

Tough 2000

March 2020

Take a look at the notes section for more information

	TOUGH v5	TOUGH 2000
How it feels	Strong and Stiff	Stronger and Stiffer → reduced deformation over time
Toughness	Tough	Tougher
Failure mode	When broken, parts shatter (brittle failures)	When broken, parts snap
How it looks	Bright color	Neutral (Engineering) color

Reference for definition	TOUGH v5	TOUGH 2000	ABS
UTS (MPa)	44	46	39
Elongation (%)	23	48	24
Tensile Modulus (GPa)	2.1	2.2	2.3
Flexural Strength (MPa)	57	65	74
Flexural Modulus (GPa)	1.6	1.9	2.4
Notched Impact Strength (J/m)	48	40	219
HDT @0.45 MPa	47	63	139
@1.8 MPa	43	53	128

	DURABLE	TOUGH 1500	TOUGH 2000
Material behaves most like..	Low density/High density polyethylene (LD/HDPE)	Polypropylene (PP)	ABS
How it feels	Pliable and soft	Pliable and stiff	Sturdy and stiff
Why to use	Difficult to break, bends easily, low coefficient friction	Bends and quickly springs back	Handles highest strength, and holds its shape well
Why not to use	Deforms easily under stress, and will quickly lose shape	Will lose shape over time, not very strong	Can break under sudden impact, i.e. when dropped
Application	Squeezable, pliable, low friction/non-degrading surfaces	Living-hinges, resilient jigs and fixtures	Rugged, snapfit, and fixtures

Reference for definition	DURABLE	TOUGH 1500	TOUGH 2000
UTS (MPa)	28	33	46
Elongation (%)	55	51	48
Tensile Modulus (GPa)	1	1.7	2.2
Flexural Strength (MPa)	25	39	65
Flexural Modulus (GPa)	0.6	1.4	1.9
Notched Impact Strength (J/m)	114	67	40
HDT @0.45 MPa	41	45	63
@1.8 MPa	--	52	53

