Design For Manufacturing Ability

This DFM report for injection mold manufacturing
### Design For Manufacturing

<table>
<thead>
<tr>
<th>Customer</th>
<th>VALEO</th>
<th>This is customer name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name</td>
<td>V54X</td>
<td>This is customer’s project name.</td>
</tr>
<tr>
<td>Part Number</td>
<td>Right:L90060929  Left:L90060885</td>
<td>This is customer’s part number.</td>
</tr>
<tr>
<td>Part Name</td>
<td>HOUSING halogen</td>
<td>This is customer’s part name.</td>
</tr>
<tr>
<td>Mold Number</td>
<td>UP-140801</td>
<td>This is mold name of Upmold</td>
</tr>
</tbody>
</table>

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Customer-Oriented & Quality-Adherence  August 7, 2018  http://upmold.com
<table>
<thead>
<tr>
<th></th>
<th>Base information for part and mold</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>模腔数Cavity No.</td>
<td>1L*1R  That means it will be 2 cavities in this mold</td>
</tr>
<tr>
<td>2</td>
<td>塑料Material</td>
<td>PP TD40  That lets you know that PP TD40 Material will be used for molding.</td>
</tr>
<tr>
<td>3</td>
<td>收缩率Shrinkage</td>
<td>1.009?  That means that please double check the shrinkage rate for this mold.</td>
</tr>
<tr>
<td>4</td>
<td>产品外形Part Size</td>
<td>238 mmX 520 mmX 365 mm  This mold molded Part size will be...</td>
</tr>
<tr>
<td>5</td>
<td>产品重量Part Weight</td>
<td>875g per part  This mold molded part weight will be...</td>
</tr>
<tr>
<td>6</td>
<td>模具零件钢材Cor. /Cav. /Slide steel</td>
<td>定模仁Cav steel: LKM738HH HRC33-36  That means what steel will be used on cavity, core, slide, lifter and inserts.</td>
</tr>
<tr>
<td></td>
<td>动模仁Cor steel: 2738HH HRC33-36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>滑块Slide steel: 2738HH HRC33-36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>镶件 Inserts steel:2343 HRC46~48</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>模架钢材Mold base steel</td>
<td>A板A Plate: 2312  That means what steel will be used for each plate on mold-base.</td>
</tr>
<tr>
<td></td>
<td>B板 B Plate: LKM738HH HRC33-36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>托板 Plate: 2312</td>
<td></td>
</tr>
<tr>
<td></td>
<td>顶针底板 Lower ejector plate: 2312</td>
<td></td>
</tr>
<tr>
<td></td>
<td>其它Other: 1.1730</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>注塑机Injection machine</td>
<td>Please offer the machine datasheet of size 1000 Ton  That is what machine will be used for molding</td>
</tr>
</tbody>
</table>

Information
1. 产品优化设计（The Part design optimization）： Page 5-13
2. 产品缩痕分析（The analysis of sink marks）： Page 5-13
3. 产品拔模角分析（The analysis of draft）： Page 14-17
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5. 分型线 （parting line）： Page 23-25
6. 镶件线 （insert line）： Page 26-30
7. 行位线 与内抽线（slide and retractor lines）： Page 31-40
8. 顶出线（ejector line）： Page 41-46
9. 浇口位置与尺寸（gate location and size）： Page 47-48
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On our DFM Report there are 11 indexes that guide designer how to design a complete report for DFM, the DFM concerns: early stage engineering support, part structure design optimizing, part moldable analysis, Material Selection Consultation, Quality Requirement Planning, mold concept planning, mold design optimizing, Mold Design Specification, mold or part potential risk preventing and solution, mold manufacturable optimizing.
Because the part design is quite good, we have no more information for the tow part model.
二：产品缩痕分析

(The analysis of sink marks)

In this section, we will do a complete potential risk analysis for sink mark, then make a report and give the customer our solution for each problem.
2.1 The analysis of sink marks

1. The normal thickness of part is 1.9mm.
2. But there are some big side of rib are 1.6-3.8mm on part that will be sink mark on the visible side, UpMold proposed to make it with 1.5mm.
3. That will be potential risk of sink mark at red area as below picture showing, please improve that.
2.2 The analysis of sink marks

