**Elemental—how it works**

By utilising pressure controls in Elemental’s custom designed vat during the printing process, Elemental’s laser system can cure a layer of resin accurately, quickly and quietly. The creation of an object’s first layer is done by curing the resin onto the surface of a removable build platform found in the centre of the vat. The pressure control system then allows the flow of material from a control chamber within the vat into the build chamber, increasing the level of the resin. The laser system then sets about curing the next layer of resin to further create the object. The process is repeated until the object is produced.

The vat’s control chambers act as reservoirs for material to flow from or flow to depending on what is needed during the print process. By controlling the pressure in the control chambers, Elemental can raise or lower the resin level precisely and without the need for mechanical interaction with either the build area or the resin.

**Elemental—revolutionary design provides for revolutionary functionality**

Elemental’s revolutionary functionality in resin based 3D printing gives it the advantage over other printers as it is capable of working with a wide range of production materials – typically photosensitive resins – from thin resins to those that are much more viscous. This revolutionary functionality is a result of there being no direct mechanical interaction with the production material. Elemental can also operate in an economical manner – by the use of a support material on which the printing resin floats. Certain thin resins are capable of being floated on denser material such as a saline solution. This means lower operating costs to produce 3D prints. In fact the first prints on Elemental were created this way.

The skull, spiral egg with an enclosed free floating sphere, shoe, hollow black horse and green horse prints contained in the attached dropbox link were all produced using saline as a support material.

Pressure control provides for extremely accurate control over layer heights. It also reduces the need to print support structures where there is overhang in a 3D model. The material surrounding the cured material holds the build material in place long enough for the laser to cure the resin above it. The free floating sphere contained within the spiral egg was created this way, without the need of support structures.

Supporting images and material can be obtained at

<https://www.dropbox.com/sh/17adzedg0vpwvo8/AACvb8eaSUt72298wK5Ikxoza>

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