The demands by the medical and pharmaceutical sectors on elastomers and their compounds and vulcanizates are extremely high. Halogenated X_Butyl® is widely used in pharmaceutical rubber products, such as closures for infusion containers, injection vials, lyophilization and blood collection tubes.

Manufactured to stringent requirements, pharmaceutical closures often come into direct contact with pharmaceutical products, either dissolved or in other forms. Therefore, they must comply with existing standards and regulations relating to the contact of rubber articles with pharmaceuticals. Halogenated X_Butyl® is generally preferred, because they ensure adequate protection of sterile pharmaceutical products against external contamination during storage and use. Halogenated X_Butyl® grades are also found as O-rings and gaskets in a variety of aerosol containers, personal care and cosmetic spray pumps and inhalers. In addition, they are used in plungers for applications such as infusion pumps, pre-filled syringes, insulin injectors and dental anesthetics.

PRODUCT PROPERTIES

<table>
<thead>
<tr>
<th>Grade</th>
<th>X_Butyl® BB 2030</th>
<th>X_Butyl® BB X2</th>
<th>X_Butyl® CB 1240</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mooney Viscosity (ML(1+ 8) @ 125 °C, MU)</td>
<td>32</td>
<td>46</td>
<td>38</td>
</tr>
<tr>
<td>Halogen (wt%)</td>
<td>1.8</td>
<td>1.8</td>
<td>1.25</td>
</tr>
<tr>
<td>Stabilizer (wt%)</td>
<td>1.3</td>
<td>1.3</td>
<td>n/a</td>
</tr>
</tbody>
</table>

TYPICAL COMPOUND FORMULATION: S-CURE

| Ingredient       | phr | | Mechanical Properties | Unit | Typical Value* |
|------------------|-----||------------------------|------|------------------|
| X_Butyl® BB 2030 | 100 | | Hardness              | (ShA) | 50               |
| Calcined Clay    | 85  | | Tensile Strength      | (MPa) | 8.2              |
| Sulphur          | 1.5 | | Modulus 100%          | (MPa) | 1.7              |
| MgO              | 3   | | Modulus 300%          | (MPa) | 2.7              |
|                  |     | | Elongation at break   | (%)  | 660              |
|                  |     | | Compression Set (24 h/70 °C) | (%) | 25               |

*These items are provided as general information only. They are approximate values and are not considered part of the product specifications. Please contact your regional representative for additional information.
The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

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Note: The information contained in this publication is current as of September 2018. Please contact ARLANXEO USA LLC to determine if this publication has been revised.

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