RELEASE AGENTS / DRY LUBRICANTS

CONVENIENT AEROSOLS

There are two aerosol formulations for use where hand spraying is convenient and economically feasible. One, MS-122, is for applications at room temperature. The other, MS-136, is for injection and other heated molding operations.

FLUOROCARBON BASED

The active ingredient in Miller-Stephenson Release Agents/Dry Lubricants is a tetrafluoroethylene telomer resembling Teflon®. This gives excellent adhesion to most substrates and results in an extremely low coefficient of friction. In addition there is:

■ NO DISCERNABLE TRANSFER

Miller-Stephenson mold release agents do not noticeably transfer to the molded part. Therefore, they do not interfere with secondary processes such as printing, metalizing, bonding or other finishing operations. By staying on the mold, they work longer—yielding more release cycles from each spraying. This results in higher productivity.

■ NO MIGRATION

These release agents contain no silicones which can show up unexpectedly as oily residue in other work areas.

■ NO OILS OR WAXES

There is no gumming or charring; therefore, no need for harsh scraping and cleaning which can shorten mold life.

BROAD TEMPERATURE RANGE

Miller-Stephenson release agents are carefully formulated to meet expected operating conditions:

MS-122 RELEASE AGENT—for application on room temperature molds (up to 120°F/40°C).

NEWS NOTE! ...nese aerosol products are also ...vailable with a non-CFC (Chlorofluoro- ...arbon propellant). Should you wish a free ...mple or technical information, please call our Tech- ...cal Service Department—**1-800-992-2424** or (203) 743-4447 ...4 Eastern Time). In Canada call 1-800-323-4621 (8-4 Eastern Time).

COMPATIBLE WITH MOST RESINS

Both formulations are designed to release a wide variety of resins:

MS-136 HEATED MOLDS

Rubbers/ Elastomers	Nylons
Structural Plastics (ABS, NORYL, etc.)	Acetals
Polypropylene	Cellulosic Plastic
Polyesters (Thermoplastics; PET, PBT)	Ionomers
Polyurethanes	Melamines
	Phenolics
	Phenylene Oxides
	Vinyls (PVC)
	Ureas

MS-122 ROOM TEMPERATURE MOLDS

Epoxies	Acrylics
Rubbers/ Elastomers	Polyurethanes
Phenolics	Polycarbonates
Nylons	Polypropylene
	Polystyrene

USED IN MANY TYPES OF MOLDS

Excellent release is obtained with a variety of mold materials:

Metals	Urethanes
Epoxies	Ceramics
Rubber/Elastomers*	Plastic

* Not recommended for multiple releases from silicone rubber molds

MANY DRY LUBRICANT APPLICATIONS

The outstanding lubricity of the retrafluoroethylene solids incorporated in Miller-Stephenson Release Agents/Dry Lubricants is indicated by the low coefficient of friction. The following values were determined at 23 pounds per square inch: steel on steel, 0.11; aluminum on aluminum, 0.16; hardwood on hardwood, 0.10. The MS-122 aerosol is useful as a dry lubricant on many materials and applications:

Metals	Paper
Plastics	Gears and Belts
Rubber	Thread Connections
Glass	Wire
Wood	Cable

USED IN MANY PROCESSES

These versatile products are used in a variety of operations:

Injection Molding	Encapsulating
Compression Molding	Masking
Transfer Molding	SMC Forming
Reaction Injection Mold (RIM)	Foaming
Potting	Prepeg Fabrication
Laminating	Filament Winding
	Wire Drawing

EXCELLENT FOR COMPLEX MOLDED PARTS

Miller-Stephenson release agents have proven themselves in the most complicated and demanding molded part configurations imaginable. Their extremely low coefficient of friction permits clean release with no discernable residue on molded parts. Distortion is virtually non-existent—an extremely important criteria in precision molding.

PREPARING THE MOLD FOR FLUOROCARBON RELEASE AGENTS

The following procedure is suggested for cleaning molds before applying Miller-Stephenson's release agents:

1. Take the mold that needs cleaning and apply either MS-180 Freon TF to remove surface soils and particulates. MS-170 1,1,1-Trichloroethane solvent to remove heavy grease or MS-185 Freon TA solvent for removal of oils, rust preventatives and hard to remove mold releases.

