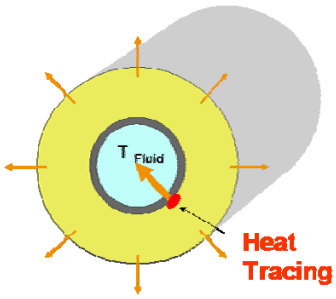
Technology Background:

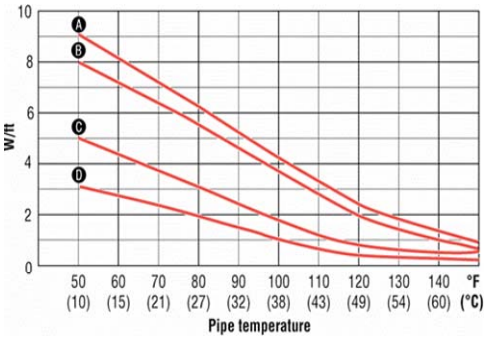
What is heat tracing?

Heat tracing refers to the application of heat to a pipeline or vessel in order to replace heat loss through thermal insulation to ambient. The heat loss needs to be replaced to maintain the fluids at a desired temperature and prevent them from freezing or thickening. The heat is applied by a cable which is run the length of the pipe or around the vessel. This helps improve plant operations prevents pipe failures due to freezing.



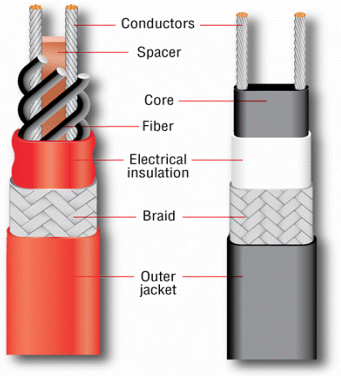
What is self-regulating cable?

Self-regulating cable is Polymer based heat-tracing cable which inversely varies the heat it applies depending on the actual pipe temperature. Typical power-temperature curves of Raychem heat-tracing cables are shown:



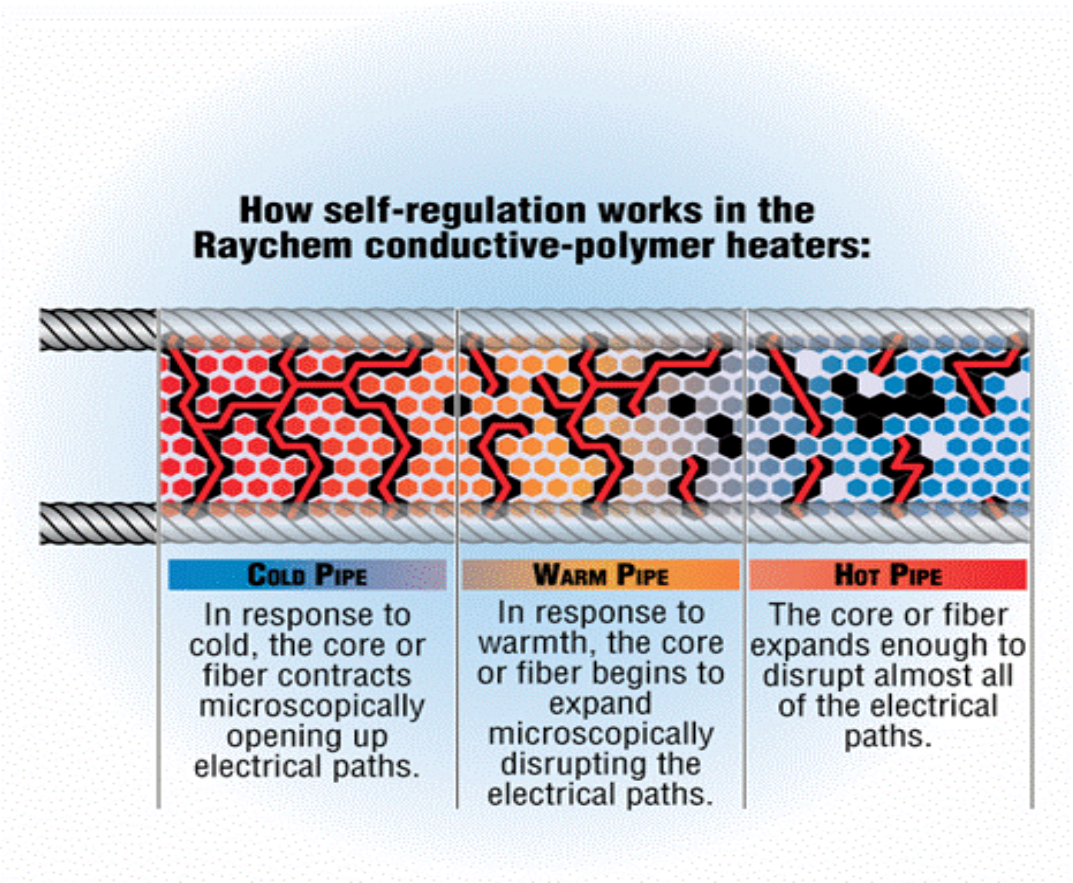
What do the cables look like?

Self-regulating cables consist of layers:
Conductors - Carry electric current
Core- Conductive polymer generates heat
Electrical insulation - Separates the conductive core from the metallic braid
Braid- Acts as a ground path
Outer jacket - Protects the braid
Tyco Thermal Controls provides cables with 2 different constructions as shown:



How does the self-regulating technology work?

Polymer and conductive carbon black in the core create conductive paths between conductors. Lower pipe temperatures result in microscopic contraction of conductive core with increased number of conductive paths between the conductors. This results in higher current flowing between conductors and increased power output of the cable. Higher pipe temperature results in microscopic expansion of polymeric core with reduced number of conductive paths between the conductors. This results in lower current flowing between the conductors and reduced power output of the cable.



Features and Benefits of Self-Regulating Cables:

Feature	Benefit
Parallel Construction: Self-regulating cables are resistors connected in parallel	**Cut-to-length Capability:** Wattage of the cable is not affected by its length. Exact length ordering and pre-engineering of each design is not necessary
Regulated Power Output: Power varies inversely with the temperature	**Energy Savings:** Self-regulation of wattage results in uniform pipe temperature and lower energy costs
No Overheating: Cables don't overheat	**Easy Installation, Safe designs:** Cables can be crossed over on valves and other pipe fittings. Cables don't damage themselves or the pipe contents
Cross-linking Technology: Raychem pioneered the polymeric cross-linking	**Reliable, Long Life:** Products successful in operation for decades