WASH DURABLE FLAME RETARDANT
FOR FINISHING CELLULOSIC FABRICS
AND BLENDS
SYSTEM DESCRIPTION AND ADVANTAGES

Texax® 9020 is a water based dispersion which provides solutions for flame and smoldering suppression, when wash durable FR coating and backcoating formulations are required.

Texax® 9020 has the following properties:
• Effective smoldering suppression in cellulosic fabrics
• Best cost efficient FR solution for backcoating applications
• Enables significant reduction in bromine and antimony trioxide (ATO) and opens up the possibility of ATO free formulations
• Low melt active component (240°F, 115°C)
• Opportunity for lower latex levels
• Ability to achieve fully laundry durable FR cotton fabrics
• Good transparency
• Easy incorporation in common binder systems
• Compatibility with most textile finishing chemicals
• Good pH stability
• Supplied as an aqueous concentrate with up to 65% solids
• Alternative system to Deca and HBCD based formulations

Sustainability and Durability

Texax® 9020 has an optimal melting range, enabling better penetration of the finish into the fabric during the curing process resulting in excellent durability. The FR cannot be extracted from the fabric, even at the boil. It also minimizes the whitening effect often observed with traditional FR systems.

Flexibility

These unique properties make Texax® 9020 the solution of choice for flame retardant finishing of cellulosic fabrics. This homogenous product enables long shelf life and easy product management. Additionally, the flexibility of Texax® 9020 opens up opportunities for uncomplicated water based treatment of both cellulose and cellulose/synthetic blends.
TexPro® 9020 enables use of significantly reduced levels of bromine and antimony trioxide synergist on the fabric, thus providing additional cost benefit.

TexPro® 9020 is easily diluted in water, yet has outstanding performance as a wash durable finish after curing. Once incorporated in the aqueous binder system, it is easy to handle and may be adjusted for different foaming, hydrophobic/hydrophilic, adhesion, viscosity properties, etc.

TexPro® 9020 may be applied by various coating and backcoating application techniques including spray, pad, print, coat, foam and brush. It is most suitable for 100% cotton and cotton/synthetic blend fabrics.

TexPro® 9020 is highly compatible with most common textile formulation additives such as cross-linkers, softeners, antimony oxide, UV inhibitors, antimicrobials, pigment dispersions, etc.
PROPERTIES

TexRan® 9020 65% solids aqueous concentrate is a milky dispersion that contains 35% bromine. It is suitable for preparing durable textile coating formulations, especially to pass stringent standards such as BS-5852, NFPA-701 and 16 CFR 1633.

TexRan® 9020 concentrate should be handled in a similar manner to customary BFRs. It is also important to note that TexRan® 9020 is provided as an aqueous dispersion; therefore comparisons with other solid FR products must be done on a percent Br and/or dry add-on basis.

<table>
<thead>
<tr>
<th>Property</th>
<th>TexRan® 9020</th>
<th>HBCD</th>
<th>DECA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>milky white dispersion</td>
<td>white powder</td>
<td>white powder</td>
</tr>
<tr>
<td>Melting Temp</td>
<td>113-117°C</td>
<td>175-185°C</td>
<td>300-310°C</td>
</tr>
<tr>
<td>Solids</td>
<td>65%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Bromine</td>
<td>35%</td>
<td>73%</td>
<td>83%</td>
</tr>
<tr>
<td>Advantages</td>
<td>need 30% less Br &amp; 50% less ATO on fabric</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
FORMULATION PROCEDURE

Dispersions are prepared by the following procedure:

1. Calculate the amount of water needed, in addition to the water already present in the TexPro 9020 dispersion as supplied, to achieve the desired final dilution (solids content) in the coating formulation.

2. TexPro 9020 dispersion concentrate is pre-stirred and added to water with a dispersing agent. If desired, ATO is then added slowly with stirring. The resulting mixture is stirred with a mixer (500 rpm) for 15 minutes followed by addition of the binder emulsion.

