

AUTOMOTIVE



Monarch® #3091

- ASTM D 1056-07 2A1 grade material
- Fine cell – manufactured in blocks (buns)
- Approved source for Delphi SD2-207, paragraph 6.10
- Widely used, low density pure EPDM material
- ASTM D 6576-07 Type II, Grades B & C, Condition Soft

Monarch®

General Information

Armacell Monarch® #3091: Armacell LLC (Spencer, WV Plant) manufactures a black, pure EPDM, $4 \pm 1 \text{ lb./ft}^3$ ($64 \pm 16 \text{ kg/m}^3$) density, closed cell sponge rubber product #3091, that meets all the requirements of ASTM D 1056-07 2A1 and SAE J18 APR2002 2A1. #3091 is manufactured with non-staining oils and anti-oxidants. #3091 does not incorporate a flame retardant but meets FMVSS-302 at thicknesses of 3/16" (0.1875") (4.76 mm) and higher. #3091 is listed as an approved source for Chrysler MSAY 430 Type II and Delphi SD2-207 paragraph 6.10. #3091 has excellent resistance to ozone and elevated temperatures. #3091 is also available in gray (#3991).

Bun Size Information

| Product | Bun Size (Inches) | | | Bun Size (mm) | | | Color |
|---------|-------------------|----|------|---------------|------|------|-------|
| | W | L | T | W | L | T | |
| 3091 | 48 | 80 | 2 | 1219 | 2032 | 50.8 | Black |
| 3091 | 42 | 54 | 2 | 1067 | 1372 | 50.8 | Black |
| 3091 | 54 | 70 | 2 | 1372 | 1778 | 50.8 | Black |
| 3091 | 52 | 74 | 2.25 | 1321 | 1880 | 57.2 | Black |
| 3091 | 48 | 74 | 2.5 | 1219 | 1880 | 63.5 | Black |

Automotive and Industrial Specifications

The following is a list of automotive and industrial specifications that Armacell Monarch® #3091 has been tested to or can meet. Additional specifications are listed that have a few exceptions. Feel free to suggest other automotive, military or industrial specifications, and a full review will be made.

| Source | Specification | Armacell Monarch® #3091 | Comments |
|---------------|---------------------------|--|--|
| ASTM | ASTM D1056-07 | 2A1 | Additional (optional) suffixes can be added |
| ASTM | ASTM D 1149 | Pass, no cracking, rating 0 | Ozone resistance test method |
| ASTM | ASTM D 1171 | Pass, no cracking, rating 0 | Ozone resistance test method |
| ASTM | ASTM D 6576-07 | Type II, Grades B & C, Condition Soft | Formerly MILR6130-C |
| ASTM | ASTM G 21-09 | Pass, rating 0 | Fungus resistance test method |
| Chrysler | Chrysler MSZ-75 J18 | 2A1 | Additional (optional) suffixes can be added |
| Chrysler | Chrysler MS JP9-4 | Meets at thicknesses of 3/16" (0.1875") (4.76 mm) & higher | Flame resistance (horizontal burn rate) |
| Chrysler | Chrysler MSAY 430 | Type 2 | On approved source list |
| Delphi | SD2-207 | Paragraph 6.10 | See note 4. On approved source list |
| Federal | FMVSS-302 | Meets at thicknesses of 3/16" (0.1875") (4.76 mm) & higher | Flame resistance (horizontal burn rate). See note 3 |
| FORD | FORD WSK M2D 419-A | Type 2 | See note 2 |
| GM | GM 6086-M | Type II | CD tested at 50% deflection. See note 1 |
| GM | GM 6090-M | (B4A) Meets at thicknesses of 3/16" (0.1875") (4.76 mm) and higher | Flame resistance tested per GM 9070-P (horizontal burn rate) |
| GM | GMN11106 | Type II | CD tested at 50% deflection. See note 1 |
| GM | GMW15473 | Class I Type IV | CD tested at 50% deflection. See note 1 |
| GM | GME 60-251 | 2A2U: pass, grade 0 | Ozone test |
| Hyundai | Hyundai MS260-13 | Classification ER | Additional (optional) suffixes can be added |
| ISO | ISO 6916 | 2A1 | Exception to compression set |
| Mercedes Benz | Mercedes Benz DBL 5574.10 | Meets with exceptions | Request additional information regarding multiple exceptions |
| Military | ASTM D 6576-07 | Type II, Grades B & C, Condition Soft | Formerly MILR6130-C |
| SAE | SAE J 18 APR2002 | 2A1 | Additional (optional) suffixes can be added |
| SAE | SAE J 369 | Meets at thicknesses of 3/16" (0.1875") (4.76 mm) & higher | Flame resistance (horizontal burn rate) |
| SAE | SAE J 1351 | Rating 2 | Odor specification |
| Toyota | TSM 1501G | 2A1 | Exception to compression set |
| Toyota | TSM 0500G | Meets at thicknesses of 3/16" (0.1875") (4.76 mm) & higher | Flame resistance (horizontal burn rate) |
| Visteon | VEF 4VH-80A100-AA | Pass | Biocide performance specification |