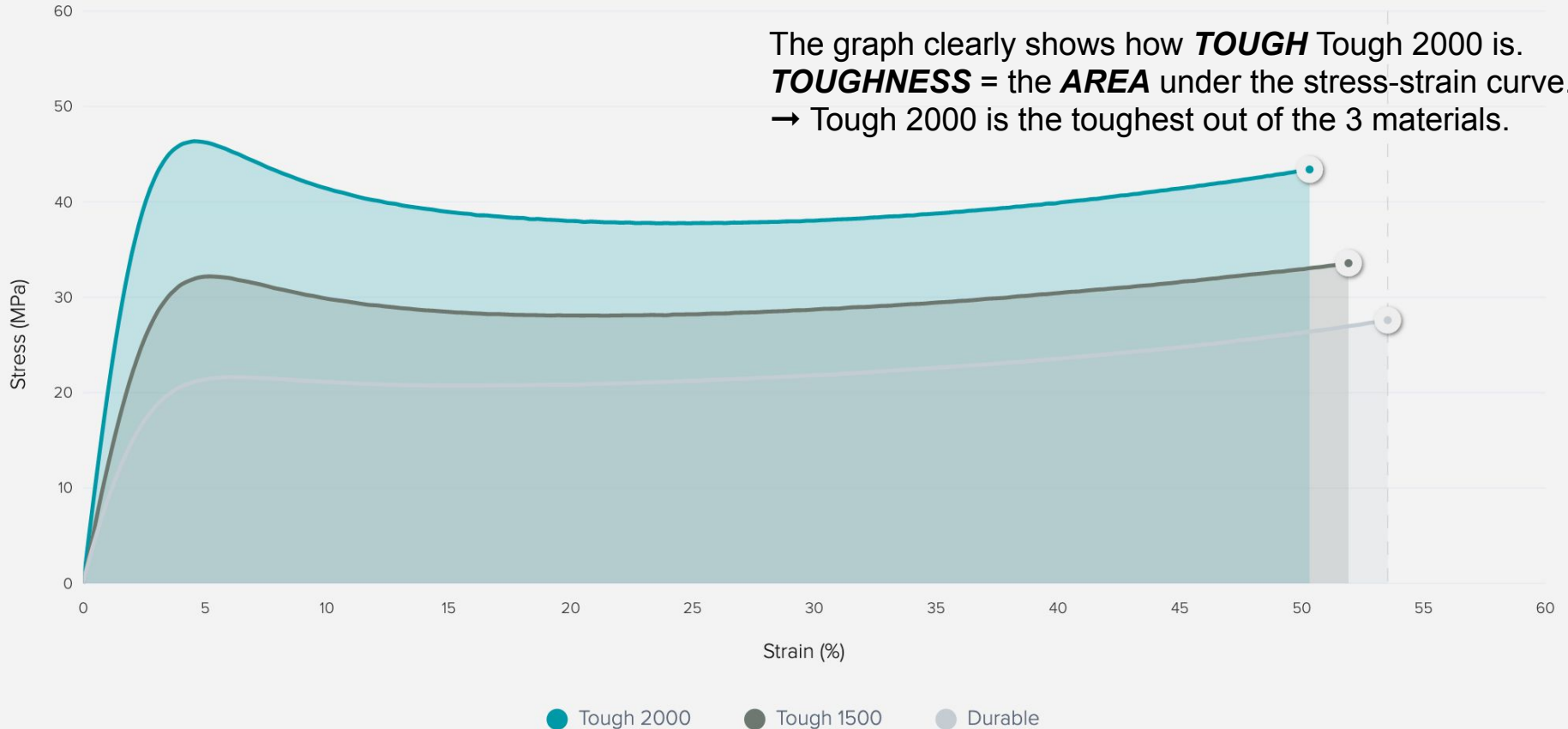


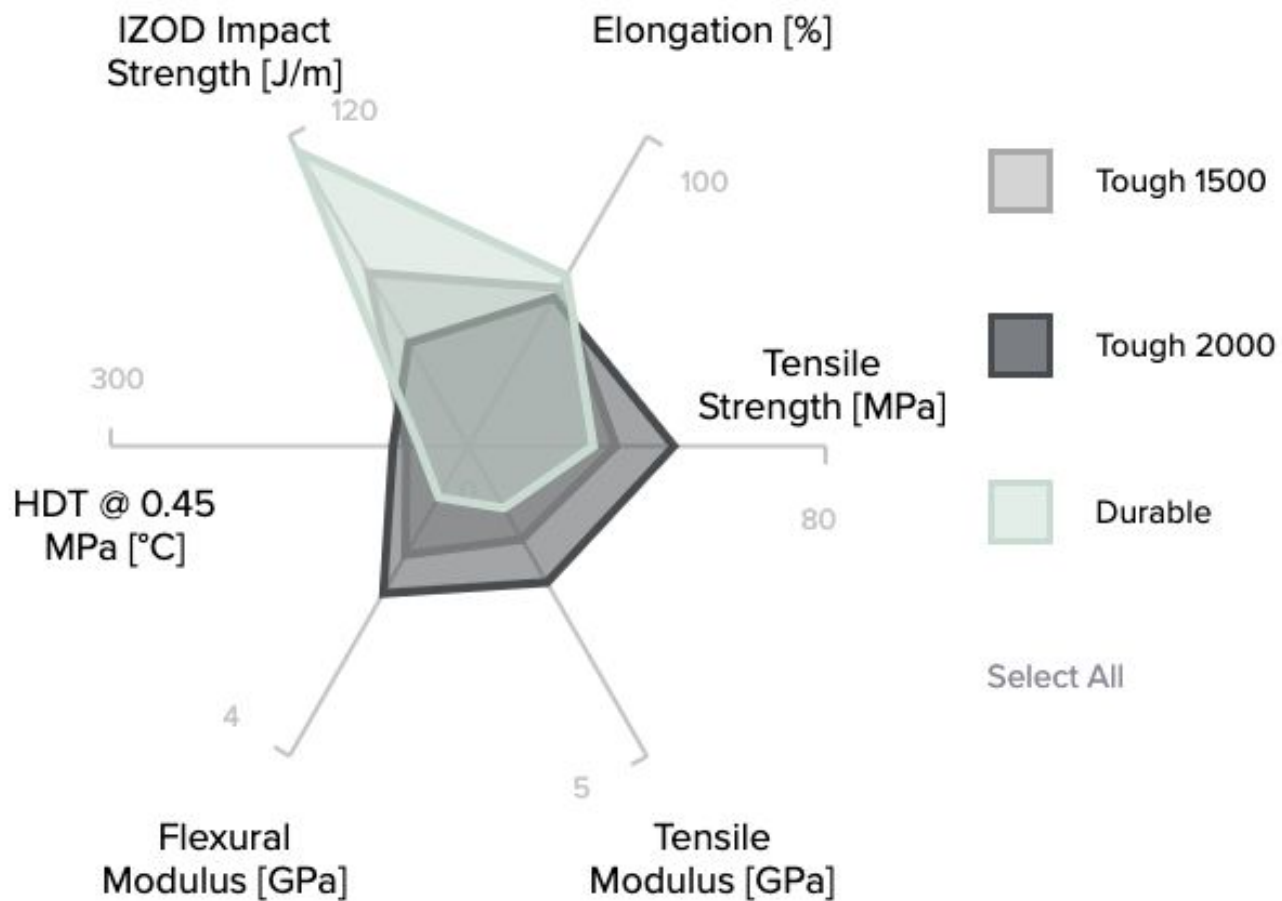
TOUGH 2000

TOUGH 1500

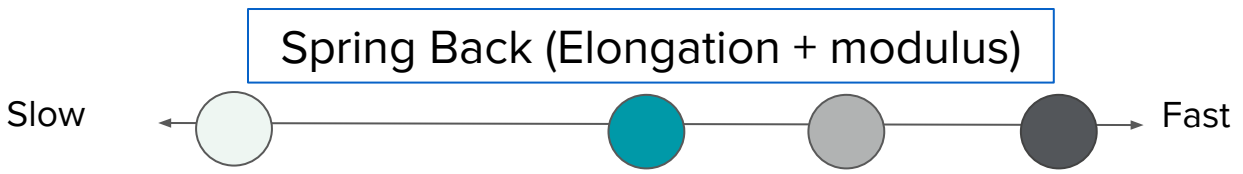
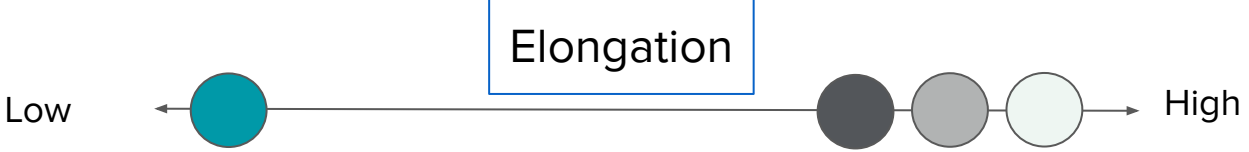
