

Interface *LIMIT* – MSC Marc

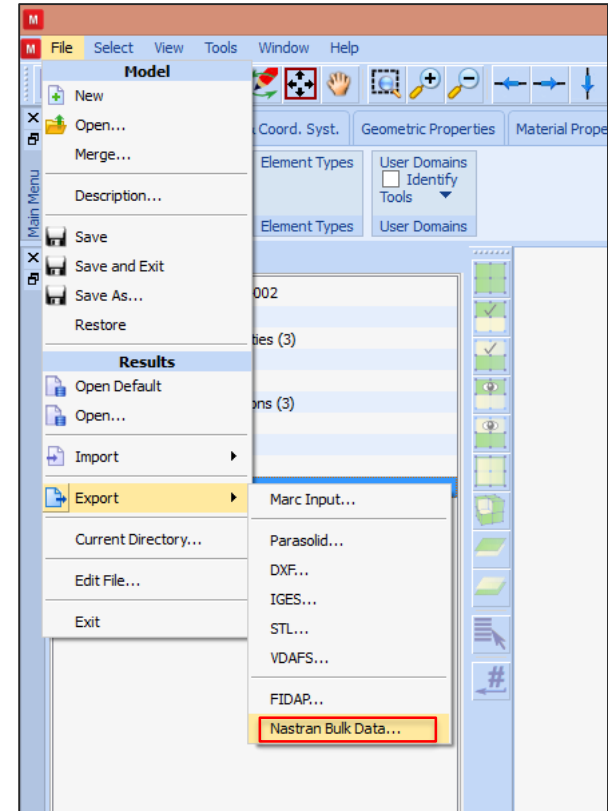
Supported Marc Versions in Release Package

- ✨ 14.2
- ✨ 14.2 works also for newer versions. 16.0 has been successfully tested!

If you have questions please contact LIMIT support (limit@cae-sim-sol.com)

Import into LIMIT-CAE via Nastran-BDF

- ✦ In the current release the Marc-dat format can't be imported directly! The Finite Element model must be imported into the LIMIT-GUI using the standard Nastran Bulk Data format (.bdf).
- ✦ Exporting the BDF from Mentat is shown on right side.
- ✦ Only the element topology and the nodes are needed from the Finite Element model. Thus no essential information is lost converting to the BDF-format.



Specification of the Interface

- ✨ **Maximum nodenumber respectively elementnumber :**
 - Windows 64 bit (x64): 20000000
- ✨ **Maximum number of nodes :**
 - Windows 64 bit (x64): 3000000
- ✨ **Maximum number of elements :**
 - Windows 64 bit (x64): 4000000
- ✨ **These LIMITS can be changed by the user. See document LIMIT_2017, section: *Redimensioning of Arrays***
- ✨ **Coordinate systems:**
 - Nodes must be defined in the global coordinate system
 - Result data must exist in the global system (Solids) respectively in the default element system (shells, membranes).

Supported Element Types:

✨ Solids:

- Element 7, 84, 117, 120 (lin. Hex-elements)
- Element 134, 157 (lin. Tet-elements)
- Element 136 (lin. Wedge-element)
- Element 21, 35, 57, 61 (quadr. Hex-elements)
- Element 127, 130 (quadr. Tet-elements)
- Element 202 (quadr. Wedge-element)

✨ Shells:

- Element 138 (3 nodes)
- Element 75, 139, 140 (4 nodes)
- Element 49 (6 nodes)
- Element 22, 72 (8 nodes)

✨ Membranes:

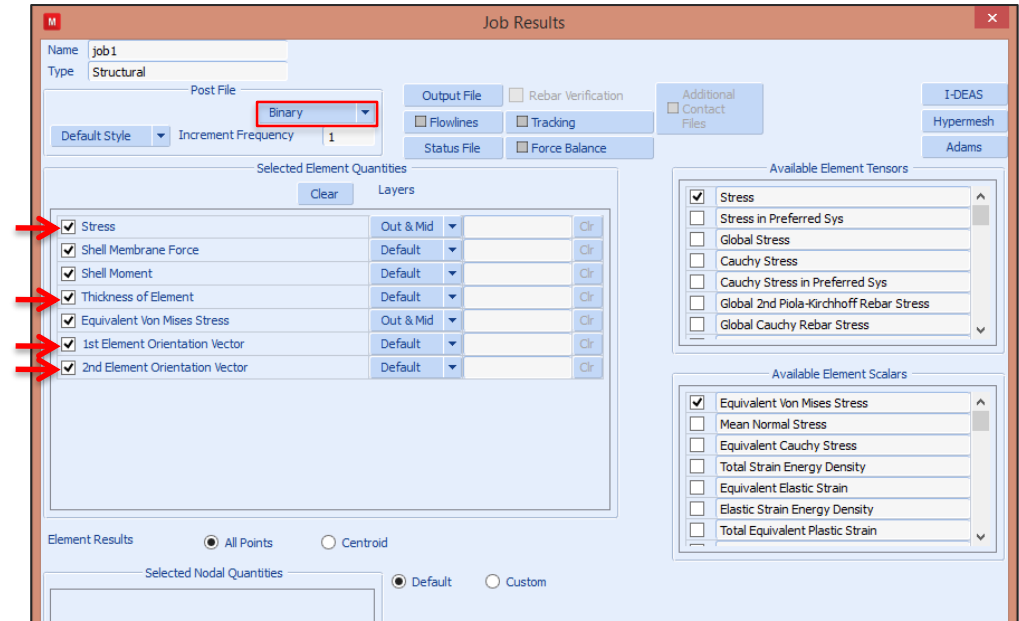
- Element 158 (3 nodes)
- Element 18 (4 nodes)
- Element 200 (6 nodes)
- Element 30 (8 nodes)