1. The normal thickness of part is 1.9mm.
2. But there are some big side of rib are 1.6-3.8mm on part that will be sink mark on the visible side, UpMold proposed to make it with 1.5mm.
3. That will be potential risk of sink mark at red area as below picture showing, please improve that.
4. It will be sink mark of potential risk at the root of all bosses, please improve it.
### 2.3 The analysis of sink marks

<table>
<thead>
<tr>
<th><strong>Origin (原始数据)</strong></th>
<th><strong>Proposal (优化建议)</strong></th>
</tr>
</thead>
</table>

1. Normal thickness is 1.9mm

#### Problem description

It will be sink mark on part as the Section A-A showing.

#### SEC A-A

- 3.8mm
- 1.9mm

#### Corrective Actions

Upmold proposed to reduce the wall as above picture.
2.4 The analysis of sink marks

Origin (原始数据)

1. Normal thickness is 1.9mm

Problem description

It will be sink mark at part as the SEC D-D showing

Proposal (优化建议)

Our Proposal as above pictures showing that suggests to reduce wall thickness.

Corrective Actions
2.5 The analysis of sink marks

Origin（原始数据）
1. Normal thickness is 1.9mm

There will be sink mark on rib as above SEC E-E showing

Proposal（优化建议）
Upmold proposed to reduce the thickness of rib as above picture showing, please concern and change the design

Problem description

Corrective Actions

SEC E-E

Upmold proposed to reduce the thickness of rib as above picture showing, please concern and change the design.
2.6 The analysis of sink marks

Origin (原始数据)
1. Normal thickness is 1.9mm

Problem description
It will be sink mark on rib as above SEC F-F showing

Corrective Actions
Upmold proposed to change the thickness by 1.5mm for sink mark issue.
2.7 The analysis of sink marks

Origin

1. Normal thickness is 1.9mm

Problem description

It will be sink mark at root of boss as SEC E-E showing.

Proposal

Our proposed to reduce the wall of boss by 2mm.
2.8 The analysis of sink marks

Origin (原始数据)
1. Normal thickness is 1.9mm

Problem description
These ribs will be sink mark as pictures.

Proposal (优化建议)
2.8 The analysis of sink marks

Corrective Actions
Please reduce the thickness by 1.5mm.
三. 产品拔模角分析

The analysis of draft

We will do a demold analysis, and approve the part that it is moldable or not, are there any undercut problem? Is the draft direction corrected or not? And the angle, is it enough for demold or not? What is the potential risk for aspect of part.
3.1 The analysis of draft

Please add a draft with 1 degree on these green surface for demold.
3.2 The analysis of draft

Please add a draft angle with 1 degree on these area for demold necessary.
3.3 The analysis of draft

Please add a draft angle by 0.5 degree to avoid scratch problem.
四：产品刻字及外观要求

（Engraving and Aspect）

In this section, we will discuss with our customer regarding the engraving requirements and the part aspect specification, what letters and symbols will be made on part? What finish requirement for molding part? Is it texture or polish? Or part surface polish and texture? What texture spec? and what the polish grade?
Please select following mark you want: （请选择你需要的标记）

[ ] Date Code: Year & Month （日期章，年月合并型）

[ ] Date Code: Year（日期章年章）

[ ] Date Code: Month（日期章月章）

[ ] Cavity No.（型腔号）

[ ] Part No.（零件编号）

[ ] Rev. No.（版本号）

[ ] Material（材料标识）

[ ] Recycle Symbol（回收标志）
4.1 Engraving and Aspect

The 2.4V will be removed, right?
4.2 The difference on right and left hand

Please approve both parts is mirroring design

Housing-Hal-L

Housing-Hal-R
4.2 The difference on right and left hand

Please confirm these rib features is different on R&L part.
五：分型线

（Parting Line Design）

In this section, we will discuss with our customer about the parting line design, and give a complete report to customer for approving, including problems and our proposals; especially, the split line will be effected part quality of aspect.
5.1: Parting Line design
5.2 Parting Line design

Origin（原始数据）

Proposal（优化建议）

Problem description

We proposed to add a radius at the root of lock as right picture for part strengthened.
六：镶件线