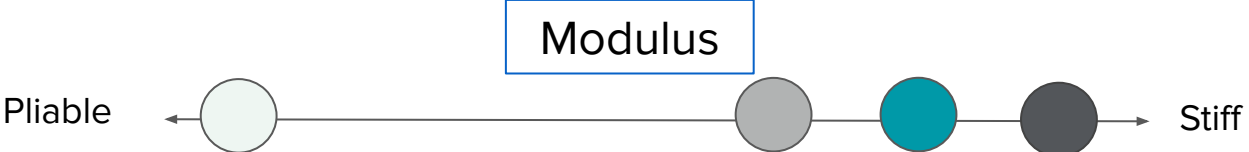
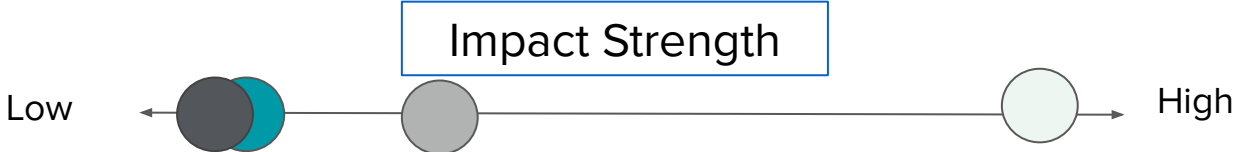
DURABLE

Stress-Strain Curves of Tough and Durable Resins





In Comparison



-  Tough v5
-  Tough 2000
-  Tough 1500
-  Durable