Multi-functional Solutions

- Numerous benefits in one material choice.
- Unique chemistries deliver exceptional performance to long-term physical, thermal and environmental abuse.

Long-Term Durability

- Excellent dimensional stability.
- Resilient to mechanical fatigue.
- High & low temperature resistance.
- Low compression set, creep and stress relaxation.

Design Reliability

- BISCO Silicone vibration isolation pads enable optimum passenger comfort, floor protection and design flexibility.
- Suitable for plywood, honeycomb or composite floors.

Passenger Safety

- Compliant with EN 45545 requirements without the use of restricted toxic substances.
- Flame-retardant properties are inherent to the homogenous formulation and cell structure, eliminating the need for fire-block layers and providing lasting fire resistance.

Reducing Maintenance Costs

- By utilizing the MF1® silicone seat foam, transit authorities benefit from:
  - Longer lasting cushion life and comfort compared to commonly used urethane cushions.
  - Significant savings in maintenance costs and revenue lost to downtime.

About Rogers Corporation

Rogers Corporation (NYSE: ROG) is a global leader in engineered materials to power, protect, and connect our world. With more than 180 years of materials science experience, Rogers delivers high performance solutions that enable clean energy, internet connectivity, and safety and protection applications, as well as other technologies where reliability is critical. Rogers delivers Power Electronics Solutions for energy-efficient motor drives, vehicle electrification and alternative energy; Elastomeric Material Solutions for sealing, vibration management and impact protection in mobile devices, transportation systems, industrial equipment and performance apparel; and Advanced Connectivity Solutions for wireless infrastructure, automotive safety and radar systems. Headquartered in Connecticut (USA), Rogers operates manufacturing facilities in the United States, China, Germany, Belgium, Hungary, and South Korea, with joint ventures and sales offices worldwide.

Contact Information

Belgium
Rogers BEBA
Tel: +32 9 235 3611
Fax: +32 9 235 3638

Taiwan
Rogers Taiwan Inc.
Tel: +886.2.8660.9056
Fax: +886.2.8660.9057

Japan
Rogers Japan Inc.
Tel: +81.3.5200.2700
Fax: +81.3.5200.0571

Korea
Rogers Korea Inc.
Tel: +82.31.291.3660
Fax: +82.31.291.3610

Beijing
Rogers (Shanghai) International Trading Co., Ltd.
Tel: +86.10.5820.7667
Fax: +86.10.5820.7997

Shenzhen
Rogers (Shanghai) International Trading Co., Ltd.
Tel: +86.755.8236.6060
Fax: +86.755.8236.6123

Elastomeric Material Solutions
Carol Stienstra, E. USA / Tel: 650.794.6245 / Fax: 650.794.6261
Cost: Orders Toll Free: 800.227.2668
Samples, Literature, Tech Support: 650.794.6112 or Toll-Free: 800.605.3940

For additional information or product availability contact your Rogers Customer Service Representative.
### EN 45545 Explained

#### Standards:
- EN 45545-1: Fire Protection of Railway Vehicles: General Guidelines
- EN 45545-2: Fire Protection of Railway Vehicles: Requirements for Fire Behavior of materials and components

The material requirement set (R1, R2, R3) is dependent on the train car type (HL rating) and product classification (IN1A, EX2, R2):

#### Hazard Level Classification

- **HL1**
- **HL2**
- **HL3**

<table>
<thead>
<tr>
<th>DESIGN CATEGORY</th>
<th>EN 45545-1</th>
<th>EN 45545-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Civil Bucket:** Includes underground sections, tunnels and/or elevated urban and suburban infrastructure.

**Mainline:** Includes mainline, regional, and urban and suburban infrastructure. Includes underground sections, tunnels and/or elevated urban and suburban infrastructure.


---

**Design Category**

- **A:** Automatic
- **B:** No on board emergency staff
- **D:** Double vehicle
- **S:** Sleeping couchette

**Operation Categories**

- **R1:** Interiors Primary
- **R2:** Interiors Limited Use
- **R3:** Interiors Non-Access
- **R4:** Interiors Access

**Hazard Level Classification**

- **HL1**
- **HL2**
- **HL3**

**Product Classification**

- **IN1A, IN1B, IN1D, IN1E:** Interiors Including, Interiors Including, Interiors Including, Interiors Including
- **IN2:** Interiors Limited Use
- **IN9A, IN10:** Interiors Primary
- **IN11:** Interiors Non-Access
- **IN12A, IN12B:** Interiors Access
- **IN14:** Interiors Access

