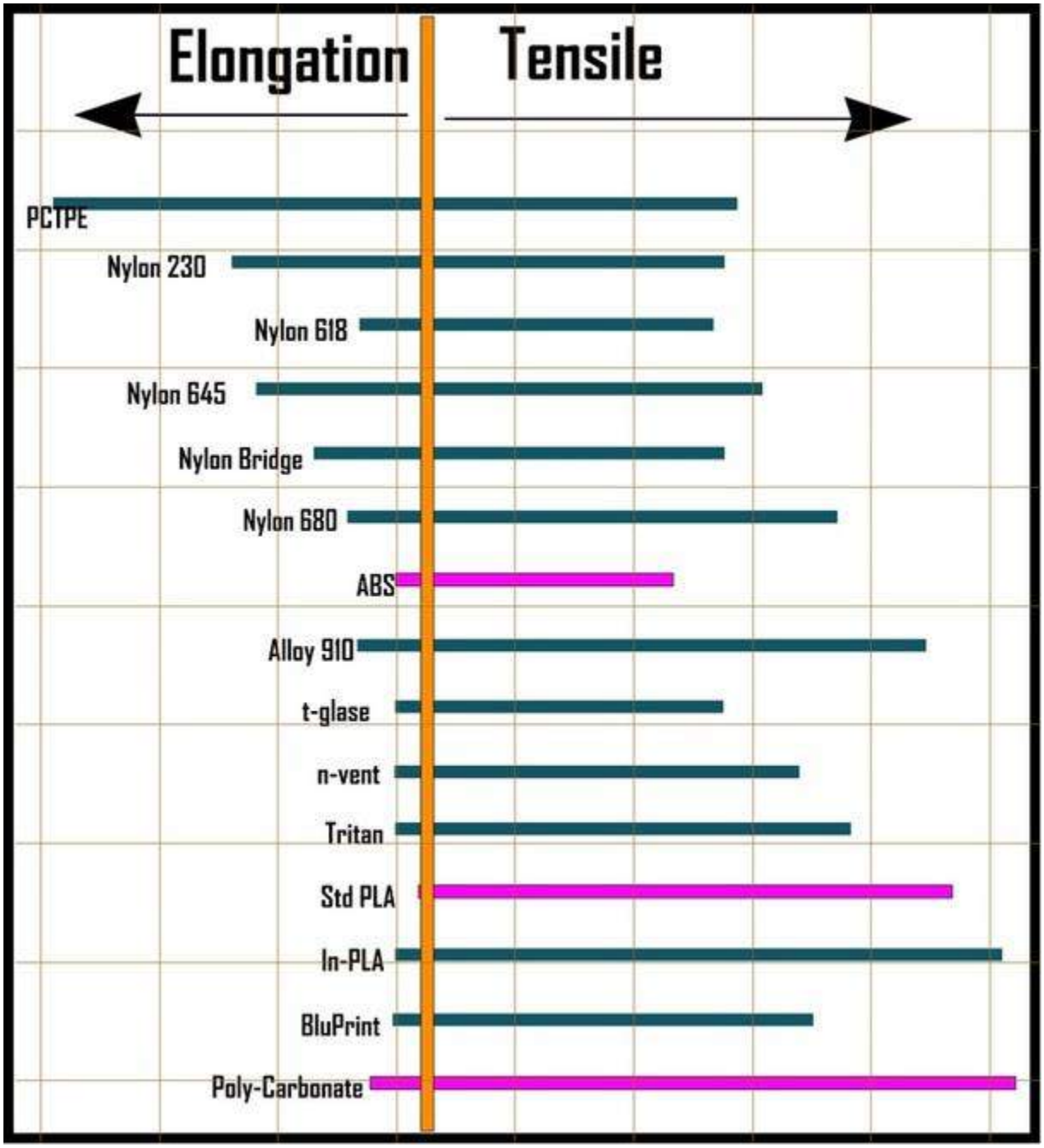
Choosing the right taulman material for your project



