

Technical - Information

AVCO-GARD SIL

HIGHLY DURABLE ANTI-MICROBIAL FOR TEXTILES

AVCO-GARD SIL is a polymer-based antimicrobial that uses a patented delivery system to transport and secure the silver ions to a treated article. This novel system controls the release of the silver to avoid discoloration and early exhaustion typical of other silver products. When incorporated into industrial and household materials during the manufacturing process, AVCO-GARD SIL inhibits the growth of microbes to offer protection, durability and freshness.

Suitable for all kinds of textile fibres, synthetic natural and blends.

Recommended for various textile end uses such as apparel, technical fabrics, toweling, athletic shoes, sleeping bags, wiping mats etc.

Appearance	Pale amber liquid.		
Chemical nature	Aqueous preparation contained Silver and aqua ammonia.		
Solubility	Miscible with water at any ratio.		
pH (10%sol.)	9.5 – 10.5		
Compatibility	Compatible with a wide range of chemicals. However, pretests are recommended before use.		
Storage	Store and use product in a well- ventilated area. It should be stored at ambient conditions in the original container, tightly sealed. Protect from frost and heat.		
Shelf life	When properly stored, shelf life is 6 months at least.		

SPECIFICATION:

PROPERTIES AND USES:

- 1. Smart control: control release of silver for improved durability.
- 2. Improved durability: longer term efficacy and improved cost to treat.
- 3. Novel liquid formulation: a clear and non-tacky solution that is easy to dilute, dose, formulate and apply.
- 4. Broad spectrum activity: controls various odor-causing microorganisms.
- 5. Color stability: improved product quality and appearance vs. other silver products.
- 6. Thermal stability: high tolerance in manufacturing.
- 7. Easy to coat natural and synthetic fibers.



Technical - Information

- 8. Compatible with a broad range of woven and non-woven additives, including fluorocarbon chemicals, softeners, anti-wrinkle resins, etc.
- 9. Maintains aesthetics of the fabric.
- 10. Can be applied by both pad and exhaustion process.

APPLICATION:

- 1. Can be applied to both organic or inorganic surface using standard coating method such as: spray, foam, printing or exhaustion.
- 2. Approved applications for AVCO-GARD SIL are the preservation of non-food contact coatings and films, and industrial and household woven and nonwoven fibers.
- 3. From mattresses and linens, to sports apparel and footwear, to fabrics used in hygienic environments, AVCO-GARD SIL is an ideal solution.
- 4. For use in fibers: non-food contact uses in industrial and household woven and non-woven fibers such as bedding, apparel, footwear, wall and floor coverings, carpets, draperies, wiping cloths, brushes, filters, insulation, tents, awnings and tarps. Use AVCO-GARD SIL in the treatment bath to provide 5 to 300 ppm silver on the fiber. The pH of treatment baths should not be lower than 5.5.
- 5. Use AVCO-GARD SIL in a well ventilated area, free of sparks and open flames. Standard city water may be used, provided it is free of high concentrations of metal ions and chloride.

APPLICATION IN THE PADDING PROCESS:

Pad with the following recipe:

AVCO-GARD SIL	50 – 300 g/l
Pick up:	70 - 80%
Dry at:	130 – 150°C

APPLICATION BY EXHAUTION:

- 1. Adjust pH of bath to 6 7.
- 2. Use the following recipe:

AVCO-GARD SIL 5 - 20% o.w.g.

3. Heat up to $40 - 60^{\circ}$ C and treat for 20 - 30 minutes.

Application can be done at lowered temperature for longer time $(30^{\circ}C / 30 - 60 \text{ min})$.

- 4. If possible after the exhaustion, increase pH of the bath to 8 10, this will improve the fixation and durability of the product.
- 5. Apply cationic softener by the normal procedure.
- 6. Hydro-extract and dry at 130 150^oC.



Technical - Information

REMARKS:

- 1. If there is a problem of anionic sites on the textile before application such anionic fixing agents, rinse the textile with 0.5% o.w.g of cationic softener before application of AVCO-GARD SIL, to ensure blockage of all the anionic residuse on the fabric surface.
- 2. Complete exhaution of the treatment bath and AVCO-GARD SIL existance on the treated fabric can be checked by the Bromo Phenol blue Indicator for cationic agents.
- 3. The antibacterial treatment is not checked by the "zone of inhibition test", as the finish is non-leaching type and it should be checked by the "Dynamic shake flask" test method.
- 4. Before handling the product read safety data sheet for safe use, physical, ecological and health information.

ANTIMICROBIAL ACTIVITY:

AVCO-GARD SIL is effective at controlling and eradicating a number of microorganisms, including, but not limited to:

- **Bacteria:** Escherichia coli; Klebsiella pneumonia; Pseudomonas aeruginosa; Staphylococcus aureus; Corneybacterium ammoniagenes.
- *Molds:* Aspergillus niger; Trycophyton mentagrophytes.

Efficacy of 3% AVCO-GARD SIL antimicrobial on Standard Textiles

Textile	ISO 20743* Log Reduction CFU		
	Untreated	Treated(3%)	
100% Cotton	+2.0	> 3.0	
100% Nylon	+1.2	> 3.0	
100% Polyester	+1.5	> 3.0	
50/50 PES/Cotton	+1.4	> 3.0	

• *Escherichia coli* with 1:500 nutrient broth in Inoculum. Positive value indicate microbial growth.

Efficacy on Polyester Cotton Blend (60/40) washed 50 times

AVCO-GARD SIL	AATCC Method 100 Percent Reduction CFU/ml		Dorformanco	
Antimicrobial (%)	Staphylococcus aureus	Klebsiella pneumoniae	Performance	
0	0	0	Microbial growth	
6*	>99.9%	>99.9%	Excellent Control	

• At 0.1% silver content in AVCO-GARD SIL.