



**KEY ADVANTAGES**

- High abrasion resistance and anti-friction properties to eliminate “stick-slip”
- Efficiency > 90% even after > 1 mil cycles with 25lb load
- Tight OD tolerances and ultra-long cont. length
- Available in natural color or with different fillers
- Custom jacketing available in PVC, PA, PP or PBT, lower weight compared to steel and transmitting less noise than steel flat wraps
- Compliant with different specifications and requirements from automotive manufacturers

Optinova produces tubing in a variety of dimensions, material combinations, and standard and custom sizes. Fillers and property-enhancing compounds vary depending on the application. Testing is carried out regularly to uphold high quality standards.

**APPLICATIONS**

- Moderate duty cables used in accelerator, clutch, and automatic transmission actuator assemblies.
- Loads up to 25 lbs and difficult routings
- High service temperatures and long life-cycle requirements
- Aircraft, heavy-duty off-road equipment and industrial controls

**DIMENSION EXAMPLES**

ID	ID Tolerance	OD	OD Tolerance
1,82 mm	+/-0,06 mm	2,70 mm	+/-0,08 mm
2,10 mm	+/-0,08 mm	2,80 mm	+/-0,08 mm
2,46 mm	+/-0,08 mm	3,12 mm	+/-0,08 mm
2,50 mm	+/-0,08 mm	3,05 mm	+/-0,08 mm
2,80 mm	+/-0,08 mm	3,60 mm	+/-0,08 mm
3,20 mm	+/-0,08 mm	3,80 mm	+/-0,08 mm
3,68 mm	+/-0,08 mm	4,39 mm	+/-0,08 mm

Contact our sales offices or visit our website for more information about sample and specifications!

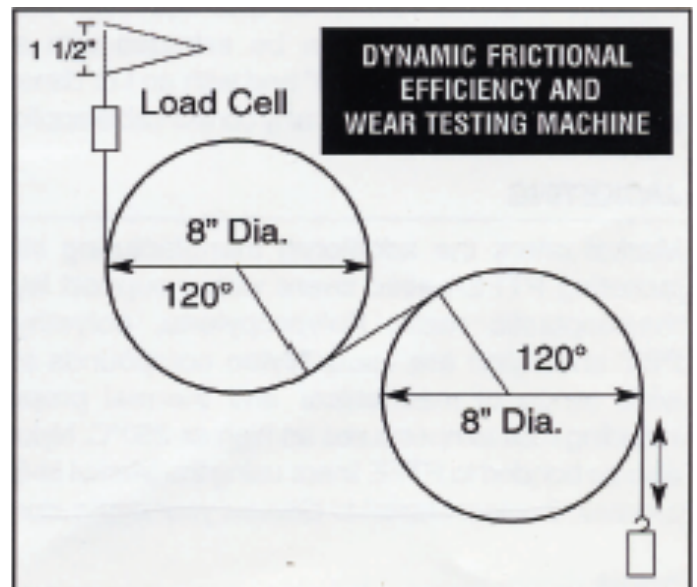
## TUBING MATERIAL PROPERTIES

Property	Unit	Test method	OPTI750	OPTI650	OPTI500
Color				Yellow	Brown
Base material			PTFE	PTFE	PTFE
Filler			Proprietary Organic	High Temperature Polymer	PPS
Particle size of filler				90% at < 20 micron*	90% at < 30 micron*
Cont. use temp.	°C		200	200	200
Melt point	°C	DSC 20°C/min	PTFE at 327	PTFE at 327 Filler degrades at > 450	PTFE at 327 Filler degrades at > 277
Tensile strength	MPa (psi)	ASTM D 638	31-44 (4500-6500)	38.8 (5623)	38.3 (5547)
Elongation	%	ASTM D 638	200-400	313	293
Specific gravity, Method A-1		ASTM D792	2.10	2.11	2.06
Durometer "D", 15 seconds		ASTM D 676		55	55
Dimensional capability (ID & OD)		AIAG MSA	Cp 1.786, Cpk 1.675 ID 4.30, OD 3.91	Cp 2.722, Cpk 2.482	Cp 2.705, Cpk 2.0.6
Chemical resistance		Immersion, week 1 at 25°C	Excellent	No swelling or loss of mechanical properties	

\* Smaller particle size enhances dispersion in the compound for greater homogeneity to less process variation. Chemicals tested are Hydraulic Fluid, Hydrocarbon Solvents, Brake Fluid, Lubricants, Alkaline and Acidic Aqueous solutions.

Test	OPTI750	OPTI650	OPTI500
Test Cycles	1 mil	1 mil	1 mil
Load Lbs.	6-25 lbs	6-18 lbs, 26.7-80N	6-18 lbs, 26.7-80N
Initial Efficiency	90%	88%	86%
Final Efficiency	95%	92%	91%
Loss Factor K, In <sup>3</sup> -min/lbs-ft-hr (tested dry)	7,5	7.5	7.5

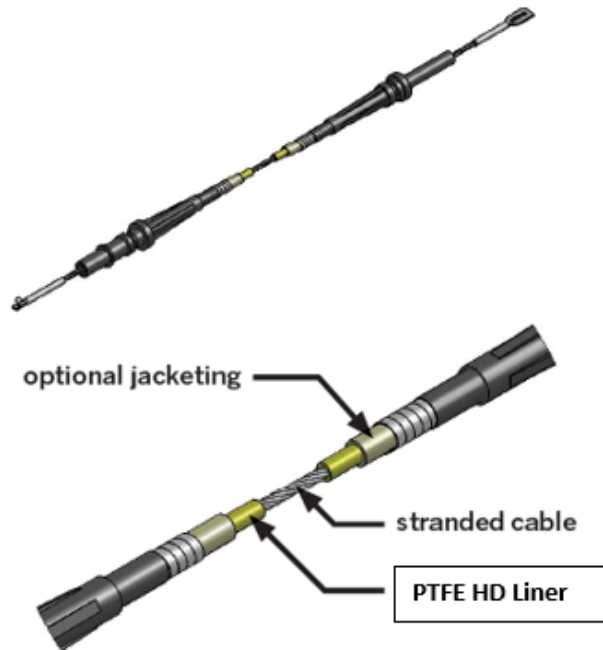
**Note:** Tested with E-155 Silicone lubricant (Wacker Silicone, Adrian, MT). Machine performs a reciprocating motion. A spring applies 18 Lbs./80N at full extension and 6 Lbs./26.7N in the compression portion of the test cycle. A 25 Lbs./111N weight, shown in the illustration, is used for the heavy-duty test. Typical performance data are not intended for use as design data.



## JACKET MATERIAL PROPERTIES

Property	Unit	Nylon 6	Nylon 66	Nylon 12	Acetal	PP	PBT
Service temperature	°C	120	135	105	112	115	120
Specific gravity		1.13	1.14	1.07	1.41	0.93	1.31
Tensile strength	MPa (psi)	48 (7 000)	84.4 (12 300)	55 (8 000)	52 (7 429)	37.7 (5 500)	54.9 (8 000)
Elongation at break*	%	225	90	300	45	200	250
Flexural modulus	MPa (psi)	837 (122 000)	2827 (410 000)	565 (82 000)	2 500 (357 150)	1 481 (216 000)	2 263 (330 000)
Water absorption*	%	2.2	2.1	0.7	0.2	< 0.1	0.2
Flame resistance		UL94HB	UL94V2	UL94HB	UL94HB	UL94V2	UL94HB

\* tested at 23°C with 50% relative humidity



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