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RESEARCH STUDY ON DESIGN AND ANALYSIS OF LAN SOCKET BOX

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Abstract

Injection molds are divided into two types based on the rolling structure (i.e. cold rolling moulds) and non-running moulds (e.g. hot running moulds). In cold-running, multi-cavity and multi-point injection molding, material loss occurs in the tread. Sometimes the waste material exceeds the weight of the part. To avoid the above problems, the technique used is hot-run molds. Hot runner molding is one of the advanced manufacturing methods for multi-cavity molds. These molds are usually used for high production rates. While plastic parts are made with standard/standard multi-cavity molds, we face problems such as partial filling, component cavities, product quality deterioration, injection pressure and temperature drop and deformation age, etc. So, we redesigned the Lan Socket Box and it will be useful for our intended use. Component design and tool flow analysis were performed using Auto CAD, Creo Parametric and Solidworks18 software.

Key Words: Injection Mould, Injection Mould for Face Plate, Runner Diameter,Mould Flow Analysis.

1. INTRODUCTION

Injection molding is extremely dull to get plastic data that is from another oil thermocouple whether its measuring beet is very heavy with the extra hopper In this law, it should be emphasized whether there is another clamping that to that to the solidify the white and it is to be lebbirt from the lagla. This is the way that can and does with pl pla pla a a le with lon of complexity and he. Waiting for the runner system on which plastic fills its pool from the barrel and directs it to the light cavity. Shrink by its configuration, dimensions, and its connection to the environment the information we can That is to say, it is the runner system that shocks the information and the part law. The temperature law at runner law is at law and the at at the other island delivers the best system For this it is available, a hot runner system is used, in medicine with a very runner system. The hot-sculpted expression is melted into molten and neat objects with the measurement protection.

2. INJECTION MOULD

An injection mold consists of a high pressure injection molding material into a mold, which molds the polymer into the desired shape. The mold may have one or more holes. In the case of multiple holes, each hole can be the same and form a single section or it can be unique and then create several different geometries in a circle. Molds are made of cast iron, but stainless steel and aluminum molds are ideal for some applications. Aluminum alloys are usually ideal for the production of high volumes or parts with narrower dimensions, as they have lower performance and are more likely to wear, break, and deform during welding and locking. . however, aluminum molds are cheaper and cheaper, because the mold cost and time are greatly reduced. Many steel molds are designed to process more than a million parts over their lifetime and can cost hundreds of thousands of dollars to manufacture. . The mold may have one or more holes. In the case of multiple holes, each hole can be the same and form a single section or it can be unique and then create several different geometries in a single loop. Molds are made of cast iron, but stainless steel and aluminum molds are ideal for some applications. Aluminium moulds are typically ill-suited for high volume production or parts with narrow dimensional tolerances, as they have inferior mechanical properties and are more prone to wear, damage, and deformation during the injection and clamping cycles; however, aluminium moulds are cost-effective in low-volume applications,

as mould fabrication costs and time are considerably reduced. Many steel moulds are designed to process well over a million parts during their lifetime and can cost hundreds of thousands of dollars to fabricate.

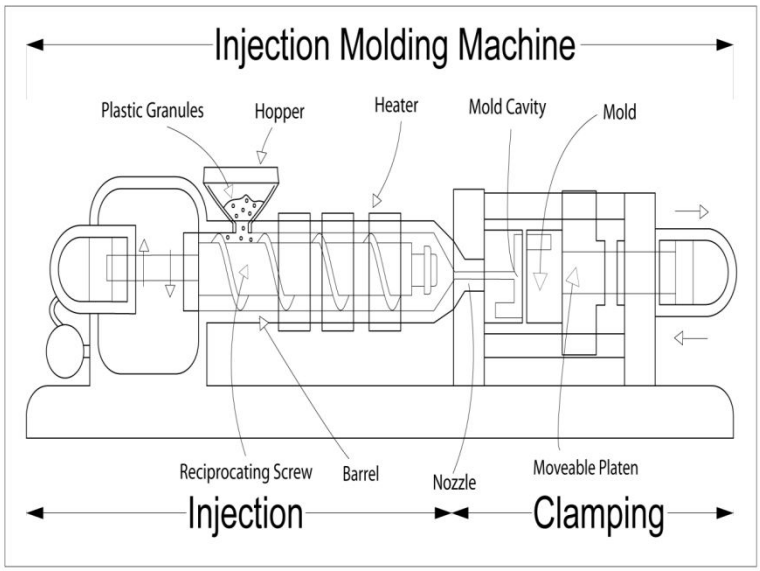


Fig. 1 Injection Molding Machine

2.1 Injection Mould for Face Plate

Calculations

No. of Cavities for front part

Mass of component = 27 grams

Plasticizing rate of PS = 40 kg/h

Specific heat of material A = 239.4 KJ/kg

Specific heat of material B = 302.4 KJ/kg

$Plasticising\ capacity\ P = Plasticising\ rate\ of\ PS\ X\ QAQB$ =40 X 239.4302.4

