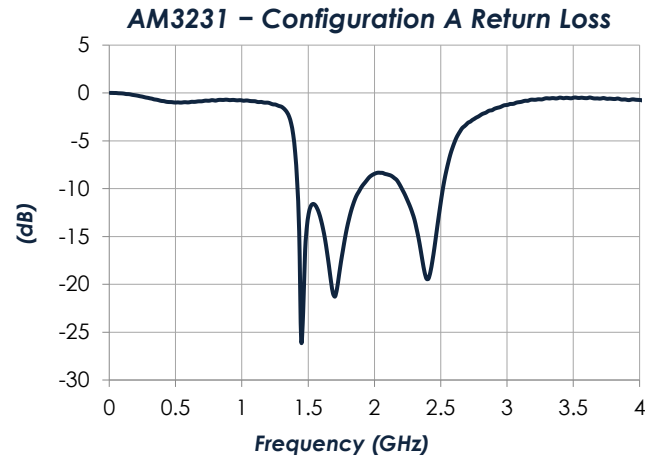
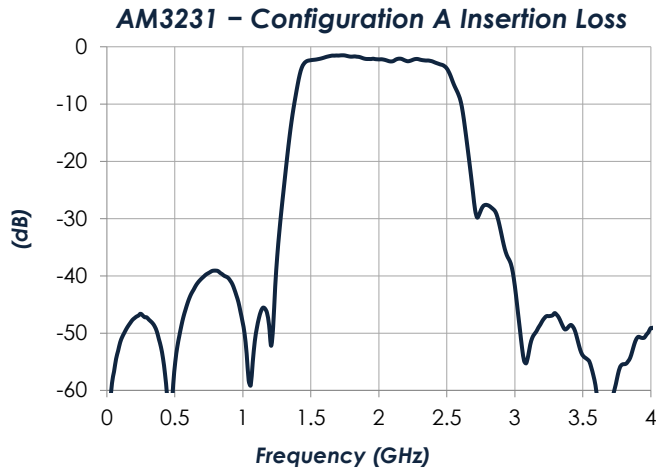
(T = 25 °C unless otherwise specified)

| Param              | Testing Conditions | Min     | Typical | Max     |
|--------------------|--------------------|---------|---------|---------|
| Passband Range     |                    | 1.3 GHz |         | 2.3 GHz |
| Bandwidth          |                    |         | 1 GHz   |         |
| Passband Flatness  |                    |         | 1.7 dB  |         |
| Stopband Rejection | f < 1 GHz          |         | 45 dB   |         |
|                    | f > 2.8 GHz        |         | 40 dB   |         |
| Insertion Loss     | f = 1.3 GHz        |         | 3.5 dB  |         |
|                    | f = 1.8 GHz        |         | 2.1 dB  |         |
|                    | f = 2.3 GHz        |         | 2.7 dB  |         |
| Return Loss        | f = 1.3 GHz        |         | 8.6 dB  |         |
|                    | f = 1.8 GHz        |         | 10 dB   |         |
|                    | f = 2.3 GHz        |         | 14 dB   |         |

