Autodesk® Moldflow® Insight 2012

AMI Gate Location Analysis

Autodesk®

Revision 1, 22 March 2012.

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Gate Location analysis 1

The Gate Location analysis is used to recommend injection locations for the part. This analysis works for all analysis technologies and is used as a preliminary input for a full Fill+Pack analysis.

You can choose between two algorithms when running a Gate Location analysis, the **Advanced Gate Locator** algorithm or the **Gate Region Locator** algorithm. The Advanced Gate Locator algorithm is used by default.

When using this analysis, you can define prohibited gate nodes to specify areas where you do not want to place gates.

After running a Gate Location analysis, the recommended injection location is automatically displayed in a duplicate of the study.

NOTE: CAD models that have been imported through the Direct Import option are not duplicated with the study. However, they remain available in the original study.

Gate Location analysis

You can use the Gate Location analysis to obtain recommended injection locations for the part.

Setting up a Gate Location analysis

The following table summarizes the setup tasks required to prepare a Gate Location analysis.

The setup tasks below are for non fiber-filled, or fiber-filled thermoplastic materials.

Setup task	Required for analysis technology
Molding processes	
Meshing the model	
Checking the mesh before analysis	
Analysis sequence	
Selecting a material	
Process settings	

Setup task	Required for analysis technology
Prohibited Gate Nodes on page 8 **NOTE:** Set prohibited gate nodes when using the Advanced Gate Locator algorithm.	

Optional setup tasks

Setup task	Supported for analysis technology
Injection locations **NOTE:** The Advanced Gate Locator algorithm does not work on models that contain existing gates.	

NOTE: You can select between two algorithms when running a Gate Location analysis. If you have not set an injection location for your study, you can use either the Advanced Gate Locator algorithm or Gate Region Locator algorithm. If you have set one or more injection locations, then you can only use the Gate Region Locator algorithm.

Performing a Gate Location analysis

Performing a Gate Location analysis allows you to see which areas of the part are recommended for placing gates.

Ensure the study mold type is set to **Part only**.

NOTE: If you have defined prohibited gate regions, the analysis will avoid placing gates in the areas defined.

1. Set the analysis sequence to Gate Location, **Home tab > Molding Process Setup panel > Analysis Sequence > Gate Location**.

   NOTE: If Gate Location is not available in the default list, then click **More...** and then select **Gate Location** from the list.

2. Click **Home tab > Molding Process Setup panel > Process Settings**.
3. Select a gate locator algorithm and then click **OK**.
   - **Advanced Gate Locator** recommends up to 10 gate locations for your study, based on minimized pressure.

You can specify the number to gates to be analysed here. You are not required to specify Material properties or Process Settings conditions.

- **Gate Region Locator** recommends a gate location for your study, based on balanced flow.

  You can specify the Material properties or Process Settings conditions if you wish. You may either accept the default settings, or change the default settings to suit your analysis. If an injection location exists, this algorithm will determine the next best gate location.

NOTE: If there is an existing injection location, then you can only use the Gate Region Locator algorithm.

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4 Double-click **Start Analysis!** from the **Study Tasks** pane, or **Home tab > Analysis panel > Start Analysis**.

After the analysis has finished, the **Summary** pane appears. Each area on the model is rated on its suitability for an injection location.

NOTE: To abort the **Gate Location** analysis, click (**Abort Job**) located at the bottom of the **Job Manager** dialog box **Home tab > Analysis panel > Job Manager**.

The recommended injection locations are not displayed and applied to the model by default. To display and accept the injection locations, you need to apply the results.

Gate Location analysis

Use this dialog to specify settings for a Gate Location analysis.

Process Settings Wizard dialog—Gate Location Settings

This page of the **Process Settings Wizard**, which can be accessed by clicking (**Home tab > Molding Process Setup panel > Process Settings**), is used to specify the gate location algorithm and related process settings, used by the Gate Location analysis.

NOTE: Some of the items listed below may not be available on the current dialog. This is dependent on the analysis technology, molding process and analysis sequence selected.

Injection molding machine	Select and edit an injection molding machine to simulate your molding machine during the analysis. You can

	configure the injection unit, hydraulic unit, and clamping unit.
Mold surface temperature	The temperature of the mold at the plastic-metal interface, where the plastic touches the mold.
Melt temperature	The temperature of the molten plastic, or melt, as it starts to flow into the cavity.
Gate locator algorithm	You can select the algorithm that your Gate location analysis uses to find the best gate locations.
Advanced options...	Displays the advanced options for the analysis.

Gate Region Locator algorithm 2

The Gate Region Locator algorithm determines and recommends suitable injection locations based on criteria such as the part geometry, flow resistance, thickness, and molding feasibility. The Gate Region Locator algorithm produces the Gate Location Analysis result.

If there is no existing injection location, the algorithm considers all the criterion to recommend an optimal position for an injection location. If there is an existing injection location, then the algorithm looks for the next best injection location that will achieve balanced filling so that areas filled from each gate fill at the same time.

The locations that rate highest are identified by the color blue for Best locations, and the unsuitable locations are identified by the color red for Worst locations.