= 31.667 kg/h $T = m\ X\ 3600P$ =27 X 360031667

= 3 sec $No.of\ Cavities$=0.85 $X\ P\ X$ 103600 X 27

= 2.65≈ 2

No. of Cavity for Front Part = 2

2.2. Runner Diameter

D = $\sqrt{m}\ X\ \sqrt{L}43.7$

D = Diameter of Runner (mm)

M= Mass of Mould (g)

L= Length of Mould (mm) $\boldsymbol{D}=\sqrt{\mathbf{25}}\ \boldsymbol{X}\ \sqrt{\mathbf{2743.7}}$

D = 3.363 mm

D= 4mm

4.1.2 Depth of gate

Depth of Gate = nXt

t = thickness of part

n= constant (0.9)

Depth of Gate = 0.9X2

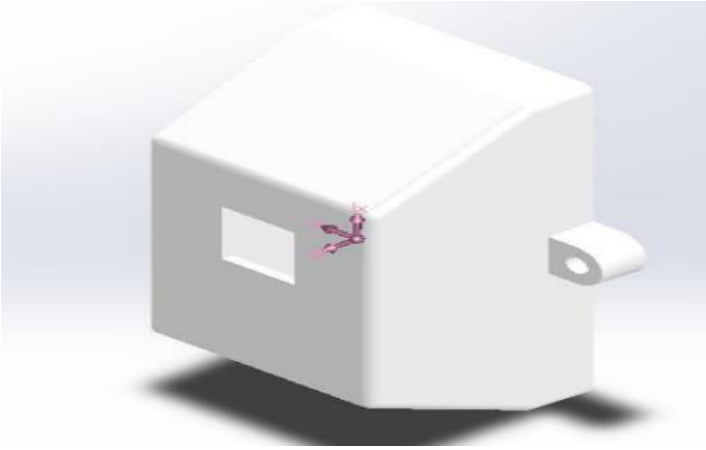
= 1.8 mm

3. METHODOLOGY

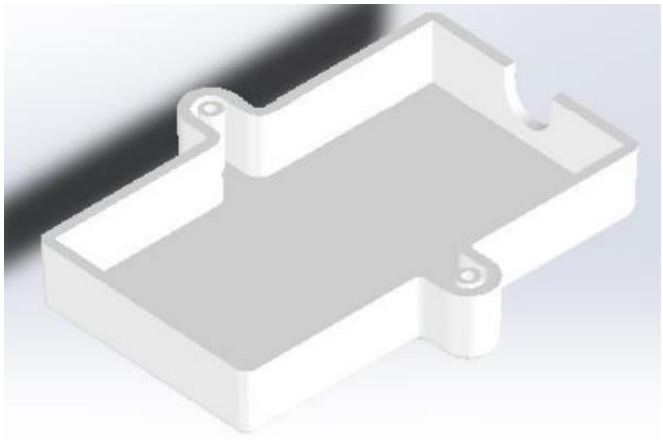
The complete study of Design and analysis of Lan Socket Boxwill be done through the CAD Software Auto CAD, Creo Parametric & Solid Works 18.

1. Study of component.
2. Design Parameters consideration
3. Component material selection.
4. Geometrical dimensional consideration.
5. Modelling using CATIA software.
6. Mould flow analysis for proper filling of component using Solid Works 18
7. Core Cavity extaction
8. Mould Design
9. Drafting of production drawing

2.1 . Face Plate

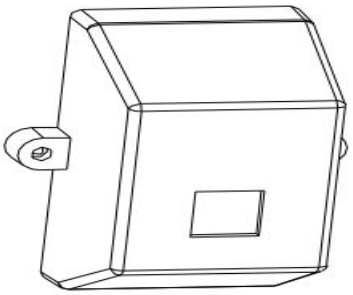


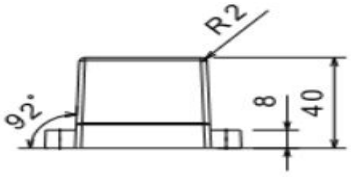
Material = ABS
Mass = 22.73 grams
Volume = 22285.37 cubic millimetres
Surface area = 22923.01 square millimetres
Centre of mass: (millimetres) X = 0.00 Y = -0.12 Z = -18.50
Fig.1 Face Plate