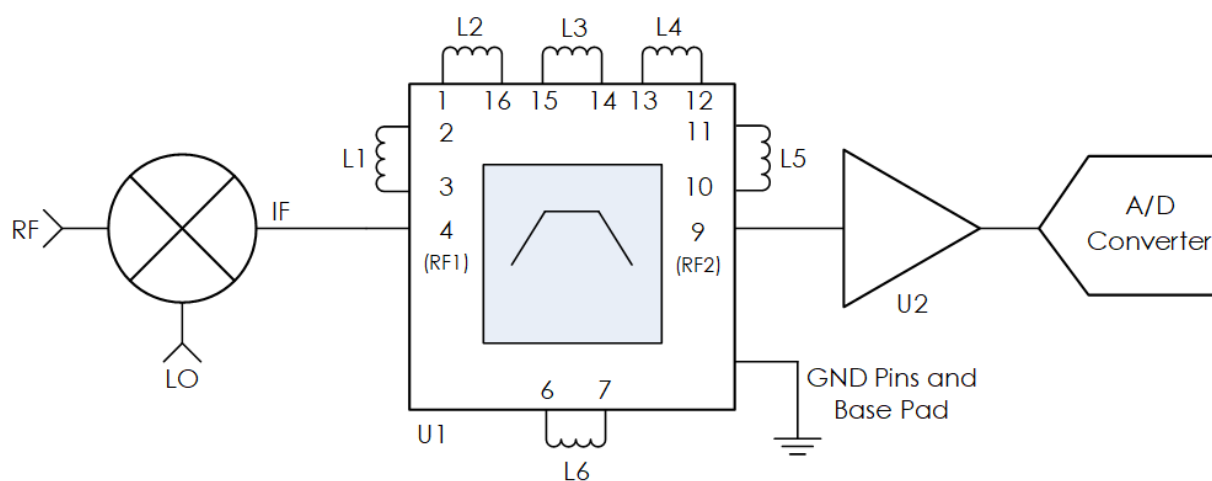
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TYPICAL PERFORMANCE

(T = 25 °C unless otherwise specified.)



## Typical Application



**Configuration A Recommended Component List (or equivalent): 2.0 GHz Center**

| Part       | Value  | Part Number    | Manufacturer |
|------------|--------|----------------|--------------|
| U1         |        | AM3231         | Mercury      |
| U2         |        | AM1025B        | Mercury      |
|            |        |                |              |
| L1, L2, L3 | 1.7 nH | 0402DC-1N7XJRW | Coilcraft    |
| L4         | 3.5 nH | 0402DC-3N5XGRW | Coilcraft    |
| L5         | 4.5 nH | 0402DC-4N5XGRW | Coilcraft    |
| L6         | 5.8 nH | 0402DC-5N8XGRW | Coilcraft    |

## AM3231 - Filter

**Configuration B Recommended Component List (or equivalent): 1.9 GHz Center**

| Part   | Value  | Part Number    | Manufacturer |
|--------|--------|----------------|--------------|
| U1     |        | AM3231         | Mercury      |
| U2     |        | AM1025B        | Mercury      |
|        |        |                |              |
| L1, L2 | 2.1 nH | 0402DC-2N1XJRW | Coilcraft    |
| L3     | 1.9 nH | 0402DC-1N9XJRW | Coilcraft    |
| L4     | 4.4 nH | 0402DC-4N4XGRW | Coilcraft    |
| L5     | 5.3 nH | 0402DC-5N3XGRW | Coilcraft    |
| L6     | 7.2 nH | 0402DC-7N2XGRW | Coilcraft    |