Processability	The algorithm determines whether it is possible to produce a part if the part is gated at this location. This is the major component in the Gate Region Locator algorithm. If the part cannot be produced from an investigated location, the location appears in red; otherwise, all other components are factored into the result.
Minimum Pressure	Lower injection pressure usually produces lower shear rate and shear stress levels, or lower clamp force requirements.
Geometric Resistance	Where would gating not cause overpacking? The resistance in the X and Y directions is normalized. This is why disk shaped parts tend to produce a square pattern. For multiple gated parts, this calculation measures the resistance through each node. If two gates fill with equal flow resistance, then they fill with equal pressure producing no overpacking. If the resistance is different then one gate fills first resulting in an overpacking situation whilst the other gate continues to fill.
Thickness	The algorithm determines whether it is possible to pack the part effectively when gating at this location.

IMPORTANT: Although a Gate Location analysis using the Gate Region Locator algorithm will find the most suitable injection location, do not base part design solely on the Gate location results: always run a full analysis.

Advanced Gate Locator algorithm

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The Advanced Gate Locator algorithm identifies optimal injection locations based on minimizing the flow resistance.

This algorithm produces the Flow resistance indicator result and, optionally, the Gating suitability result. The Flow resistance indicator result shows the resistance at the flow front from the gates. The Gating suitability result rates each place on the model for its suitability as an injection location.

When using this algorithm, you can specify multiple gates with one analysis. This algorithm requires the model to have no existing injection locations.

NOTE:

- The Gating suitability result is produced only if the **Number of gates** is set to one (1); otherwise, only the Flow resistance indicator result is produced.
- You can also define prohibited gate nodes to specify areas on the part where you do not want to place injection locations.

Advanced Gate Locator algorithm

Use this dialog to specify settings for a Gate Location analysis using the Advanced Gate Locator algorithm.

Gate Location Advanced Options dialog

This page of the **Process Settings Wizard**, which can be accessed by clicking  (**Home tab > Molding Process Setup panel > Process Settings**), is used to specify the gate location analysis related advanced options for the analysis sequence.

To access this dialog, ensure that you have selected the analysis sequence **Gate Location**, click  (**Home tab > Molding Process Setup panel > Process Settings**), then click **Advanced options**.

Minimum thickness ratio	Use the Minimum thickness ratio to automatically exclude extremely thin regions from being considered as positions for injection locations. This option is used by the Advanced Gate

	Locator algorithm when running a Gate Location analysis.
Maximum design injection pressure	Specifies the maximum injection pressure to be used in the gate location analysis. The gate location algorithm will take this limit into consideration when searching for feasible gate locations.
Maximum design clamp force	Specifies the maximum clamp force to be used in the gate location analysis. The gate location algorithm will take this limit into consideration when searching for feasible gate locations.

Prohibited Gate Nodes 4

Prohibited gate nodes are used to block the Gate Location analysis algorithm from automatically setting injection locations at those locations.

If there are no prohibited gate nodes on the model, then the Gate Location analysis rates the gating suitability throughout the part, and creates a copy of your study to place one gate in the best location found during the analysis.

Prohibited Gate Nodes

Prohibited Gate Nodes are used to block the Gate Location analysis, using the Advanced Gate Locator algorithm automatically setting injection locations at those locations.

Setting prohibited gate nodes

Ensure you have activated the layer containing the nodes you want to prohibit.

Before running a Gate Location analysis using the Advanced Gate Locator algorithm, you should set a constraint on the nodes where you do not want injection locations. This may be based on part or mold geometry, or where a defect caused by an injection location must be avoided.

1. Click **Boundary Conditions tab > Injection locations panel > Prohibited Gate Nodes**.
   The **Prohibited Gate Nodes** dialog is displayed.
2. Select the nodes you want to prohibit from being injection locations.
   You can change the Selection option Filter to be Any item, Nearest Node (selects one node), or Node.
   In the Input Parameters area the **Select** list displays the node number(s)
3. Click **Apply** to prohibit the selected nodes.
   The model display indicates prohibited nodes by colouring them red.

Prohibited gate nodes will not allow an injection location to be placed in that position when a Gate Location is run using the Advanced Gate Locator algorithm. Repeat the steps above to apply the constraint to more nodes if necessary.

Prohibited Gate Nodes

Access this dialog by selecting  (**Boundary Conditions tab > Injection Locations panel > Prohibited Gate Nodes**).

Prohibited Gate Nodes dialog

The Prohibited Gate Nodes dialog is used to set constraints on nodes, blocking a Gate Location analysis from automatically creating injection locations at those positions when using the Gate Locator algorithm.

Access this dialog by selecting  (**Boundary Conditions tab > Injection Locations panel > Prohibited Gate Nodes**).

Before running a Gate Location analysis using the Advanced Gate Locator algorithm, you should set a constraint on the nodes where you do not want injection locations. This may be based on part or mold geometry, or where a defect caused by an injection location must be avoided.

Input Parameters	Use this to list the selected entities and to specify when to use the constraint.
Selection option	Use this option to help you click on the desired nodes.