Cycolac® ABS resin

Product guide
Americas
Performance, commitment and innovation.

Sharing our futures
At SABIC Innovative Plastics, the future is now

Cycolac* ABS resins have an impressive history of providing versatile, value-added solutions in application markets from appliances to healthcare.
1. Introduction

The future of the Cycolac* portfolio shines even brighter.
The SABIC Innovative Plastics team recognizes that the measure of quality engineering is how efficiently a design achieves its intended performance goals. Through this recognition and our commitment to customers, a new commercial focus and innovative technologies are helping to drive the latest generation of our Cycolac® resins. New products from plating grades to color aesthetics can provide unique performance to support customer success.

Instrumental to this evolution is SABIC Innovative Plastics's active role in helping customers find the best Cycolac grade for their application. In addition to our superb field technical support and product development tools, we offer a unique selection of custom color capabilities, including express, small-lot service, color matching and a broad array of visual effects.

SABIC Innovative Plastics reinvents the potential of acrylonitrile-butadiene-styrene (ABS) with its line of Cycolac performance products, featuring more innovation, more color and more service.

**Cycolac resins**

The Cycolac family comprises one part of a much broader selection of engineering resins available from SABIC Innovative Plastics. But this versatile family of thermoplastics includes over 100 grades that all provide impressive mechanical, thermal and processing performance.

The Cycolac product family also encompasses a range of aesthetic options, from clear, opaque and highly colorable resins to a variety of special effects. All grades are characterized by a rich, glossy surface finish, with admirable depth of color and good scratch resistance.

Cycolac ABS resin is a terpolymer formed by blending an amorphous thermoplastic copolymer of acrylonitrile and styrene with an elastomeric component, such as polybutadiene or a butadiene polymer. By altering the ratio of these three monomers, Cycolac resins can offer an expansive assortment of performance properties tailored to meet a wide range of end-use requirements.

Typical property profiles of Cycolac ABS resin include:

- High gloss finish
- Good low temperature ductility
- Excellent thermal properties
- Very good processing performance
- Good chemical resistance
- Low shrinkage, low warping
- High dimensional stability
- Good electrical properties
- Good paintability and platability

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**Table 1 Cycolac ABS performance products**

- Extrusion
  - Specials
    - Aesthetics
    - Healthcare
    - Electroplating
    - High heat
    - Flame retardant
  - General purpose injection molding
SABIC Innovative Plastics offers a selection of general purpose ABS grades suitable for a variety of demanding applications. But our Cycolac product portfolio is distinguished from competitive brands by a range of high-performance specialty grades.

**Alliage* effect**
This versatile alloy effect offers three dimensionality in a wide color range. Playing with the orientation of the flakes creates either a very rich, glossy, brushed aluminum look or a random burst, cracked or torn look.
By modifying the ABS monomers or by incorporating specific additives and fillers, SABIC Innovative Plastics’ Cycolac® ABS resin family offers several enhanced or expanded performance product lines that meet target applications. These performance product lines include

- Aesthetics, including custom color and Visualfx® (Vfx) compatibility
- Healthcare
- Electroplating
- High heat
- Flame retardant

With support from SABIC Innovative Plastics engineers and a host of online design guides and tools, OEMs can find a Cycolac ABS product that meets their precise design parameters.

2.1 Specialty grades for aesthetics

SABIC Innovative Plastics offers some of the most outstanding custom color capabilities of any ABS resin supplier. Our portfolio encompasses a wide spectrum of highly colorable opaque and transparent grades. Many are compatible with our Visualfx technology, which offers designers unique aesthetics options, such as Flame, Speckle, Stone, Marble and others. The potential benefit for customers is highly differentiated end-products manufactured without the cost, emissions or added steps associated with paint processes. Plus, SABIC’s molded-in color solution delivers consistency from lot to lot.

SABIC Innovative Plastics also offers its world-class ColorXpress® services, providing rapid delivery and color matching for most ABS grades. If none of our standard aesthetic platforms apply, customers can seek a custom solution from SABIC’s Innovation Centers located in Selkirk, NY; Bergen op Zoom, The Netherlands; or Shanghai, China.

**Table 2.1 – Visualfx aesthetics resin portfolio**

<table>
<thead>
<tr>
<th>Resin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FXS610SK</td>
<td>General purpose, metallic</td>
</tr>
<tr>
<td>FXS630SK</td>
<td>FR-ABS, metallic</td>
</tr>
</tbody>
</table>

**Figure 2.1 – Visualfx grades – product performance heat, impact and flow**

<table>
<thead>
<tr>
<th>Melt flow rate (230°C/3.8 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FXS610SK</td>
</tr>
<tr>
<td>FXS630SK</td>
</tr>
</tbody>
</table>
2. Specialty grades for healthcare

Few applications demand consistent materials performance more than medical devices. SABIC Innovative Plastics has helped designers meet this demand for surgical instruments, fluid and drug delivery components, oxygen and respiratory devices, and drainage and suction tools.

In addition to the broad aesthetics options available in our portfolio, this selection of Cycolac ABS resins offers FDA and ISO 10993-compliance for healthcare applications, and many base resins are approved in Europe for food contact.

Our healthcare specialty grades offer resistance to chemicals and lipids, reduced in-mold stress cracking and durable performance after repeated exposure to several sterilization methods. See figure 2.2 (page 9) for gamma radiation performance.