<table>
<thead>
<tr>
<th>Requirement Set</th>
<th>Requirement Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Interiors Primary</td>
</tr>
<tr>
<td>R2</td>
<td>Interiors Limited Use</td>
</tr>
<tr>
<td>R3</td>
<td>Interiors Non-Access</td>
</tr>
<tr>
<td>R4</td>
<td>Interiors Access</td>
</tr>
</tbody>
</table>

**Material Selection Guide**

- **Multi-functional Usage:** Barrier / Anti-Squeak / Rattle / Gasket / Insulation / Acoustic
- **BISCO® product family** offers a wide range of silicone-based elastomeric foams and solids for use in many rail interior applications such as seals, gaskets, floor isolation pads, thermal insulation, sound barriers and anti-squeak / rattle pads. These materials are offered in continuous sheet form, enabling ease of fabrication whether slitting, die-cutting or laminating with adhesive.

---

**Rogers — Technical expertise to help design robust solutions**

- **Design and application support:**
  - Seat cushion design
  - Cushion CAD mockup and prototyping
  - Molded to fabricated cushion conversion and design
  - Cost of cushion ownership calculation
  - Seat construction guidance
  - Floating floor isolation material design
  - Vibrations and acoustic
  - Seat and seat design
  - In-house R&D and product development

**Converter Network:**

- Rogers partners with and sells its materials through a select group of Preferred Converters.
- These converters specialize in various fabrication processes including laminating adhesives, slitting, die-cutting, contour shape cutting, CNC and assembly of components.

---

**Value Added**

- Pressure sensitive adhesive options
- Acrylic adhesive (one or two sides of material)
- Silicone adhesive (one side of material)
- Slitting
- Slitting to desired length
- Material with or without adhesive
- Specialty substrates applied to material

**BISCO Silicone Specialty Services**

- **Seat Cushion Fabrication**
  - (MF1® BUN STOCK ONLY): 25 and cut to desired sheet dimensions
  - Complete contour cutting using CNC
  - Cut and assemble process to meet desired cushion shape
  - Cotton duck cloth reinforcement

**Contact Rogers**

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Long-term Durability

- Excellent dimensional stability
- High compression set, creep and stress relaxation
- Long-term material durability and performance
- Resistance to environmental factors (UV, ozone, chemical, temperature resistance)

Design Reliability

- BISCO Silicones ensure components and systems perform as expected for the life of the railcar through:
  - Long term material durability and performance
  - Resistance to environmental factors (UV, ozone, chemical, temperature resistance)

Passenger Safety

- Compliance to EN 45545 requirements without the use of restricted toxic substances.
- Fire-resistant properties are inherent to the homogenous formulation and cell structure, eliminating the need for fire-block layers and providing lasting fire resistance.

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Contact Information

Belgium
Rogers BEL
Tel: +32 9 235.3611
Fax: +32 9 235.8088

Taiwan
Rogers Taiwan Inc.
Tel: +886.2.8660.9056
Fax: +886.2.8660.9057

Singapore
Rogers Technologies Singapore Pte Ltd.
Tel: +65 6747 7651
Fax: +65 6747 7652

Japan
Rogers Japan Inc.
Tel: +81 3 291 3600
Fax: +81 3 291 3650

Korea
Rogers Korea Inc.
Tel: +82 31 291 3600
Fax: +82 31 291 3650

Shanghai
Rogers Shanghai International Trading Co., Ltd.
Tel: +86 21 6275 7509
Fax: +86 21 6275 7510

Shenzhen
Rogers (Shenzhen) International Trading Co., Ltd.
Tel: +86 755 8236 6060
Fax: +86 755 8236 6123

Elastomeric Material Solutions

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Rail Interiors Solutions – Peace of Mind

The BISCO Silicones Advantage – Peace of Mind

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In addition, Rogers offers a highly durable silicone seat cushion foam supplied in bun stock form or as a fabricated cushion shaped to the customer’s design requirements.

**Rogers … leading the way with EN 45545 compliant solutions and technical expertise**

The EN 45545 Explained

Standards:

EN 45545-1: Fire Protection of Railway Vehicles - General Guidelines

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The material requirement set (R1, R2...) is dependent on the train car type (HL rating) and product classification (IN1A, EX2, F1...): 

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Automatic Urban and suburban Mainline, regional, Urban and suburban structures without walkways / safe side evacuation. May stop at walkway / safe side evacuation. Vehicle shall continue to the next station, includes underground sections, tunnels and / or elevated structures with walkways / safe side evacuation. Vehicle shall stop at suitable ground level location or rescue station.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D: Double</td>
<td>HL1</td>
<td>HL2</td>
<td>HL3</td>
<td></td>
</tr>
<tr>
<td>R1, R2, R3...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material Requirement Set (R1, R2, R3...)**

- **R1** - Fire Resistance
- **R2** - Smoke Emission
- **R3** - Combustion Behavior

Material Thickness: All intermediate thickness are also compliant when a product is compliant at two sets are groupings of various product classifications. 