**Configuration C Recommended Component List (or equivalent): 1.8 GHz Center**

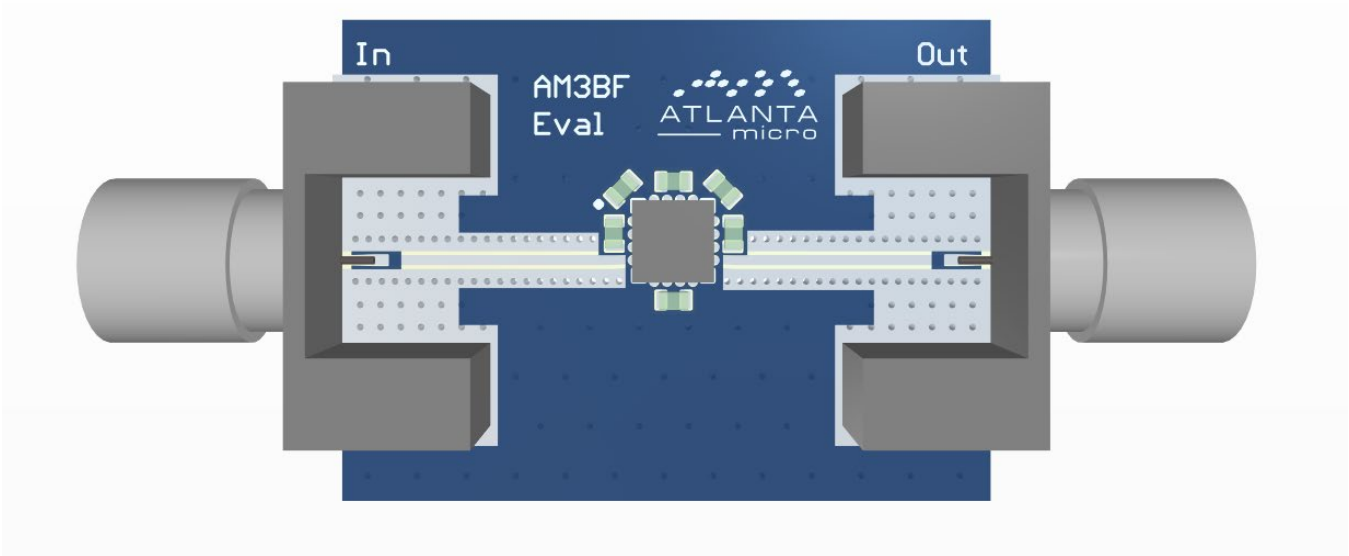
| Part | Value  | Part Number    | Manufacturer |
|------|--------|----------------|--------------|
| U1   |        | AM3231         | Mercury      |
| U2   |        | AM1025B        | Mercury      |
|      |        |                |              |
| L1   | 2.1 nH | 0402DC-2N1XJRW | Coilcraft    |
| L2   | 2.3 nH | 0402DC-2N3XJRW | Coilcraft    |
| L3   | 2.0 nH | 0402DC-2N0XJRW | Coilcraft    |
| L4   | 4.8 nH | 0402DC-4N8XGRW | Coilcraft    |
| L5   | 5.3 nH | 0402DC-7N3XGRW | Coilcraft    |
| L6   | 7.2 nH | 0402DC-9N5XGRW | Coilcraft    |

## Notes:

1. L1-L6 should be placed close to AM3231.

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EVALUATION PC BOARD



PART ORDERING DETAILS

| Description                             | Part Number |
|-----------------------------------------|-------------|
| 2.9 mm x 2.9 mm x 0.8 mm QFN package    | AM3231      |
| AM3231 Evaluation Board with Connectors | AM3231 Eval |

RELATED PARTS

| Part Number |                      | Description                |
|-------------|----------------------|----------------------------|
| AM3056      | 0.75 GHz to 1.25 GHz | Bandpass                   |
| AM3232      | 0.75 GHz to 1.25 GHz | Bandpass                   |
| AM3188      | 2.5 GHz to 3.5 GHz   | Bandpass                   |
| AM3187      | 3.25 GHz to 4.25 GHz | Bandpass                   |
|             |                      |                            |
| AM3103      | 1 GHz to 3 GHz       | Digitally Tunable Bandpass |

## COMPONENT COMPLIANCE INFORMATION

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| Substance List                        | Allowable Maximum Concentration |
|---------------------------------------|---------------------------------|
| Lead (Pb)                             | <1000 PPM (0.1% by weight)      |
| Mercury (Hg)                          | <1000 PPM (0.1% by weight)      |
| Cadmium (Cd)                          | <75 PPM (0.0075% by weight)     |
| Hexavalent Chromium (CrVI)            | <1000 PPM (0.1% by weight)      |
| Polybrominated Biphenyls (PBB)        | <1000 PPM (0.1% by weight)      |
| Polybrominated Diphenyl ethers (PBDE) | <1000 PPM (0.1% by weight)      |
| Decabromodiphenyl Deca BDE            | <1000 PPM (0.1% by weight)      |
| Bis (2-ethylhexyl) Phthalate (DEHP)   | <1000 PPM (0.1% by weight)      |
| Butyl Benzyl Phthalate (BBP)          | <1000 PPM (0.1% by weight)      |
| Dibutyl Phthalate (DBP)               | <1000 PPM (0.1% by weight)      |
| Diisobutyl Phthalate (DIBP)           | <1000 PPM (0.1% by weight)      |

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