●Common defects when injection molding & countermeasures

Main causes of defects and corrective measures are described in the following table. (Table 7)

Appearance	Cause	Countermeasures
Deformation by water content	• Decomposition by insufficient drying of pellet	• Sufficient predrying • Maintain temperature of hopper
Vacuum foam	• Insufficient capacity from the lack of shrinkage caused by quenching around thick wall section • Unsuitable mold temperature • Unsuitable cylinder temperature • Insufficient injection pressure and pressure keeping	• Eliminate thickness deviation • Modify gate position to meet at right angles at thick wall section • Raise mold temperature • Lower cylinder temperature • Raise injection pressure and pressure keeping
Weld mark	• Unsuitable cylinder temperature • Lack of injection pressure • Unsuitable mold temperature • Lack of degassing in the cavity	• Raise cylinder temperature • Raise injection pressure • Raise mold temperature • Add airrent
Sink mark	• Caused by the shrinkage that results from slow cooling of the surface of thick wall parts (unsuitable thickness) • Insufficient injection pressure • Insufficient injection capacity • Mold temperature is too high or lack of cooling • Insufficient pressure maintained • Insufficient gate dimension	• Reduce thickness deviation • Raise injection pressure • Increase injection capacity • Increase cooling time if mold temperature is suitable • Extend holding time • Increase gate dimension
Burning (whole or partial change in color)	• Unsuitable cylinder temperature • Retention occurs partially in cylinder • Seepage into the screw joint between cylinder and nozzle • In case of using check valve and ring • Decomposition from insufficient pellet drying • Excessive capacity of molding machine	• Lower the cylinder temperature • Eliminate dead corners • Eliminate gap around screw joint • Eliminate the material retention • Provide predrying as recommended • Change to a suitable capacity machine
Silver streak	• Unsuitable cylinder temperature • Long retention time • Unsuitable injection speed • Unsuitable gate dimension • Insufficient pellet drying • Unsuitable injection pressure	• Lower cylinder temperature • Eliminate retention • Slow injection speed • Enlarge the gate size • Provide predrying as recommended • Reduce injection pressure
Wave around gate (devitrifying)	• Unsuitable injection speed • Unsuitable pressure holding time • Unsuitable mold temperature • Unsuitable gate dimension	• Slow injection speed • Shorten pressure holding time to avoid the presence of molten materials in the cavity after filling • Raise mold temperature • Enlarge the gate size
Jetting and flow marks	• Unsuitable mold temperature • Unsuitable injection pressure • Unsuitable gate dimension	• Raise temperature • Reduce injection pressure • Enlarge the gate size
Defective ejection (defective mold release)	• Lack of gradient in core and cavity • Unsuitable cycle • Unsuitable cylinder temperature • Unsuitable position and number of knock pins • Vacuum with molded products in mold release from core • Unsuitable mold temperature • Unjection pressure is too high and filling capacity is too large	• Add a draft • Cooling time is too short or extremely long • Lower molding temperature to reasonable value • Examine reasonable position and number • Often occurs when the surface of the core is smooth. Eject with plate not with pin, and add vent pin. • Lower the mold temperature and lengthen the cycle • Reduce injection pressure and reduce weight of materials
Brittleness of molded products	• Unsufficient drying • Mold temperature is too low • Injection pressure and pressure holding are excessive, occurrence of inside stresses caused by thickness deviation and defective mold release • Notch effective • Heat decomposition • Contamination by foreign material	• Maintenance of drying machine and hopper • Select suitable conditions • Eliminate thickness deviation • Eliminate sharp corners, modify position of gate • Lower the cylinder temperature • Eliminate the material retention • Cleaning of hopper and cylinder

●Extrusion defects & countermeasures

Main causes of defective extrusion and corrective measures are described in the following table. (Table 9)

Appearance	Cause	Appearance	Cause
Fluctuation of sheet width	Change of extrusion output, Unsuitable screw shape, fluctuation in screw revolution, fluctuation in cylinder and die temperature, fluctuation in dryness of materials, fluctuation in extrusion output relative to the molecular weight	Hue coloration	Defectiveness of material hue Decomposition caused by excessive cylinder and die temperatures
Dispersion of sheet thickness	Fluctuation in extrusion output Ununiformity of flow due to insufficient kneading Dispersion of die temperature Ununiformity of receive speed Incomplete adjastment of lip clearance	Vertical line of surface	Adhesion of decomposition debris at die outlet Insufficient kneading Unsuitable die structure Streak inside die Lack of cleaning of extrusion and die Streak in lip edge
Contamination of foam	Insufficient drying Insufficient back pressure Contamination of cracked gas caused by extremely high temperature	Surface wave	Fluctuation of flow rate Unsuitable cooling temperature for polishing rol
Contamination of debris	Contamination of debris in material Contamination of debris caused by harsh environment in sheet production Appearance of decomposition products in cylinder or die Insufficient cleaning of the extruder	Irregular surface	Insufficient length for die land Insufficient back pressure Insufficient kneading Excessive lubricant Extremely high temperature
Fish eye	Insufficient kneading Insufficient back pressure Non-plasticity caused by extremely low cylinder temperature Unsuitable screw shape	Spots in surface	Ununiformity of die temperature Misalignment of crimping for polishing roll Welding polishing roll at extremely high temperature