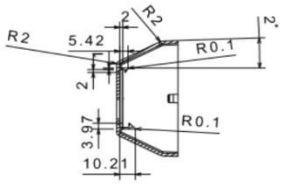
Material = PVC
Mass = 16.87 grams
Volume = 13074.72 cubic millimetres
Surface area = 13881.84 square millimetres
Centre of mass: (millimetres) X = -0.41 Y = 0.00 Z = 9.03
Fig.2 Gang box
Hence total weight of previous model was 78.78 grams and weight of modified model is 39.6 gram. As the weight of modified model is less than previous one, the cost of product will be reduced.

2.2. Drafting of Face Plate

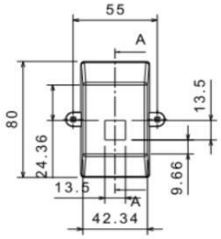




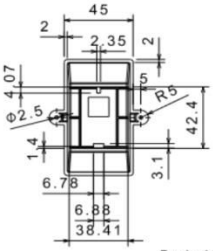
Bottom view
Scale: 1:2



Section view A-A
Scale: 1:2



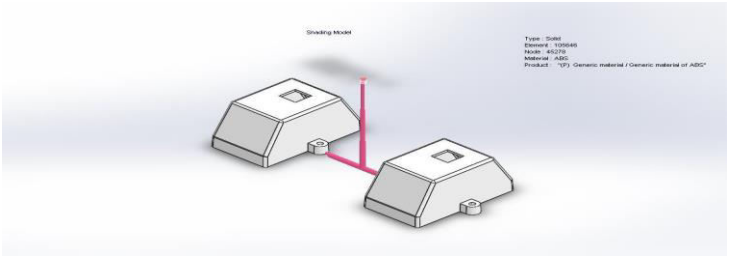
Front view
Scale: 1:2



Back view
Scale: 1:2

4. Mould Flow Analysis

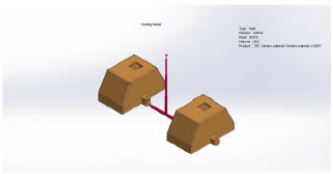
4.1 Model Information



Name: Part
Current Configuration: Default

Name	Default
Type	Solid
Element	105646
Node	45278
Symmetry Face	No
Volume	46.05 (cm3)
Weight	50.74 (G)
Size	190.78 (mm) x 91.00 (mm) x 80.00 (mm)

4.2 Material Properties

Model Reference	Properties	
	Material Name	ABS
	Product Name	"(P) Generic material / Generic material of ABS"
	Melt Temperature	230.00 °C
	Mould Temperature	50.00 °C
	Ejection Temperature	90.00 °C
	Glass Transition Temperature	100.00 °C
	Specific Heat	2.400000e+007 erg/(g-C)
	Thermal Conductivity	1.800000e+004 erg/(sec-cm-K)
	Young Modulus	2.250000e+010 dyne/cm2
	Poisson's Ratio	3.900000e-001

4.3 .Proecess Parameters

Fill Settings:

Filling Time	1.78 sec
Main Material Melt Temperature	230 °C
Mould Wall Temperature	50 °C
Injection Pressure Limit	100 MPa
Max. Inject (Machine) Flow Rate	194 cc/s
Flow/Pack Switch Point in Filled Volume	100 %
Pressure Holding Time	3.89 sec
Total Time in Pack Stage	17.79 sec
Auto Filling Time (1: Exist, 0: Not)	1
Auto Packing Time (1: Exist, 0: Not)	1
Venting Analysis (1: Exist, 0: Not)	0
Cavity Initial Air Pressure	0.1 MPa
Cavity Initial Air Temperature	25 °C

4.4. Flow Results

Flow Summary

X-dir. Clamping Force	15.2439 Tonne (16.8000 Ton U.S)
Y-dir. Clamping Force	10.1608 Tonne (11.2000 Ton U.S)
Z-dir. Clamping Force	11.9789 Tonne (13.2000 Ton U.S)
Requiring injection pressure	81.6386 MPa (11800.0000 psi)
Max. real temperature	253.1706 °C (488.0000 °F)
Max. bulk temperature	252.6845 °C (487.0000 °F)
Max. shear stress	1.6185 MPa (235.0000 psi)
Max. shear rate	35275.0500 1/sec
CPU Time	4718.75 sec
Cycle Time:	20.61 sec

5. Reference

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