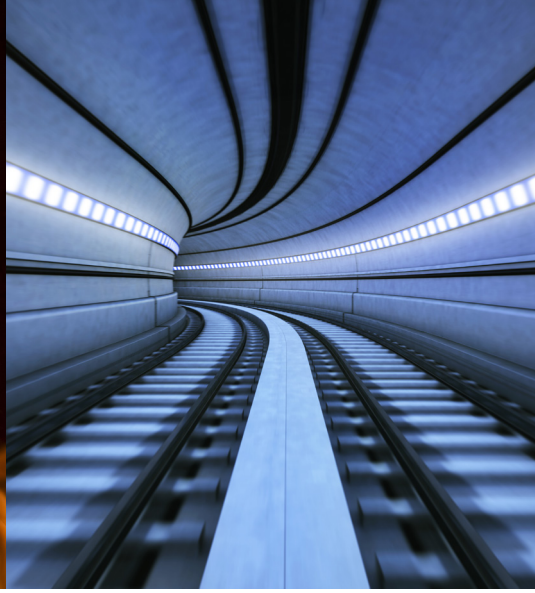




PRODUCT BULLETIN

ECCOH™ Specialty Solutions

Helping Cable Manufacturers Meet CPR Standards

ECCOH™ Low Smoke and Fume Non-Halogen (LSFOH) formulations offer a range of non-halogen, flame retardant solutions that enable manufacturers to meet the Construction Products Regulation (CPR) standards set out by the harmonized European Standard, EN13501. During a fire, ECCOH formulations eliminate the production of corrosive gas and toxic fume emissions, and generate a low amount of smoke, meaning they meet the highly demanding Euroclass designations—Class B2ca and Cca—as well as being suitable for other classes such as Dca or Eca.

ECCOH LSFOH solutions can also achieve specified performance to additional criteria such as smoke production, acidity and flaming droplets.

With cable design at the forefront of any material recommendation, Avient provides a range of additional technical services including extrusion simulation, in order to more fully understand a cable's design before providing fine-tuned recommendations to help customers comply with the criteria for the applicable CPR Euroclass designation.

KEY CHARACTERISTICS

- **Highly flame retardant:** Flame retardancy helps prevent fire and to limit damage if one starts
- **Non-halogenated:** During a fire, there are no ingredients to cause acidic gas emissions from the polymer, which can damage equipment and buildings
- **Low smoke:** In the event of fire, people are more able to find the escape exit and fire fighters can quickly find the source of the fire
- **Low toxicity:** People are not likely to be overcome by toxic fumes
- **Low dripping:** No flaming droplets are likely to propagate a fire or injure evacuees
- **Manufacturing efficiency:** Easy processing with a smooth surface finish

MARKETS AND APPLICATIONS

The ECCOH range of specialty polymers help manufacturers meet CPR requirements for power, control and communication cables (including optical fiber cables) used in buildings.

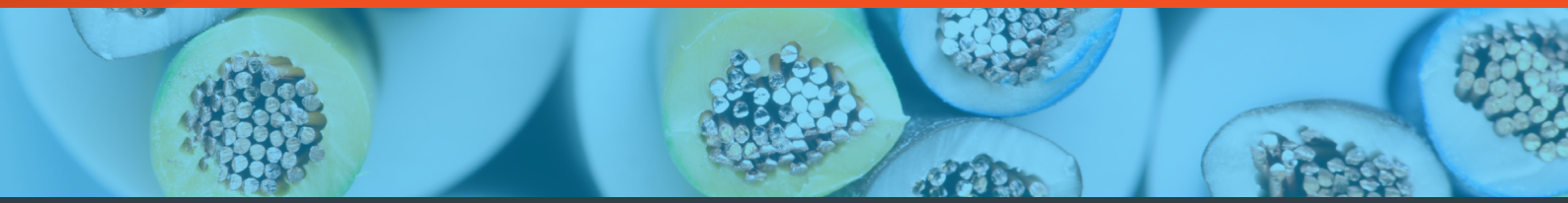
AVIENT™

SELECTING THE RIGHT ECCOH SOLUTION

Avient provides additional technical services to help cable manufacturers find the right CPR compliant cable solutions. Recommendations are built on a comprehensive understanding of the cables design, its required performance characteristics, as well as any additional criteria that need to be considered.