Solid Assessment:

- ✨ **Goal of a LIMIT FKM proof of strength :**
 - Assessment of surface stresses (2D-tensors)
 - Popular method and conservative
- ✨ **Free surfaces :**
 - Are necessary for the consideration of stress gradients normal to the surface
 - Are identified by the software LIMIT
 - Can be generated by covering the solids with 2D-elements (skin) in the preprocessor.
- ✨ **2D-skin elements (membranes) can be assessed as well**
 - But without supporting effect => conservative
 - This leads to considerable less data
- ✨ **Supporting effect is only possible with solids!**
 - Results of a 3D analysis with good element quality and fine meshing are more precise than results of 2D-skin elements.

Output Format:

- ✨ The interface uses the Marc t16 binary result file
- ✨ For shell and membrane elements the local element coordinates as well as the shell thickness must be written to the t16 file. Typical settings (for all element types) in Mentat/Job Results:



Setting Job Parameters within LIMIT:

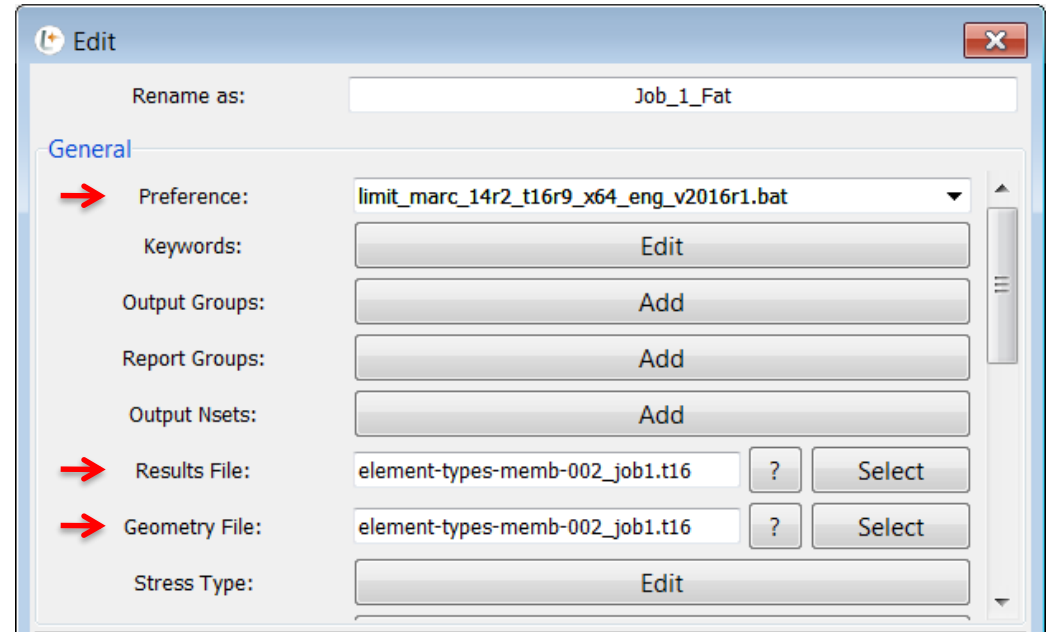
✦ LIMIT/Jobs/JobManager/Edit

✦ Preference:
limit_marc_14r2...

✦ Result: [FE-job].t16

✦ Geometry: [FE-job].t16

*Note: The FE model information
(=Geometry) is taken from the t16-file*



Addressing Loadcases via Step:

- ★ Last increment of step
 - Step => Stepnumber
 - Incr. => remains empty



The screenshot shows the LoadManager interface with three main sections: FE Results, Loads, and Spectra. A red arrow points to the first row of the FE Results table.

Name	Step	Incr.	File
LC1	1		Kastentraeger-postcodes_job_stru

Name	Load Group	FE Result	Factor/Channel	File
LOAD_LC1	Default	LC1	1.0	
LOAD_LC2	Default	LC1	0.0	

Name	Loads/Load Groups	Cycles	Mode	Coefficient	Distribution
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Addressing Loadcases via consecutive increment number:

- ★ **Last increment of step**
 - Step => set to 0 (zero)
 - Incr. => consecutive number throughout all steps



The screenshot shows the LoadManager interface with three main sections:

- FE Results:** A table with columns Name, Step, Incr., and File. The row for LC1 is highlighted, showing Step 0 and Incr. 3.
- Loads:** A table with columns Name, Load Group, FE Result, Factor/Channel, and File. It lists LOAD_LC1 and LOAD_LC2.
- Spectra:** A table with columns Name, Loads/Load Groups, Cycles, Mode, Coefficient, and Distribution. It is currently empty.

Last slide