Surface finish

Surface finishes can be used to give an injection molded part a certain look or feel. Besides cosmetic purposes surface finishes can also serve technical needs. For example, the average surface roughness (Ra) can dramatically influence the lifetime of sliding parts such as plain bearings.

Keep in mind that rough surfaces increase the friction between the part and the mold during ejection, therefore a larger draft angle is required.

| Finish | Description | SPI Stds. | Applications |
| --- | --- | --- | --- |
| Glossy finish | The mold is first smoothed and then polished with a diamond buff, resulting in a mirror-like finish. | A-1  A-2  A-3 | Suitable for parts that require the smoothest surface finish for cosmetic or functional purposes (Ra less than 0.10 μm).  The A-1 finish is suitable for parts with mirror-like finish and lenses. |
| Semi-gloss finish | The mold is smoothed with fine grit sandpaper, resulting in a fine surface finish. | B-1  B-2  B-3 | Suitable for parts that require a good visual appearance, but not a high glossy look. |
| Matte finish | The mold is smoothed using fine stone powder, removing all machining marks. | C-1  C-2  C-3 | Suitable for parts with low visual appearance requirments, but machining mark are not acceptable. |
| Textured finish | The mold is first smoothed with fine stone powder and then sandblasted, resulting in a textured surface. | D-1  D-2  D-3 | Suitable for parts that require a satin or dull textured surface finish. |
| As-machined finish | The mold is finished to the machinist's discretion. Tool marks will be visible. | - | Suitable for non-cosmetic parts, such industrial or hidden components. |

For a detailed description of the SPI standards and the compatibility of each materials with a specific surface finish, see the Tables 2& 3

A high glossy mold finish is not equivalent to a high glossy finished product. It is significantly subject to other factors such as plastic resin used, molding condition and mold design. For example, ABS will produce parts with a higher glossy surface finish than PP. To find the recommended material and surface finish combination Table 3.

Finer surface finishes require a higher grade material for the mold. To achieve a very fine polish, tool steels with the highest hardness are required. This has an impact on the overall cost (material cost, machining time and post-processing time).

from: <https://www.3dhubs.com/knowledge-base/injection-molding-spi-surface-finishes>