CABLE DESIGN CONSIDERATIONS

1. Performance Requirements
   - Physical performance
   - Fire performance (Euroclass)
2. Cable Design
   - Final cable
   - Wire
   - Jacket
   - Bedding/Sheathing
   - Insulation
3. Additional Criteria
   - Total heat release (MJ/m^2)
   - pHRR (kW/m^2)
   - Time of Ignition (s)
   - Smoke production
   - Acidity
   - Flaming droplets

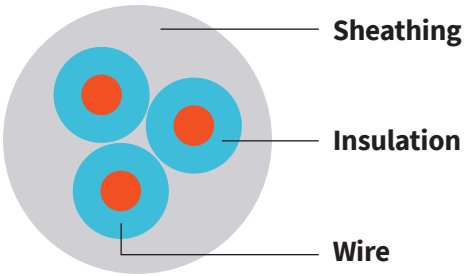


EXAMPLE: IMPACT OF CABLE DESIGN ON CPR EUROCLASS

KEY REQUIREMENTS

FINAL CABLE	Ø = 7.4–7.8mm
WIRE	Ø 1.37mm Copper 1.5mm2
INSULATION	Ø 2.8mm WT: 0.8mm XLPE or LSFOH
SHEATHING	WT required to achieve the cable diameter LSFOH
EUROCLASS	B2ca s1 d1 a1

CABLE DESIGN



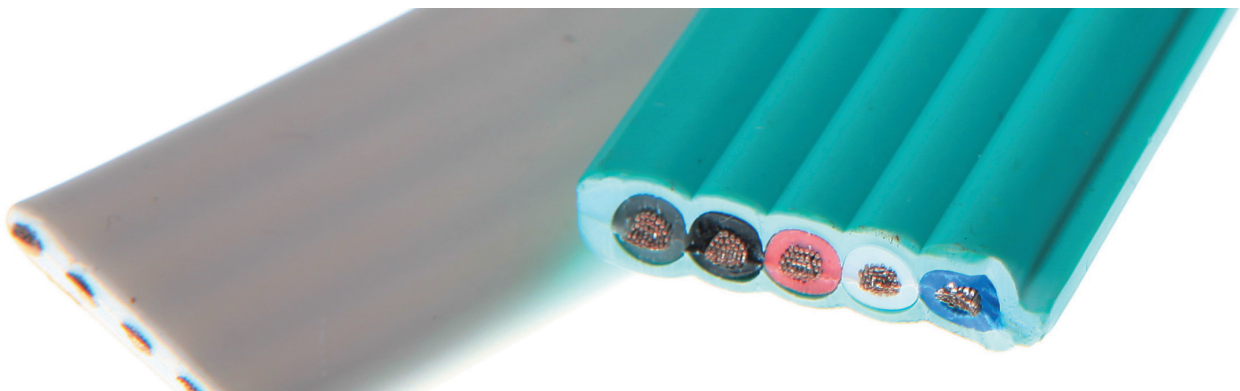
SOLUTIONS AVAILABLE

SHEATHING	INSULATION	SHEATHING LOI (%)	EUROCLASS
ECCOH™ 5549 LM	XLPE	45	Dca s2 d2 a1
ECCOH™ 5549 LM	ECCOH™ XLS 8001	45	B2ca s1 d1 a1
ECCOH™ 5924	ECCOH™ XLS 8001	37	B2ca s1 d1 a1

This example demonstrates the need to consider the complete cable design, as using XLPE for the insulation layer would not give the required Euroclass.

