

ABS 材质的相关问题

Issues related to ABS material

ABS 塑料是丙烯腈(A)-丁二烯(B)-苯乙烯(S)的三元共聚物。它综合了三种组分的性能，其中丙烯腈具有高的硬度和强度、耐热性和耐腐蚀性；丁二烯具有抗冲击性和韧性；苯乙烯具有表面高光泽性、易着色性和易加工性。上述三组分的特性使 ABS 塑料成为一种“质坚、性韧、刚性大”的综合性能良好的热塑性塑料。

调整 ABS 三组分的比例，其性能也随之发生变化，以适应各种应用的要求，如高抗 ABS、耐热 ABS、高光泽 ABS 等。ABS 塑料的成型加工性好，可采用注射、挤出、热成型等方法成型，可进行锯、钻、锉、磨等机械加工，可用三氯甲烷等有机溶剂粘接，还可进行涂饰、电镀等表面处理。ABS 塑料还是理想的木材代用品和建筑材料等。ABS 塑料强度高，轻便，表面硬度大，非常光滑，易清洁处理，尺寸稳定，抗蠕变性好，宜作电镀处理材料。其应用领域仍在不断扩大。

ABS 塑料在工业中应用极为广泛。ABS 注射制品常用来制作壳体、箱体、零部件、玩具等。挤出制品多为板材、棒材、管材等，可进行热压、复合加工及制作模型。

塑料 ABS 树脂是产量最大，应用最广泛的聚合物，它将 PB，PAN，PS 的各种性能有机地统一起来，兼具韧，硬，刚相均衡的优良力学性能。ABS 是丙烯腈、丁二烯和苯乙烯的三元共聚物，A 代表丙烯腈，B 代表丁二烯，S 代表苯乙烯。

经过实际使用发现：ABS 塑料管材，不耐硫酸腐蚀，遇硫酸就粉碎性破裂。

由于具有三种组成，而赋予了其很好的性能；丙烯腈赋予 ABS 树脂的化学稳定性、耐油性、一定的刚度和硬度；丁二烯使其韧性、冲击性和耐寒性有所提高；

苯乙烯使其具有良好的介电性能，并呈现良好的加工性。

大部分 ABS 是无毒的，不透水，但略透水蒸气，吸水率低，室温浸水一年吸水率不超过 1%而物理性能不起变化。ABS 树脂制品表面可以抛光，能得到高度光泽的制品。比一般塑料的强度高 3-5 倍。

ABS 具有优良的综合物理和机械性能，较好的低温抗冲击性能。尺寸稳定性。电性能、耐磨性、抗化学药品性、染色性、成品加工和机械加工较好。ABS 树脂耐水、无机盐、碱和酸类，不溶于大部分醇类和烃类溶剂，而容易溶于醛、酮、酯和某些氯代烃中。ABS 树脂热变形温度低可燃，耐热性较差。熔融温度在 217~237℃，热分解温度在 250℃以上。如今的市场上改性 ABS 材料，很多都是掺杂了水口料、再生料。导致客户成型产品性能不是很稳定。

(1) 物料性能

综合性能较好，冲击强度较高，化学稳定性，电性能良好；
与 372 有机玻璃的熔接性良好，制成双色塑件，且可表面镀铬，喷漆处理；
有高抗冲、高耐热、阻燃、增强、透明等级别；
流动性比 HIPS 差一点，比 PMMA、PC 等好，柔韧性好；
适于制作一般机械零件，减磨耐磨零件，传动零件和电讯零件。

(2) 成型性能

无定形材料，流动性中等，吸湿大，必须充分干燥，表面要求光泽的塑件须长时间预热干燥 80-90 度，3 小时；
宜取高料温，高模温，但料温过高易分解(分解温度为>270℃)。对精度较高的塑件，模温宜取 50-60℃，对高光泽、耐热塑件，模温宜取 60-80℃；
如需解决夹水纹，需提高材料的流动性，采取高料温、高模温，或者改变入水位

等方法;

如成形耐热级或阻燃级材料, 生产 3-7 天后模具表面会残存塑料分解物, 导致模具表面发亮, 需对模具及时进行处理, 同时模具表面需增加排气位置;

冷却速度快, 模具浇注系统应以粗, 短为原则, 宜设冷料穴, 浇口宜取大, 如: 直接浇口, 圆盘浇口或扇形浇口等, 但应防止内应力增大, 必要时可采用调整式浇口。模具宜加热, 应选用耐磨钢;

料温对塑件质量影响较大, 料温过低会造成缺料, 表面无光泽, 银丝紊乱料温过高易溢边, 出现银丝暗条, 塑件变色起泡;

模温对塑件质量影响很大, 模温低时收缩率, 伸长率, 抗冲击强度大, 抗弯, 抗压, 抗张强度低。模温超过 120°C 时, 塑件冷却慢, 易变形粘模, 脱模困难, 成型周期长;

成型收缩率小, 易发生熔融开裂, 产生应力集中, 故成型时应严格控制成型条件, 成型后塑件宜退火处理;

熔融温度高, 粘度高, 对剪切作用不敏感, 对大于 200 克的塑件, 应采用螺杆式注射机, 喷嘴应加热, 宜用开畅式延伸式喷嘴, 注塑速度中高速。

ABS plastic is a terpolymer of acrylonitrile (A)-butadiene (B)-styrene (S).