- **IN1, IN2, IN3** Non-listed Products: Products not listed in EN 45545-2 Table 2 are subject to the requirements of EN 45545-2 Section 4.3 and Table 3.

**Non-listed Products**

- **R10** - Flooring Components
- **R9** - Bogie Rubber Elements
- **R8** - External Roof Features
- **R7** - Internal Panels
- **R6** - Interior Sealing Elements
- **R5** - Floor Coverings
- **R4** - Seating Cushions
- **R3** - Window Seals
- **R2** - Exterior Seals
- **R1** - Internal Seals

**Table 1 - Hazard Level Classification**

- **HL1** - Low hazard
- **HL2** - Medium hazard
- **HL3** - High hazard

**Table 2 - Operation Categories**

- **INFRASTRUCTURE** - Liberty or contained fire including passenger evacuation
- **EVACUATION PLAN** - Severe fire, containment not possible, evacuation required

**Product Classification**

- **IN1A, EX2, F1...** Leading Products: EN 45545-2 Table 2 defines the product classification for the materials and products. The table permits the material and product producer to determine the appropriate conditions for the material and product category. EN 45545-1 and 2 are the most Hazard classification products. **HL1, HL2, HL3**, the non-listed products are groupings of various product classifications. 

**Material Selection Guide**

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**Visit:** www.rogerscorp.com/ems/bisco/contactus.aspx

Talk to a Rogers’ technical sales or application engineer today.
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The material requirement set (R1, R2, R3, Rn) is dependent on the train car type (HL rating) and product classification (IN1A, EX2, R1, R2, R3...)

**Hazard Level Classification**

<table>
<thead>
<tr>
<th>Level</th>
<th>Requirement Category</th>
<th>Material Thickness</th>
<th>Product Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL1</td>
<td>Pressure sensitive adhesive options</td>
<td>0.79MM - 12.7MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Acrylic adhesive (one or two sides of material)</td>
<td>0.79MM - 12.7MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Silicone adhesive (one side of material)</td>
<td>0.79MM - 12.7MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Slitting</td>
<td>4MM - 25MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Slitting rolls to desired width</td>
<td>4MM - 25MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Material with or without adhesive</td>
<td>4MM - 25MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
<tr>
<td></td>
<td>Specialty substrates applied to material</td>
<td>4MM - 25MM</td>
<td>Seat Cushion Fabrication</td>
</tr>
</tbody>
</table>

**BISCO Silicone Specialty Services**

Value Added

- Pressure sensitive adhesive options
- Acrylic adhesive (one or two sides of material)
- Silicone adhesive (one side of material)
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- Slitting rolls to desired width
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**Design and application support:**

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- Weather resistant and perform well across varying temperature and humidity conditions.
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- BISCO's broad product range offers a comprehensive solution for railcar interiors and systems.
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For additional information or product availability contact your Rogers Customer Service Representative.

Contact Information

Belgium
Rogers BBA
Tel: +32 2.320.0111
Fax: +32 2.320.0558
Toluene
Rogers Silicones Inc.
Tel: +36 3.320.0780
Fax: +36 3.320.0781
Shanghai
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 21.6270.0580
Fax: +86 21.6270.0580

Shenzhen
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 755.8236.6060
Fax: +86 755.8236.6123

Japan
Rogers Japan Inc.
Tel: +81 3.5200.2700
Fax: +81 3.5200.0571

Japan
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 21.6270.0580
Fax: +86 21.6270.0580

Korea
Rogers Korea Inc.
Tel: +82 31.291.3660
Fax: +82 31.291.3610

Beijing
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 10.5820.7667
Fax: +86 10.5820.7997

Shanghai
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 21.6270.0580
Fax: +86 21.6270.0580

Singapore
Rogers Technologies Singapore Pte.
Tel: +65 6742.3540
Fax: +65 6742.7922

Singapore
Rogers Technologies Singapore Pte.
Tel: +65 6742.3540
Fax: +65 6742.7922

Shanghai
Rogers (Shanghai)
International Trading Co., Ltd.
Tel: +86 21.6270.0580
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Japan
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Tel: +81 3.5200.2700
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Tel: +86 21.6270.0580
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