2. Follow with a final rinse of MS-180 Freon TF.

3. The release agent must be agitated before and during use to prevent settling of the active ingredients.

4. Apply the release agent by dip, spray, brush, or wipe — allowing you to control the quantity of the release agent being applied. (It is suggested that for a good release, a 1-2 mil coat be applied.)

5. If oversprayed, residue may be removed with a soft cloth without affecting the release action.

Miller-Stephenson release agents dry quickly, and one application can provide multiple cycle releases.

PROPERTY SELECTION CHART



	AEROSOLS		BULK LIQUIDS			WET PADS
	MS-122 MS-122 RED *	MS-136	MS-143 MS-143 RED *	MS-145 *	MS-144 *	MS-143P
MOLD TEMPERATURE						
Room Temp. up to 120° F	●		●		●	●
Heated Molds 120° F to 550° F		●		●		
METHOD OF APPLICATION						
Aerosol	●	●				
Brush			●	●	●	
Dip			●	●	●	
Spray Gun			●	●	●	
Wipe			●	●	●	●
CARRIER						
Solvent-based	●	●	●	●		●
Water-based						
EVAPORATION RATE						
Rapid	●		●			●
Moderate		●		●		
Slow						

* Available with red dye indicator or ultraviolet indicator

MATERIAL SELECTION CHART



	AEROSOLS		BULK LIQUIDS			WET PADS
	MS-122 MS-122 RED *	MS-136	MS-143 MS-143 RED *	MS-145 *	MS-144 *	MS-143P
SELECTION CRITERIA						
ABS		●		●		
Acetals		●		●		
Acrylics	●	●				●
Cellulosics		●		●		
Epoxies	●		●			●
Ionomers		●		●		
Nylons	●	●	●	●		●
Phenolics	●	●	●	●		●
Phenylene oxides		●		●		
Polycarbonates	●		●			●
Polyesters * * (thermoplastics)		●		●		
Polyurethanes	●	●	●	●		●
Rubber	●	●	●	●		●
SMC Materials		●		●		
Ureas		●		●		
Vinyls		●		●		

* Available with red dye indicator or ultraviolet indicator.
* * Not recommended for wet-layup polyester.

PROCESS SELECTION CHART

AEROSOLS

BULK LIQUIDS

WET PADS

	MS-122 MS-122 RED *	MS-136	MS-143 MS-143 RED *	MS-145 *	MS-144 *	MS-143P
Compression Molding		●		●		
Encapsulating	●		●			●
Filament Winding (hot mandrel)	●	●	●	●		●
Foaming	●	●	●	●		●
Injection Molding		●		●		
Laminating	●		●			●
Masking	●		●			●
Potting	●		●			●
Prepeg Fabrication	●	●	●	●		●
Reaction Injection Molding (RIM)		●		●		
Rubber Molding * * *	●	●	●	●	●	●
SMC Forming		●		●		
Transfer Molding		●		●		
Wire Drawing	●		●			
Dry Lubricant	●		●	●		●

* Available with red dye indicat or ultraviolet indicator.
* * * Not recommended for multiple releases from silicone rubber molds.

PHYSICAL PROPERTIES— BULK LIQUIDS CHART

FLUOROCARBON RELEASE AGENTS

PRODUCT	MS-143 MS-143 RED *	MS-145 *	MS-144 *
Active Ingredients	Tetrafluoroethylene ▲ Solids	Tetrafluoroethylene ▲ Solids	Tetrafluoroethylene ▲ Solids
Diluent	Fluorocarbon solvents	Blend of chlorinated and fluorocarbon solvents	Water
Method of Application	Dip, Spray, Brush on room temperature molds. Available in Aerosol MS-122 or MS-122 Red *	Dip, Spray, Brush Available in Aerosol MS-136.	Dip, Spray, Brush Heated Molds. Especially suited for rubber molding. Not Available in Aerosol
Notes	For application to room temperature molds. Solids, concentrations available to meet MIL-L-60326 A Type I, II, III, IV, V.	Recommended for use on heated molds up to 550° F.	Recommended for use on heated molds up to 550° F. Water based: Do not store at temperature below 32° F/0° C.
Boiling Point	47.7°C/118°F	74°C/165°F	100°C/212°F
Specific Gravity @ 72°F/25°C (water = 1)	1.6	1.3	1.0
Vapor Pressure @ 69°F/20°C	334 mm hg.	120 mg. hg.	17.5 mm hg.
Vapor Density @ 77°F/25°C (air = 1)	2.9	1.5	0.6
Toxicity OSHA 8 Hr. Time Weighed Average (TWA) Parts per million	1000 ppm	350 ppm	1000 ppm
Flammability	Non-flammable	Non-flammable	Non-flammable

▲ 5 Micron Average Particle Size.