It combines the properties of three components, among which

acrylonitrile has high hardness and strength, heat resistance and

corrosion resistance; butadiene has impact resistance and toughness;

styrene has high surface gloss, easy coloring and Ease of processing. The

characteristics of the above three components make ABS plastic a

thermoplastic with good comprehensive properties that is "hard, tough

and rigid". By adjusting the proportion of the three components of ABS, its performance will also change to adapt to the requirements of various applications, such as high-resistant ABS, heat-resistant ABS, high-gloss ABS, etc. ABS plastic has good molding processability and can be formed by injection, extrusion, thermoforming and other methods. It can be processed by sawing, drilling, filing, grinding and other mechanical processes. It can be bonded with organic solvents such as chloroform, and can also be painted and electroplated. and other surface treatments. ABS plastic is also an ideal wood substitute and building material. ABS plastic has high strength, light weight, high surface hardness, very smooth, easy to clean, dimensional stability, good creep resistance, and is suitable for electroplating processing materials. Its application areas are still expanding. ABS plastic is widely used in industry. ABS injection products are commonly used to make casings, boxes, parts, toys, etc. Extruded products are mostly plates, rods, pipes, etc., which can be hot-pressed, compounded, and modeled.

Plastic ABS resin is the polymer with the largest output and the most widely used. It organically unifies the various properties of PB, PAN, and PS, and has excellent mechanical properties with a balance of toughness, hardness, and rigidity. ABS is a terpolymer of acrylonitrile, butadiene and styrene, A represents acrylonitrile, B represents butadiene, and S represents styrene. After actual use, it was found that ABS plastic pipes

are not resistant to sulfuric acid corrosion and will shatter when exposed to sulfuric acid.

Because it has three components, it gives it good performance; acrylonitrile gives ABS resin chemical stability, oil resistance, certain stiffness and hardness; butadiene improves its toughness, impact resistance and cold resistance; Styrene gives it good dielectric properties and exhibits good processability.

Most ABS is non-toxic and impermeable to water, but is slightly permeable to water vapor and has a low water absorption rate. The water absorption rate does not exceed 1% in one year when soaked in water at room temperature without any change in physical properties. The surface of ABS resin products can be polished to obtain highly glossy products. It is 3-5 times stronger than ordinary plastic.

ABS has excellent comprehensive physical and mechanical properties and good low-temperature impact resistance. Dimensional stability. It has good electrical properties, wear resistance, chemical resistance, dyeability, finished product processing and mechanical processing. ABS resin is resistant to water, inorganic salts, alkali and acids, insoluble in most alcohols and hydrocarbon solvents, but easily soluble in aldehydes, ketones, esters and certain chlorinated hydrocarbons. ABS resin has a low thermal deformation temperature, is flammable, and has poor heat resistance. The melting temperature is 217~237°C, and the thermal

decomposition temperature is above 250°C. Many modified ABS materials on the market today are doped with sprue materials and recycled materials. As a result, the performance of the customer's molded products is not very stable.

(1) Material properties

It has good comprehensive performance, high impact strength, chemical stability and good electrical properties;

It has good weldability with 372 organic glass and can be made into two-color plastic parts, and the surface can be chrome-plated and spray-painted;

There are high impact resistance, high heat resistance, flame retardant, reinforced, transparent and other grades;

The fluidity is slightly worse than HIPS, better than PMMA, PC, etc., and has good flexibility;

Suitable for making general mechanical parts, wear-reducing and wear-resistant parts, transmission parts and telecommunication parts.

(2) Molding performance

Amorphous materials, with medium fluidity and high moisture absorption, must be fully dried. Plastic parts that require glossy surfaces must be preheated and dried for a long time at 80-90 degrees for 3 hours;

It is advisable to have high material temperature and high mold

temperature, but if the material temperature is too high, it will easily decompose (the decomposition temperature is $>270^{\circ}\text{C}$). For high-precision plastic parts, the mold temperature should be $50-60^{\circ}\text{C}$; for high-gloss, heat-resistant plastic parts, the mold temperature should be $60-80^{\circ}\text{C}$;

If you need to solve the water mark, you need to improve the fluidity of the material, adopt methods such as high material temperature, high mold temperature, or change the water inlet level;

If heat-resistant or flame-retardant materials are formed, plastic decomposition will remain on the mold surface 3-7 days after production, causing the mold surface to shine. The mold needs to be cleaned in time, and an exhaust position needs to be added on the mold surface;

The cooling speed is fast, the mold pouring system should be thick and short as the principle, cold material cavity should be set up, and the gate should be large, such as direct gate, disc gate or fan gate, etc., but the internal stress should be prevented from increasing. , an adjustable gate can be used if necessary. The mold should be heated and wear-resistant steel should be used;

The material temperature has a great influence on the quality of plastic parts. If the material temperature is too low, it will cause material shortage, the surface is dull, and the silver wires are disordered. If the

material temperature is too high, it will easily overflow, dark stripes of silver wire will appear, and the plastic parts will become discolored and blistered;

Mold temperature has a great influence on the quality of plastic parts.

When the mold temperature is low, the shrinkage, elongation, and impact strength are high, and the bending resistance, compression resistance, and tensile strength are low. When the mold temperature exceeds 120°C, the plastic parts cool slowly, are prone to deformation and stick to the mold, are difficult to demould, and have a long molding cycle;

The molding shrinkage is small, melt cracking is prone to occur, and stress concentration occurs. Therefore, the molding conditions should be strictly controlled during molding, and the plastic parts should be annealed after molding;

The melting temperature is high, the viscosity is high, and it is not sensitive to shearing. For plastic parts larger than 200 grams, a screw injection machine should be used. The nozzle should be heated, and an open extension nozzle should be used. The injection speed is medium to high.