SABIC Innovative Plastics is not only committed to providing high performance materials to customers in healthcare, we are a dedicated industry partner willing to take the long view on the extended product development cycles typical of the healthcare market.

These Cycolac resin grades have been approved for medical use in the US. HMG94MD and HMG47MD are grades that offer different flow rates to meet a wide range of tooling needs.

Table 2.2 – Cycolac resin biocompatibility

<table>
<thead>
<tr>
<th>Product†</th>
<th>Acute system injection</th>
<th>Intracutaneous</th>
<th>Implantation</th>
<th>Hemolysis</th>
<th>Cytotoxicity</th>
<th>Pyrogen</th>
<th>Sensitization</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMG47MD-NA1000</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HMG94MD-NA1000</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

* SABIC Innovative Plastics does not support implant applications >29 days
† Medical applications are not strictly limited to the products listed. For some medical applications, the test results on a similar product are applicable.
**Figure 2.2** – Property retention after radiation typical for Cycolac* MD resins

**Tensile yield strength**

- Radiation level
  - 0 kGy
  - 40 kGy
  - 80 kGy

**Property retention elongation %**

- Radiation level
  - 0 kGy
  - 40 kGy
  - 80 kGy

**Notched Izod impact**

- Impact (J/m)
  - 0 kGy
  - 40 kGy
  - 80 kGy

**dE color shift**

- Radiation level
  - 0 kGy
  - 40 kGy
  - 80 kGy

Cycolac MD resins properties after kGy.
2.3 Electroplating and other specialty grades

Although several thermoplastics can be electroplated, ABS resins continue to dominate this market. SABIC Innovative Plastics’ Cycolac resins stand out from competitive brands by providing high-purity, ABS substrates with excellent surface quality, dimensional stability and temperature cycling performance. For electroplaters, these qualities translate into superb adhesion, lightweight durability and reliable performance.

The versatility of Cycolac electroplating grades has driven broadening applications in automotive, household fittings, fluid engineering and electronic components. In addition, it has met the growing demand for striking aesthetics in consumer products.

Cycolac MG37EPX is characterized by excellent electroplatability yielding mirror-like plated surfaces. This grade is currently specified by many automotive OEMs. Cycolac MG37EPX is also our NSF ANSI std. 61 listed grade for potable water applications including faucets and related hardware. Please consult the NSF website (www.NSF.org) for specific details. Cycolac MG37CR features improved chemical resistance.

Table 2.3 – Electroplating portfolio

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG37EPX</td>
<td>Automotive specified</td>
</tr>
<tr>
<td>MG37EPX</td>
<td>NSF listed</td>
</tr>
<tr>
<td>MG37CR</td>
<td>Chemically resistant</td>
</tr>
</tbody>
</table>
2.4 High-heat specialty grades
Several high-heat Cycolac® ABS resins from SABIC Innovative Plastics are designed to provide cost-effective options for enduring color and mechanical performance – properties important for telecommunication components and electrical enclosures. But our high-heat Cycolac grades also excel in automotive interiors, where they provide superb materials solutions for dashboards, door trim, pillars and other interior elements.

Figure 2.3 – High-heat portfolio

HDT (66MPa, 3.2mm)

110°C

102°C

99°C

Melt flow rate (220°C/10kg)

2 4 6 8

X11

Z48

X15

X17

X15HF
2.5 Flame-retardant specialty grades

Several Cycolac resin grades offer an excellent balance of impact and flame resistance to help designers meet increasingly stringent regulatory and safety standards. SABIC Innovative Plastics expertise in flame-retardant additives and compounds has given this selection of Cycolac ABS grades a range of tensile and flex properties, and a variety of profiles for distortion temperature, melt flow index and UV stability. For thin wall applications, designers should consider our FR15U resin.

The flexible array of performance qualities available from our flame-retardant Cycolac ABS family makes these materials excellent candidates for numerous applications in consumer electronics.

Cycolac FR15U, F30U and FR25UHF have been developed to offer excellent indoor UV performance in communication equipment. See table 2.4 for UL flame ratings and specific product strengths.

| Table 2.4 – Flame-retardant Cycolac product positioning |
|---------------------------------|---------------------------------|------------------|-------------------|-------------------|------------------|
|                                 | Izod impact | Flow | Accelerated light aging | HDT | Process stability | Flame rating (e) |
| FR30U                          | V1 & 5VB @ 2.3mm | V0 @ 3.0mm |
| FR15U                          | V0 @ 1.5mm, except B1/BN 5 VA @ 2.8mm |
| FR23                           | V0 @ 2.3mm 5 VB @ 2.5mm |
| FR15                           | V0 @ 1.5mm 5 VA @ 2.5mm |
| FR25UHF                         | V0 @ 2.5mm V2 @ 1.6mm |

Relative performance:

Highest performance > > > Lowest performance

(e) See detailed listings in UL section
In addition to its outstanding range of specialty grades, SABIC Innovative Plastics offers a broad selection of general purpose Cycolac ABS resins. These highly colorable products offer excellent processing performance and a wide array of flow and impact options. SABIC Innovative Plastics’ general-purpose portfolio offers Cycolac grades designed either for extrusion or injection molding.
3. General Cycolac® ABS grades

**Figure 3.1** – Extrusion ABS grades portfolio

**Figure 3.2** – Injection molding ABS grades portfolio
Resins are available in a wide spectrum of standard and custom colors.

Table 3 - product tree
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