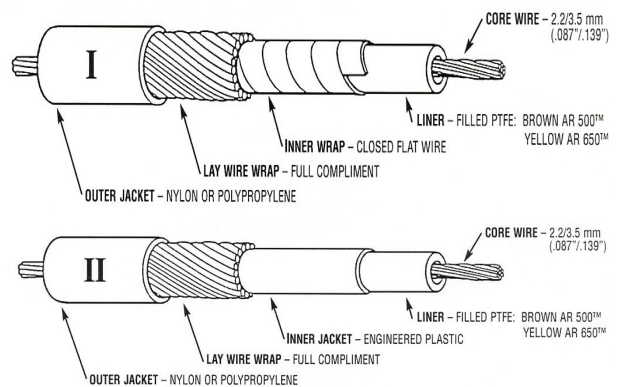
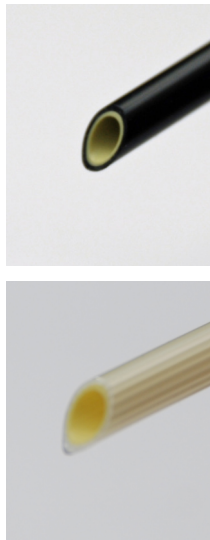


AR-650™ JACKETED CONTROL CABLE LINER

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



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

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”
- 86% average efficiency through 1,000,000 cycles with 25 lb. load

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
- Chrysler PF-8244, 8695, 8762, 8992, 9168 and 9530

PERFORMANCE DATA

Please see Markel AR-650™ Liner Data Sheet.

All materials of construction are warranted to meet specification and certified to be made from top quality resins without PFOA surfactant.

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AR-650™ JACKETED CONTROL CABLE LINER

JACKET MATERIAL PROPERTIES

PROPERTY	NYLON 6	NYLON 66	NYLON 12	ACETAL	POLY- PROPYLENE	PBT	COPOLYMER POLY- PROPYLENE
Service Temp, °C	120	135	105	112	115	120	115
Spec. Gravity	1.13	1.14	1.07	1.41	0.93	1.31	0.902
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	24.1 3,500
Elongation, % At Break*	225	90	300	45	200	250	
Flexural Modulus, MPa psi	837 122,000	2,827 410,000	565 82,000	2,500 357,150	1,481 216,000	2,263 330,000	1,000 145,000
% Water Absorption, % 50% RH.	2.2	2.1	0.7	0.2	< 0.1	0.2	<0.1
Flame	UL94HB	UL94V2	UL94HB	UL94HB	UL94V2	UL94HB	UL94HB

QUIET LINER™ Control Cable Liner jacket properties are listed in a separate data sheet.

*23°C, 50% relative humidity

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