3. Slow addition of the rest of the water, making pH corrections and adjustments according to requirements

4. Addition of other additives (such as pigments, repellents, etc.)

5. Viscosity of the formulation is adjusted from 20 cps and up depending on the application requirements for the target fabric. The viscosity is adjusted to a higher range for fabric backcoating by incorporating thickeners commonly used in the industry.

TexPro 9020 add-on is directly related to the properties of the fabric treated:
- Fabric composition and construction
- Specific area weight/thickness
- Fabric end-use
- Flammability test required to pass
EXAMPLE OF A PADDING APPLICATION ON 100% COTTON FABRIC

<table>
<thead>
<tr>
<th></th>
<th>TexPro® 9020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry weight% on fabric</td>
<td>16.2</td>
</tr>
<tr>
<td>TexPro® 9020</td>
<td></td>
</tr>
<tr>
<td>Total add-on*</td>
<td>23.0</td>
</tr>
<tr>
<td>Bromine</td>
<td>7.3</td>
</tr>
<tr>
<td>No of Laundry Cycles**</td>
<td>5</td>
</tr>
</tbody>
</table>

Flammability Results of Treated Fabric

| Flame Retardancy* | After Flame: 0 seconds | After Glow: 2 seconds | Char Length: 4.5 inches |

* Including binder, ATO, etc.
** AATCC standard - Laboratory Practice for Home Laundering AATCC technical manual/2001
* ASTM D 6413-08 vertical flame, 12 seconds ignition.

EXAMPLE OF A BACKCOATING APPLICATION ON 50/50 COTTON/ POLYESTER FABRIC

<table>
<thead>
<tr>
<th></th>
<th>TexPro® 9020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry weight% on Fabric</td>
<td>15.1</td>
</tr>
<tr>
<td>TexPro® 9020</td>
<td></td>
</tr>
<tr>
<td>Total add-on</td>
<td>25.0</td>
</tr>
<tr>
<td>Bromine</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Flammability Results of Treated Fabric

| Flame Retardancy | After Flame: 0 seconds | After Glow: 3 seconds | Char Length: 5 inches |

A typical Deca based formulation is given for comparison. Note the much reduced %Br on fabric required and the decreased smoldering when using TexPro® 9020 instead of Deca.
7020 exhibits excellent non-fogging properties useful for automotive applications.

7020 is compared to HBCD and Deca using Fogging Test Method – DIN 75201. Measurements for both the FR chemicals alone and the formulations on treated fabrics are given.

<table>
<thead>
<tr>
<th>Deca</th>
<th>Wt% dry basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deca</td>
<td>12.7</td>
</tr>
<tr>
<td>Total add-on</td>
<td>27.0</td>
</tr>
<tr>
<td>Bromine</td>
<td>10.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flammability results of Treated Fabric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame Retardancy</td>
</tr>
</tbody>
</table>

FOGGING TEST RESULTS

7020 exhibits excellent non-fogging properties useful for automotive applications.

7020 is compared to HBCD and Deca using Fogging Test Method – DIN 75201. Measurements for both the FR chemicals alone and the formulations on treated fabrics are given.

<table>
<thead>
<tr>
<th>Fogging Evaluation</th>
<th>Sample</th>
<th>Results of Fogging Test (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Run 1</td>
</tr>
<tr>
<td>Powder FR's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deca</td>
<td></td>
<td>2.65</td>
</tr>
<tr>
<td>HBCD</td>
<td></td>
<td>0.85</td>
</tr>
<tr>
<td>7020</td>
<td></td>
<td><strong>0.28</strong></td>
</tr>
<tr>
<td>Treated Fabric Samples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank</td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Deca</td>
<td></td>
<td>1.60</td>
</tr>
<tr>
<td>HBCD</td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td>7020</td>
<td></td>
<td><strong>0.06</strong></td>
</tr>
<tr>
<td>Formulation without FR</td>
<td></td>
<td>0.07</td>
</tr>
</tbody>
</table>
For further advice and assistance, contact our representatives in your area:

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