Note 1: For all GM 6086-M, GMN11106 & GMW15473 callouts, Armacell Monarch® certifies to the "basic" requirements only. Request additional information for each product. Providing application (interior, exterior or under-hood) and part thickness is helpful.

Note 2: For all FORD WSK M2D 419-A callouts, request full information for each product due to some exceptions with non-tested staining requirements.

Note 3: A number of horizontal burn tests can also be listed (GM 6090, BMW, Volvo, etc.). Request additional information.

Note 4: See QMPL-3621 Revision 12. Effective date August 24, 2009.



Polymer Base: **Pure EPDM**

F-03091 (Black)

| Physical Properties | Unit | Test Method | Typical Results |
|--|--------------------|---------------------------|------------------|
| Density | kg/m ³ | ASTM D 1056 | 64 ± 16 |
| | lb/ft ³ | ASTM D 1056 | 4 ± 1 |
| Hardness, Durometer Shore 00 | | ASTM D 2240 | 35 ± 5 |
| Compression Deflection (25%) | kPa | ASTM D 1056 | 24 ± 10 |
| | psi | ASTM D 1056 | 3.5 ± 1.5 |
| Compression Set (Room temp) | % | ASTM D 1056 | ≤ 40% |
| Tensile Strength | kPa | ASTM D 412 (Die A) | 280 |
| | psi | ASTM D 412 (Die A) | 40 |
| Tear Strength | kN/m | ASTM D 624 (Die C) | 1.2 |
| | lb/in | ASTM D 624 (Die C) | 6.8 |
| Elongation | % | ASTM D 412 (Die A) | 175% |
| Resilience | % | ASTM D 2632 | 45% |
| Service Temperature | | | |
| Low | °F (°C) | ASTM D 746 | -70°F (-56.7°C) |
| High Continuous | °F (°C) | ASTM D 746 | 220 °F (104.4°C) |
| High Intermittent | °F (°C) | ASTM D 746 | 250°F (121.1°C) |
| Water Absorption | | | |
| Maximum Weight Change | % | ASTM D 1056 | < 10% |
| Fluid Immersion (7 days at 23°C [73.4°F]) | | | |
| ASTM Ref. Fuel B, Weight Change (%) | % | ASTM D 1056 | Not Applicable |
| Accelerated Aging (7 days at 70°C [158°F]) | | | |
| Flexibility (180° bend without cracking) | | ASTM D 1056 | Pass |
| Appearance change | | ASTM D 1056 | None |
| Change in Compression Deflection | % | ASTM D 1056 | ± 30% |
| Combustion Characteristics | | Thicknesses | Comments |
| FMVSS-302 | | 0.188" (4.76 mm) & higher | Pass |

ASTM D 1056 designation: 2A1
 SAE J 18 APR2002 designation: 2A1
 ASTM D 6576: Type II, Grades B & C, condition soft
 EPDM = (ethylene-propylene-diene-methylene)

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