（Insert Line Design）

In this section, we will make a utter report for all inserts which will be made on mold, and the insert split line will be marked on part that is necessary but that must be approved by our customer.
6.1 Split mark at cavity side that will be mark on part
6.2 Insert mark at cavity side

Insert mark

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6.3 Insert mark at core side
6.4 Insert mark at core side
七：行位线和内抽线
(Slide and retractor Line)

Of course, slide and lifter will be used on mold that is best solution for undercut, but that will be marked on part after molding, so we need to discuss with our customer that what is the best location for split line, and what condition will be approved.
7.1 Slide 1 design concept for left part

Housing-Hal-L

Slider1 direction
Stroke is 35mm

Slide mark
Insert mark
Insert mark
Inset mark
7.2 Slide 1 design concept for right part

Housing-Hal-R

Slider1 direction
Stroke is 35mm

Insert mark

Insert mark

Insert mark

Insert mark

Insert mark
7.3 Slide 2 design concept for left part

Housing-Hal-L

- Slider2 direction
- Stroke is 18mm

Slide mark
7.4 Slide 3 design concept for left part

Housing-Hal-L

Insert mark

Slider3 direction
Stroke is 28mm

Insert mark
7.5 Slide 4 design concept for left part

Housing-Hal-L

Slider direction
Stroke is 45mm

Insert mark
7.6 Slide 4 design concept for left part

Housing-Hal-L

Insert mark

Insert mark for ejector pin

Insert mark for ejector pin

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7.7 Slide 4 design concept for left part

Housing-Hal-L

We proposed to change the slide split line as right picture.

It will be a draft angle with 0.5 degree for demold.

Previous design concept for slide

Insert mark

New parting line for slide

proposal

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7.8 Slide 5 design concept for left part

Housing-Hal-L

Slider5 direction
Stroke is 48mm

Slide mark
7.9 Lifter design concept for left part

Housing-Hal-L

Guide angle for lifter

Ejector stroke

Lifter mark

stroke 7

Lifter mark
In this section, we are going to discuss with our customer for ejector design, we will propose our ejector layout with comments for confirmation from the customer side that it will concern the aspect of part.
8.1: Ejector layout on cavity side

Movable inserts
8.2 Ejector mark at cavity side
8.3 Ejector mark at cavity side

There will be thinnest, we proposed to move the feature with 8 mm as right pictures showing.
8.4 Ejector layout on core side

- Ejector pin Ø12X19
- Ejector pin Ø8X4
- Ø10X3 ejector pin
- Ø8X2 sleeves
- Ø7.5X2 sleeves
- Ø8X2 sleeves
- Ø6X4 ejector pin
- Ø4X2 ejector pin with shoulder
We proposed to add some boss with 4 mm for ejector pin.
九：浇口位置及尺寸

(Gate location and size)

Here we are going to discuss with our customer for gate design concept, and pick out the gate location, size, runner system; what brand hot runner system will be used and other notice.
9.1 Injection gate design concept

It will be used INCOE DFQ 18 hot runner system 2 drops with hydraulic valve gates.

Option 1

- 20mm
- 5mm
- 4mm

SEC F-F

It will be poor cooling system around nozzle.

Option 2

- 10mm
- 8mm
- 8mm

That is good for cooling design, but it will be left a pads which is high 12mm.

Incoe DFQ18 Hot runner system 2 nozzle with hydraulic valve gates VTT+DTB
十：模具排位
（Mold Layout）

We are going to discuss with our customer regarding the mold layout, and we will sketch some drawings that will be express clearly.
10.1 Mold design layout sketch

Option 1

Insert for cavity

CAVITY

CORE

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10.2 Mold design layout sketch

It will be weakness at red mark showing, we suggest to choose option 2

Option 1 side view
10.3 Mold design layout sketch

Option 2

There without insert for cavity

TOP

CAVITY

CORE

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10.4 Mold design layout sketch

Option 2

A complete plate
Finally, we will discuss with the customer about machine issue, and let him know what we will pay attention to.
Please offer us machine datasheet, connectors for water and electronics, clamping type etc.
THANK YOU

Thanks for attention