



FilmStat 3K1 **Antistatic Performance and COF**

Introduction

Polyethylene film is inherently hydrophobic allowing the buildup of static charge. Excessive static causes processing problems as the film is manufactured, and creates dust accumulation problems in its final usage as packaging material. FilmStat 3K1 improves antistatic and properties for polyethylene film.

Advantages

- FilmStat 3K1 is provided in masterbatch form to facilitate handling and processing.
- Excellent antistatic properties are obtained by using FilmStat 3K1. These properties are consistent for a longer period of time compared to competitive products.
- FilmStat 3K1 is thermally stable.
- FilmStat 3K1 does not interfere with transparency, anti-blocking, or other properties of the base resin.
- FilmStat 3K1 is FDA compliant for food packaging. The FilmStat 3K1 active complies fully with the Federal Food, Drug, and Cosmetic Act and all applicable food additive regulations, including 21 C.F.R. § 177.1520, "Olefin polymers."

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...From Concept to Completion !!



PROPERTIES

Appearance:	White chip
Base Resin:	LLDPE (d = 0.920, MI= 2.1)
Additive Contents:	ANTISTAT agent 12.0%
	Anti-block (silica) 3.0%

RECOMMENDED USAGE

The optimum additive loading in the film depends on the specific processing conditions and environment the bag is to be used in, as well as the density and grades of base resin being used to make the in the film. The film producer will need to confirm the optimum loading level through trial-and-error analysis for each film' s particular end use.

Typical loadings for general use:

<u>Resin</u>	<u>FilmStat 3K1</u>
LDPE (Density less than 0.93)	3 to 5 %
LLDPE (Density less than 0.93)	5 to 8 %

STORAGE AND HANDLING

The FilmStat 3K1 is highly hydrophilic, and readily absorbs moisture. The FilmStat 3K1 should be stored in closed containers in a cool and dry environment to prevent water absorption.



TYPICAL EXAMPLE OF USE IN BLOWN FILM

A. Conditions:

Cylinder Temperature:	150 - 200°C
Die Temperature:	200°C
Blowup Ratio:	2.0

B. Antistatic Performance Test Procedures Film

Appearance

Anti-block Property:

Visual rating of film

Two strips of film (10 cm x 2 cm) are cut and then horizontally overlapped by 10cm². They are placed under a weight equal to 20 grams/cm² and held at 40°C for 48 hours. An Instron test instrument is used to measure the force required to separate the two strips.

Antistatic Property:

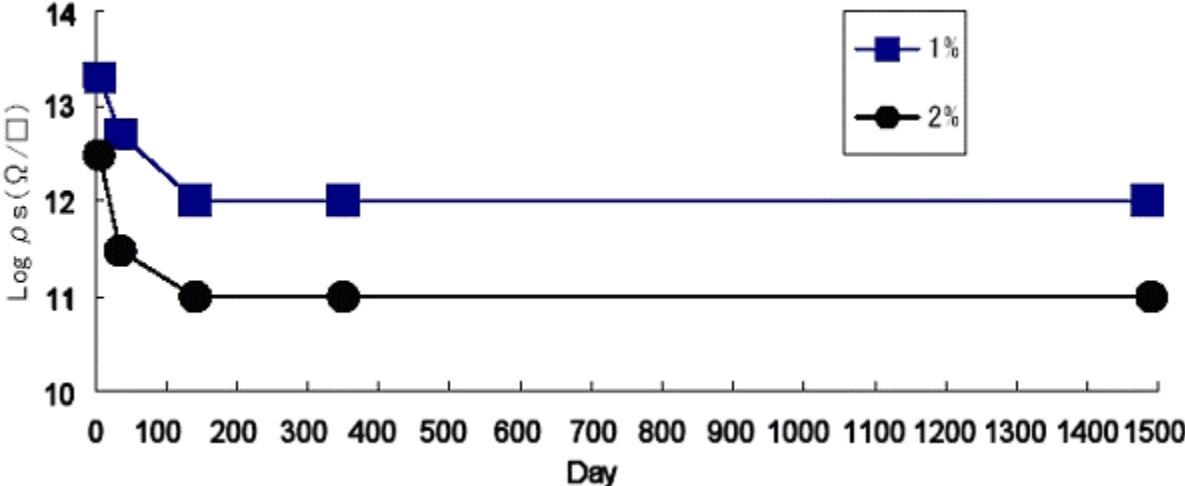
The surface resistivity is measured under the conditions of 20°C and 65% R.H.

