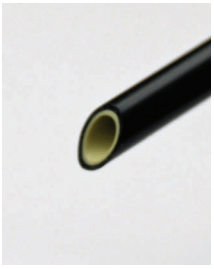
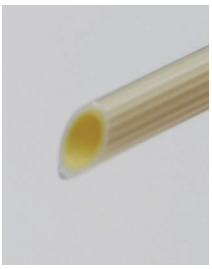
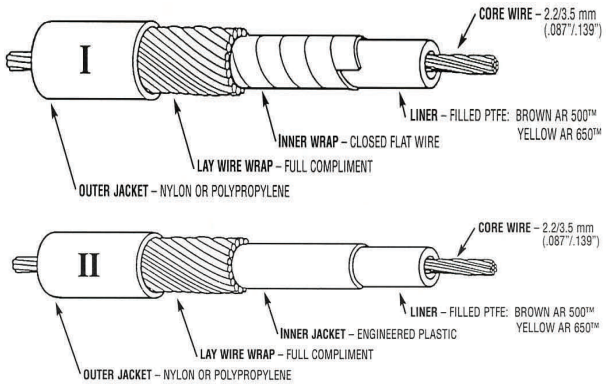
AR-650™ JACKETED CONTROL CABLE LINER

Markel AR-650™ Heavy Duty Abrasion Resistant Anti-friction Control Cable Liner is PTFE with a proprietary high temperature polymer filler material designed to enhance cycle life under heavy loads while maintaining the basic anti-slip stick characteristic of PTFE. It is the industry premier liner in terms of efficiency, load bearing capability and life cycle expectation. AR-650™ Liner (yellow) is patented and has been designed for use with or without a silicone lubricant. It replaces the original industry standard AR-500™ Liner (brown).







Plastic liner jacket replaces steel flat wrap to provide the following benefits.

AR-650™ Liner is often specified in a relatively thin wall plus a plastic jacket to replace conventional steel flat wrap with the same dimensions.

APPLICATIONS

Markel Jacketed AR-650™ liner is ideally suited for heavy duty cables used in accelerator, clutch, manual and automatic transmission actuator assemblies. Difficult routings and ever increasing operating temperatures in engine compartments require the use of high performance cable liners to meet demand for increasing life cycle performance. Non-automotive applications include aircraft, heavy duty off-road equipment and industrial controls.

SPECIFICATIONS

Markel AR-650™ Liner meets the performance requirements of the following industry specifications and replaces the original Markel AR-500™ Liner.

- Ford ESA-M4D465-A2
- General Motors TF 004 AA, GMW-15702-020251 PTFE
- Chrysler PF-8244, 8695, 8762, 8992, 9168 and 9530

PERFORMANCE DATA

Please see Markel AR-650™ Liner Data Sheet.

KEY BENEFITS

- Plastic jacket transmits less noise compared to steel flat wrap
- For Exceptional Noise Reduction use Markel QUIET LINER™ with TPE jacket.
- Weight reduction compared to steel
- Eliminates one manufacturing step and capital equipment expense by cable manufacturer
- Wide range of thermal and mechanical properties offered by various plastic jackets — see table on page 2.
- Jacket can be stabilized to liner with Markel TEFLOCK™ Splined Liner
- Anti-friction liner eliminates “stick-slip”
- 90% average efficiency through 1,000,000 cycles with 25 lb. load

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JACKET MATERIAL PROPERTIES

QUIET™ Liner properties are listed in a separate data sheet.

PROPERTY	NYLON 6	NYLON 66	NYLON 6 Impact Modified	POLYPROPYLENE	PBT
Melt Point, °C	210	257	216	169	225
Spec. Gravity	1.04	1.15	1.04	0.9	1.31
Tensile Strength, MPa psi	48 7,000	84.4 12,300	40.5 5,900	37.7 5,500	54.9 8,000
Elongation, % (break)*	225	90	>225	9(at yield)	250
Flexural Modulous, MPa psi	837 122,000	2,827 410,000	295 43,000	1,481 216,000	2,263 330,000
Hardness, Rockwell	R 120	R 108	R 55	R 106	R 120
% Water Absorption, 24hrs.	1.5	1.2	1.5	0.03	0.01

*23°C, 50% relative humidity

ADDITIONAL INFORMATION

Markel is registered to ISO 9001:2000 and ISO/TS 16949:2002. Markel also produces PTFE fluid tubing, PTFE electrical tubing, PTFE porous tubing, PTFE porous hollow fiber membrane, PTFE spiral cut tubing, PTFE insulated wire and melt fluoropolymer wire and tubing (FEP, ETFE, PFA, PVDF).

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