ECCOH™ SHEATHING GRADES

APPLICATIONS	ECCOH GRADES	MFR (150C/ 21.6kg)	TS (MPa)	EB (%)	LOI (%O_2)	CPR* (Class Perfor-	COMMENTS
LAN/coaxial sheathing[1]	5549 LM	3.0	11.0	160	45	B2ca	Excellent flame retardancy, best in class in char formation with very low dripping and low heat release.
LAN/coaxial sheathing[1]	5865/1	4.0	12.0	180	42	Cca	Very good flame retardancy and easy processing.
LAN/coaxial sheathing[1]	5836	9.5	12.0	140	37	Dca	Easy processing with low die drool performance.
LAN sheathing[1] (patch cord)	5943	6.0	11.0	220	32	Dca	Very good flexibility with easy processability.
Optical fiber sheathing[1]	5549 LM	3.0	11.0	160	45	B2ca	Excellent flame retardancy, best in class in char formation with very low dripping and low heat release.
Optical fiber sheathing[1]	5702 SEPAP	8.0	10.5	140	47	Cca	Specially formulated for optical fiber applications where the SEPAP UV test is required. Also, has a very low coefficient of friction for easy installation, excellent flame retardancy and char formation.
Optical fiber sheathing[1]	5924 UV	3.9	11.5	170	39	Dca	Medium char formation, high flame retardancy, UV resistance and good ESCR for armored cable.
Optical fiber sheathing[1]	5501 UV	11.0	11.5	170	35	Dca	Easy processing and enhanced UV resistance.
Tube for optical fiber	PF 1044	2.8	12.0	165	45	B2ca	Excellent flame retardancy and low heat release. Enhanced knife penetration.
Tube for optical fiber	PF 1040	6.0	10	150	40	Cca	Very good flame retardancy and processability.
Tube for optical fiber (stiff)	PF 1043	2.1	15.0	190	40	Dca	Good flame retardancy and high degree of stiffness.
LV cable sheathing[2]	5549/1	3.0	12.0	170	45	B2ca	Excellent flame retardancy and low heat release. Enhanced knife penetration.
LV cable sheathing[2]	5995	8.0	11.5	155	40	Cca	Class C if ECCOH used in combination with high LOI bedding. Advanced flame retardancy and easy processing performance.
LV cable sheathing[2]	5924 UV	3.9	11.5	170	39	Cca	Medium char formation, high flame retardancy, UV resistance and good ESCR for armored cable.
LV cable sheathing[2]	5555 UV	8.0	11.0	180	34	Dca	Easy processing performance with very good ESCR for armored cable.



ECCOH™ INSULATION GRADES

APPLICATIONS	ECCOH GRADES	MFR (150C/ 21.6kg)	TS (MPa)	EB (%)	LOI (%O_2)	COMMENTS
Data Insulation	5918	15.7	14.5	210	35	Excellent processability with high mechanical performance.
Data Insulation	6200 D	11.0	14	350	30	Low thickness and high speed processing.
Optical Fiber Insulation	6151	6.0	17	160	33	Low thickness, gel resistant material for micro-modules or tight buffer running at ultra-high speed.
Optical Fiber Insulation	5809	2.0	10	160	39	Highly chemical resistance products for tight buffer applications offering good mechanical properties in cold and war environments.
Optical Fiber Loose Tube	PF 4142	3.0	34	35	42	High stiffness and high flame retardancy material for dry loose tubes.
Optical Fiber Loose Tube	PF 1043	2.1	15	190	40	Medium stiffness for dry loose tubes.
LV Insulation	5918	15.7	14.5	210	35	Excellent processability with high mechanical performance.
LV Insulation	6150	7.0	17	160	33	Low thickness insulation with good processability.
LV Insulation	XLS 8001	7.5	14	160	33	Ambient curing Sioplas solutions with excellent cross-linking, surface finish and processing speed. Used in combination with the catalyst ECCOH XLS CAT5.

* The ECCOH™ grades in this selection guide can be used for cables expected to meet the noted Euroclass rating. The Euroclass indication of any particular ECCOH™ grade is offered as a suggestion only. The tests required by the CPR must be carried out on finished cables and not on the individual components of the cable. The cable design, other materials used in the cable, and the cable manufacturing process can all influence CPR test results. The cable manufacturer is responsible for conducting such trials to determine the ECCOH™ grade suitable for the application.

[1] CPR class indications are based values for a sheathing thickness of 1mm.

[2] For LV sheathing, CPR class indications are based on a cable design without bedding or flame retardant insulation.

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