Newton Frequently Asked Questions

What are the software requirements for Newton?

Newton supports Windows XP, Windows Vista, Windows 7, and Windows 10. We are currently determining compatibility with Windows 8. Both 32-bit and 64-bit operating systems are supported. We highly recommend running Newton on a Windows 7 or Windows 10, 64-bit platform.

Newton also requires:

- Microsoft.NET Framework 2.0 or newer
- Visual C++ 2008 SP1 Redistributable (provided on Newton installation DVD)
- DirectX 9.0c (http://www.microsoft.com/en-us/download/details.aspx?id=8109)
- HASP drivers for communicating with the USB key (provided on Newton installation DVD)

What are the hardware requirements for Newton?

Newton requires at least:

- CPU: A single-core processor
- RAM: 2 GB
- GPU: A video card that supports DirectX 9.0c and 1024x768 screen resolution
- HDD: 50 GB of HDD space (for simulation data)

For optimum simulation run times, we highly recommend:

- CPU: 6-Core Intel i7-4930K, or 8-Core Intel i7-5960X, or 8-Core Intel Xeon E5-2640 or better
- RAM: 8 GB of 2400 MHz DDR3 RAM or better
- GPU: NVIDIA GeForce GTX 650 video card or better
- HDD: 500+ GB of HDD space (for simulation data)

How many particles can Newton generate?

The Professional version of Newton can generate up to 1,000,000 clusters for a simulation. The Basic version is limited to 125,000 clusters.

Is Newton multi-threaded?

Yes! Newton is multi-threaded for up to 16-core processors. Both versions of Newton can use up to 16 cores, and Newton is not priced on a per-core basis.

Does Newton use Metric or Imperial units?

Newton currently only uses metric units.

What input geometry file formats does Newton support?

Newton supports the following CAD file types:

- STEP, STP (version AP203 and AP214)
- IGES, IGS (version 5.3)
- STL (binary and ASCII format)
- DXF (only supports surfaces drawn or converted to "**3DFaces**")

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Should I purchase Newton Basic or Newton Professional?

Newton Professional is recommended for most clients. The Professional version can generate more particles than the Basic version (1,000,000 clusters vs. 125,000 clusters). Additionally, the Professional version can auto-generate more complex geometry (multiple apron feeders, bucket elevators, etc.) and movement profiles and can record surface and particle wear. The Professional version also allows the USB license to be shared over a computer network, whereas with the Basic version the USB key must be plugged into the computer that will be running Newton.

However, the Basic version still provides excellent visualization of material flow through standard "one-inlet one-exit" transfer chutes, or other transfer points that do not utilize complex geometries. The Basic version can also utilize the same full multi-core processing as Newton Professional, so it will run just as fast. For a full list of the differences between Newton Basic and Newton Professional, please see the pricing section of our website.

How many Solver Licenses and UI Licenses are included?

Newton Basic includes one Solver license and one UI license. This means that Newton Basic can only be installed and operated on a single computer, and only one simulation can be running at a time. However, that same workstation could be performing pre- and post-processing on any number of other Newton files by opening more instances of Newton.

Newton Professional includes one Solver license and three UI licenses. This means that Newton can be running on up to three computers simultaneously. However, between all computers running Newton, only one simulation can be running at a time. The other workstations could be performing pre- and post-processing with Newton files.

Can the software operate over a network, or is it only for a standalone computer?

Newton Basic is a standalone license, so it can only be installed and run on a single computer using a USB dongle. Newton Professional also uses a USB dongle, and this dongle can be accessed by other computers on the same network through a TCP/IP connection.

What is the ratio of fine vs. coarse particles that can be used in simulations?

Particles are created by grouping individual spheres together into "clusters." Newton allows clusters to contain up to 2,000 spheres; we recommend limiting the max number of spheres in each cluster to approximately 300. The individual spheres in each cluster can have different radii as well.

This means that there are two ratios to discuss. Both ratios are measured within a single simulation. For example, in Newton Professional, a simulation can have up to 5 different generation locations using 5 different particle sets, so the ratios are determined by comparing all the different clusters in all the different particle sets.

1. The ratio of largest sphere in any cluster to the smallest sphere in any cluster:
    a. This ratio must be kept below 3.0 to achieve reasonable simulation times.
    b. It is recommended that this ratio is below 1.5 to achieve the fastest simulation times.
2. The ratio of the largest cluster to the smallest cluster:
    a. There is no restriction for cluster size; the sphere size ratio above should be small.

b. Typical cluster ratios range from 1-15, depending on the desired max lump size for a particle set.

How do the particle size and number of particles affect the calculation time for a simulation?

When performing DEM analyses, the size of the spheres that make up the clusters determine the required computation time in two ways. Consider a simulation which uses identical spheres that are 50mm in diameter. This simulation would require some length of computation time **X**. If the spheres are reduced in diameter by 50% (down to 25mm), then the number of spheres required to generate the same tonnage of material increases by a factor of 8. Therefore the required computation time would also increase by approximately the same factor of **8**.

But at the same time, when the sphere diameter decreases, the required time step for the simulation decreases as well (this relationship is approximately linear as well). So decreasing the sphere diameter from 50mm to 25mm will also double the number of time steps required to model the same length of time, so the required computation time will increase by an additional factor of **2**.

Therefore the overall time required for a simulation when the particle size is halved is approximately increased from **X** to **(8 * 2 * X) = 16X**. This demonstrates the problem when trying to model sub-millimeter sized material, because the required computation quickly reaches levels that even supercomputers cannot handle.

There are dozens of other factors that determine simulation time as well including the sphere size ratio, max number of spheres in a cluster, allowable percent overlap, and triangle motion, among other things.

What sort of training is required or available in order to use Newton most effectively?

The Newton software is quite simple to use, we have a full user's manual as well as over 10 hours of video tutorials on YouTube to help you get started with Newton. We can also provide on-site training or internet-based training for a fee.

What is the cost for Newton training?

Please send us an email at info@actek.com including:

- Whether you would like on-site training or internet training via a Web-Ex conference
- The number of people to attend the training
- The approximate time frame you would like for the training

For all other questions regarding Newton, please see our Newton website at www.demsoftware.net or send us an email at info@actek.com.

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