



HyperMesh[®] - Fluent[®]

This document describes two approaches to generate 3D mesh files for Fluent, using either HMAScii or NASTRAN files. Use the NASTRAN format to import directly into FLUENT, and the HMAScii format if you want to use TGrid to export a mesh for FLUENT.

Requirements: if the mesh that you want to export contains pyramid elements you will need to have two new templates installed on your system (typically on directory `../Altair/hw6.0/templates/feoutput/`), the new templates will be installed on directories `FLUENT_Nastran` (template files `general` and `generallf`) and `FLUENT_Hmascii` (template file `hmascii`). These templates are available as `FLUENT_Nastran.tgz` and `FLUENT_Hmascii.tgz`, these files can be uncompressed with `"tar xzf "` on Unix systems and with the help of `Winzip` on Windows systems. NOTE: a small number of pyramid elements are automatically generated by the `CFD` option of `tetramesh`.

- **HyperMesh Collectors:** create collectors containing *only* the elements to be exported, namely 3D linear elements (tets, hexas, piramids, pentas) and the associated 2D elements for all the subsets of the boundary that require a boundary condition other than wall (e.g. inlet, outlet, symmetry, etc). It is convenient to place the 3D elements in one or more collectors, and each set of 2D BC elements in collectors with the appropriate name (e.g. inletA, inletB, outlet, etc). The best approach to create BC collectors is to use the `"^faces"` collector, so that both 3D and 2D elements refer to the same node numbers, otherwise there will be problems when reading the mesh in Fluent.
- **Exporting NASTRAN files:**
 - If you have many collectors in your HM file, only *display* the collectors associated with the mesh (e.g. 3D and 2D BC elements) and export a NASTRAN (`.nas`) file using the `FLUENT_Nastran` template. Note: this template is a modified version of the regular `Nastran` template to support pyramid elements. If the mesh that you are exporting does not contain pyramids, then you can use the default `Nastran` template if you wish.
 - In the export panel select any of the NASTRAN templates, and make sure that `"displayed"` is selected, so that only the displayed collectors will be saved to the `.nas` file.
 - Launch Fluent, select the appropriate executable (3d or 3ddp), and import the mesh file using `File=>Import=>NASTRAN`
 - NOTE: Fluent can also import other formats, such as ANSYS and Ideas Universal files, but identifying the subsets of the boundary where BCs should be applied may be more difficult.
- **Exporting HMAScii files:**



- If you have many collectors in your HM file, only *display* the collectors associated with the mesh (e.g. 3D and 2D BC elements) and export an *HMAScii* file (.hmascii) using the *FLUENT_Hmascii* template. Note: this template is a modified version of the regular *HMAScii* template to support pyramid elements. If the mesh that you are exporting does not contain pyramids, then you can use the default *HMAScii* template if you wish.
- In the export panel select any of the *HMAScii* templates, and make sure that "*displayed*" is selected, so that only the displayed collectors will be saved to the *HMAScii* file.
- Start *TGrid* (mesh generator that comes with Fluent), and select *File=>Import=>Hypermesh Ascii=>Volume*, a file selector comes up, change *Files of Type* to *All Files* and select the saved *hmascii* file. Once the file is loaded, save a mesh file (*.msh) using *File=>Write=>Mesh*.
- Launch Fluent, select the appropriate executable (3d or 3ddp), and read the mesh file using *File=>Read=>Case* (the file selection dialog recognizes either .cas or .msh files).

Notes on mesh generation for FLUENT:

1. When generating 3-D elements dragging a 2-D mesh (e.g. using DRAG, SOLID MAP, etc), make sure that the 2-D elements' normals point in the drag direction. If the normals point in the opposite direction a mesh will be created, but when exported FLUENT will produce an error when reading elements' connectivities.
2. In very rare occasions it might happen that after importing a NASTRAN file (.nas) containing boundary conditions zones (2-D elements), the boundary conditions zones have not been imported by FLUENT. This could happen when due to the setting in HM the exported NASTRAN file contains CTRIAR cards instead of CTRIA3 cards. In such cases use any editor to perform a global substitution of the string CTRIAR with CTRIA3.