How do you choose the best material for your application?
The table above is the average of our measurements of actual 3D Printed test parts for the noted polymers. As any extreme of a polymer get's close to the **orange** center-line, we must pay special attention and or be more specific as to the desired intent of the end part. As a point of reference, a rubber-band would be on the left and have little Tensile, but a considerable elongation/stretch/bend. On the other end, we would have window glass. While it's close to a tensile of 9,000PSI, it has zero elongation, i.e. it will crack easily. ABS is often used as it has a good general combination of reasonable tensile, but with enough elongation so as not to disintegrate when put in a mild strain. Another common 3D Printing material is

standard PLA. As noted above, we are giving up elongation for tensile. The end part "feels" hard, but it's also somewhat brittle.

From the list of materials we can denote some potential uses.

PCTPE = PCTPE is a flexible nylon developed by taulman3D specifically for 3D Printing. It has an additive of TPE elastomer to give it additional flexibility.
Potential uses:
Large inaccessible gears.
Wearable items
Cogging systems and ratchet systems
Vibration damping
Motor mounting

Nylon 230 = Nylon 230 is a low temperature nylon developed by taulman3D specifically for 3D Printing on systems that have cold print beds and lower temp capabilities.
Potential uses:
Gears - light load
Fan blades
Housings
Phone covers
Protective covers/enclosures.
Cosmetics containers

Nylon 618 = Nylon 618 was the first nylon developed by taulman3D specifically for 3D Printing.
Potential uses:
Gears - Med/Heavy load
Propeller blades
Flanges
Spacers/Interconnects

Nylon 645 = Nylon 645 is an Industrial nylon developed by taulman3D specifically for 3D Printing with non-destructive evaluation capability.
Potential uses:
Gears - Med/Heavy load
Propeller blades
General Industrial needs
Large Flanges, Housings, positioning
Wide Chemical resistance of petrol's
Sand blasting
Masking
Spacers/Interconnect

Nylon 645 REV"B" called **Bridge Nylon** = Bridge was developed as a request from the 3D Printing community at large. Potential uses:
Gears - Med Load
Supports for spacers, flanges and general utility
Med chemical resistance, uses exclude any chlorine's
Household replacement parts.

Nylon 680 = Nylon 680 was developed at taulman3D to meet certain FDA criteria for clinical and other applications.
Potential uses:
There are many uses in the clinical, food and medical industries. As any material needs to be fully tested for each use, it will be several months before testing is complete and certified uses are noted.

Alloy 910 = Alloy 910 is a significant development by taulman3D and both our chemical house and post processing company. The goal was to provide a super material with very high tensile, yet sufficient elongation to maintain a high degree of durability. Alloy 910, when 3D Printed comes in at 8,100 PSI Tensile and close to 12,000PSI when injection molded.
Potential uses:
Any industrial parts that are currently being made of other high tensile polymers.
Large motor mounting
Industrial vibration isolators and damping parts
High Pressure Sand Blasting resistant
Sand Blast Masking
Electroplating supports and hangers
Chemical dip and tank supports.
High end gears and cams
Chemical resistant equipment covers.

Next in-line are the Co-Polyesters, t-glase, n-vent and Tritan
A major advantage to all co-polyesters is their low shrinkage specifications. t-glase, n-vent and Tritan are some of the easiest-to-print polymers as they adhere well to either clean glass heated to 5C below their Tg or glass with a coat of PVA heated to just 45C.

t-glase (Tee-Glass) = t-glase was developed specifically by taulman3D to provide three major features to 3D Printing. Low shrinkage, Higher strength than ABS and esthetics beyond ABS and PLA due to it's enhanced optical properties.
Potential uses:
As a replacement for any parts currently printed using ABS
t-glase is 100% bonding layer to layer and parts will never "split" apart or "delaminate" even in very large prints.
Glass like qualities
Light Pipe capable
Glass clear when used with clear epoxies.
Crystal like reflections of the surface.
Red, Green, Blue and Black are translucent.
Now in Opaque White for a white that has a super gloss surface.
"Non-shattering" parts upon over-stress
Architectural Components.
Jewelry
Gaming pc's
Light catching designs of any type.