FilmStat[®] 3K1

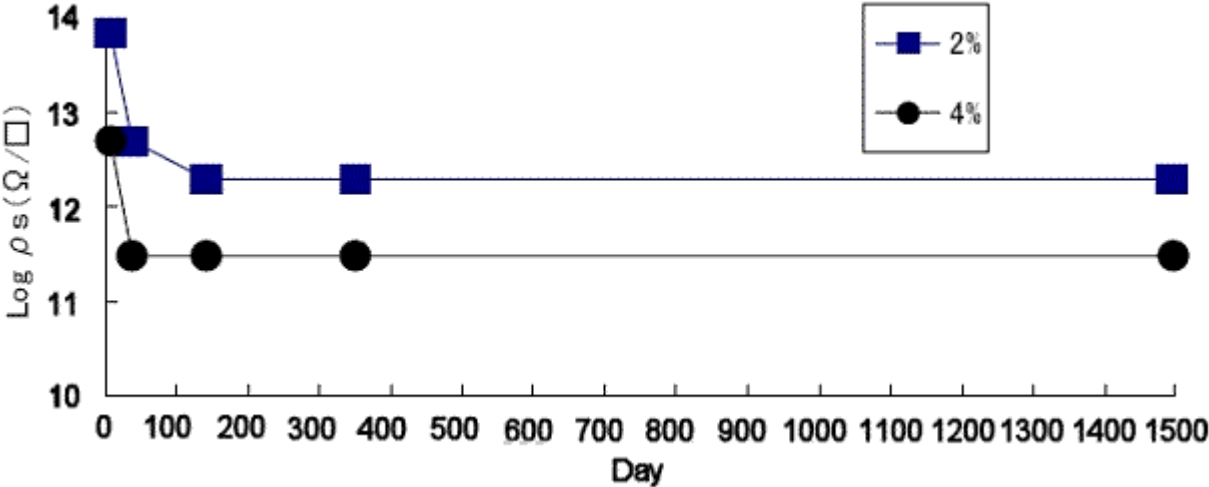
ANTISTATIC PERFORMANCE AND COF

C. Test Results

Sample 1: LDPE (d.=0.924, MI.= 1.5) Antistatic Performance



Sample 2: LLDPE (d.=0.926, M.L=2.2) Antistatic Performance





Active Contents		ADVANTAGES	FDA Compliance
Antistatic Agent	Anti-blocking Agent		
12%	3%	Antistatic additive for LDPE, LLDPE	In Compliance
18%	4.5%	Antistatic additive for LLDPE, HDPE Higher active contents	In Compliance
18%	4.5%	Antistatic additive for Laminate Films (LDPE, LLDPE) Less affected by laminate adhesives and processing.	In Compliance
18%	3.5%	Controlled -migrating antistatic additive for i) Multi-laver Film (co-extrusion) ii) Laminate Film Antistats with High COF for Thick Film	Currently Seeking Regulatory Revisions
10%	2.5%	Controlled -migrating additive for i) Multi-layer Film(co-extrusion) ii) Laminate Film	Currently Seeking Regulatory Revisions

For PE films where COF is irrelevant, FilmStat 3K1 (18% active non-anti-block) provides superior and consistent antistat performance.

For PP films, FilmStat 3K1 (18% active FilmStat 3K1, 4.5% anti-block), provides antistatic performance.



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Note: The "Material Safety Data Sheet" on this product is available from the Safety and Environmental Services Department of PolyChem Alloy Chemical, Inc.