n-vent = taulman3D was selected by Eastman Chemical Co. as the manufacture and distributor of their "Amphora" line of 3D Printing materials. Amphora (AM1800) has been available in Europe for some time and now comes to the US via n-vent from

taulman3D. We are very pleased to have a well known and tested material available as part of our line of high end materials. n-vent comes in Clear, Red, Green, Lt Blue, Yellow, Black and White.
Potential uses:
As a replacement for any parts currently printed in ABS.
n-vent is 100% bonding layer to layer and parts will never "split" apart or "delaminate" even in very large prints.
FDA compliant
"Non-shattering" upon overstress
Architectural prints and components
Precision design form/fit/function

Tritan = Coming soon!

In-PLA = The new Industrial PLA known as In-PLA from taulman3D is a true advancement in PLA 3D Printing material. With a new formulation, the color and clarity of natural In-PLA is a clear material rather than the yellowish colors users have been printing with for years. A major advantage of PLA is it's low shrinkage specification. This allows PLA to be used where mechanical Form/Fit is a requirement in initial part design. A major disadvantage has been the Brittle characteristic of std PLA. While parts have good shape, they are prone to shatter when dropped, similar to glass. This is due to an extremely small elongation. In-PLA provides the following advancements:
1. Increased tensile to 10,000PSI
2. Increased Elongation
3. Increased Heat Deflection Temp
4. Correct color properties

As noted above, In-PLA has a higher Elongation and as such can be used in more and more applications where both mechanical stress and thermal stress are in play.
Potential uses:
As a replacement for any parts currently printed using standard PLA.
Architectural Prints
Collectables
Figurines
Cases/Phone cases
Desk utility
Electronic enclosures
Wearable fashion

BluPrint - BluPrint is a specialty polymer developed to specifically handle High Heat Deflection requirements. With a Tg of 110C and a print temp of only 265C, BluPrint is an easy to print polymer that comes as a clear material similar to t-glase.
Potential uses:
Lamp covers
Antique car/item lenes or ligh covers, i.e. tail light, turn sig, etc..
Any use in high heat environment
Thermal spacers
Thermal Clamps
Any part that will need to be placed in boiling water for preparation.

BluPrint can sustain boiling water for 5 continuous hours. Clarity will be lost after 2 hours to a dull haze. Structure will be maintained.

Additional notes:

1. Only Nylons should be used for gears, etc where a slippery surface is desired. All other materials will scratch against each other creating a plastic dust. And eventual failure.

2. The scale above is for 100% infill of parts. Reducing infill % and number of perimeters will have a tendency to reduce Tensile, yet increase elongation.

3. Nylons do not crack/shatter, but will eventually compress and fold during severe overstress. t-glase, n-vent and Tritan will not shatter, but can break along and against layers. Alloy 910 can either fold/compress or crack depending on part design. An excellent feature of Alloy is that Support material easily breaks away, yet durability is retained! Do not use BluPrint with a part that must be shatter-proof.

4. Nylons can be threaded using std TAPs and drilled directly without creating cracks. t-glase, n-vent, Tritan can also be tapped. When drilling, use a pilot hole close to the desired DIM. PLA's can be damaged with both a TAP and Drilling with anything larger than about 2mm DIA.

5. Only use Nylon 645/Bridge or Alloy 910 for Sandblasting masking or similar applications. Most other materials will be destroyed in seconds.

6. For parts to be used outdoors, use a UV coating.

7. For High temperature Nylon, use Alloy 910 or Nylon 680. For High temperature co-polyester, use Tritan. For High temperature Clear, use BluPrint. In-PLA will have a higher Tg and HDT than other PLAs.