* Available with red dye indicator or ultraviolet indicator.

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MILITARY/GOVERN

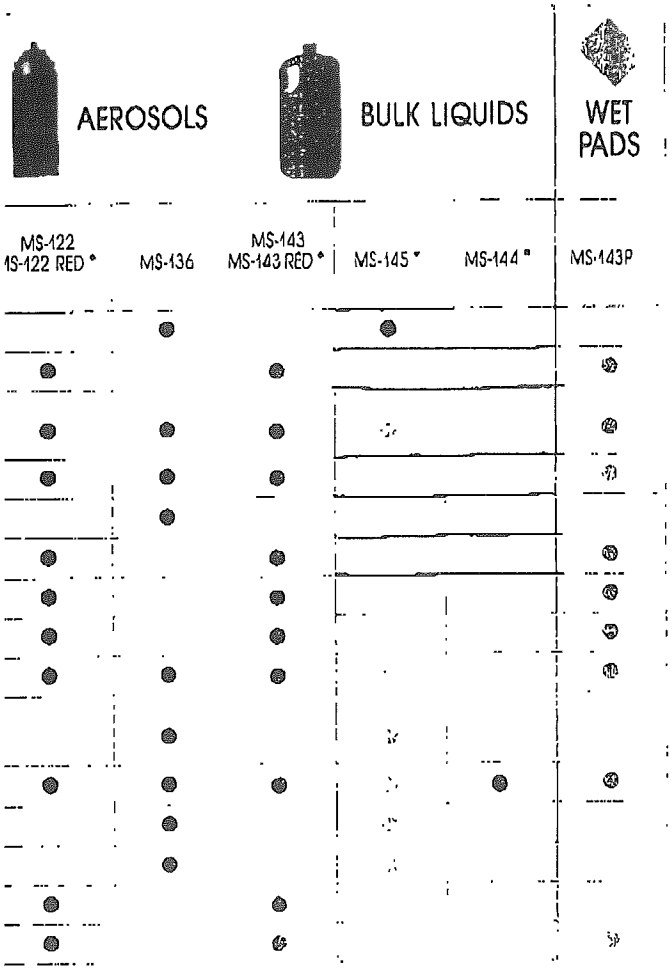
Aerosol

MS-122	Release Age Dry Lubrican
MS-122 Red	Release Age Dry Lubricar
MS-136	Release Age Heated Mol

Bulk for E Spray Gu

MS-143	Release Age Dry Lubrican
MS-143-20.0	Fluorocarbo Telomer Disp
MS-143-5.0	Fluorocarbo Telomer Disp
MS-143-2.5	Fluorocarbo Telomer Disp
MS-143-3.0	Fluorocarbo Telomer Disp
MS-143-1.0	Fluorocarbo Telomer Disp
MS-143-1.0	Fluorocarbo Telomer Disp

*Proposed changes Naval Sea Syster subject to modification. Not to be use 0761) Superseding MIL-L-60326 (MU) 19 F



* Available with red dye indicator or ultraviolet indicator.
*** Not recommended for multiple releases from silicone rubber molds.

FLUOROCARBON RELEASE AGENTS

MS-143 MS-143 RED *	MS-145 *	MS-144 *
Tetrafluoroethylene ▲ Solids	Tetrafluoroethylene ▲ Solids	Tetrafluoroethylene ▲ Solids
Fluorocarbon Solvents	Blend of chlorinated and fluorocarbon solvents	Water
Dip, Spray, Brush on room temperature molds. Available in Aerosol MS-122 or MS-122 Red *	Dip, Spray, Brush Available in Aerosol MS-136.	Dip, Spray, Brush Heated Molds. Especially suited for rubber molding. Not Available in Aerosol
For application to room temperature molds. Solids, concentrations available to meet MIL-L-60326 A Type I, II, III, V, V.	Recommended for use on heated molds up to 550° F.	Recommended for use on heated molds up to 550° F. Water based: Do not store at temperature below 32° F/0° C.
47.7°C/118°F	74°C/165°F	100°C/212°F
1.6	1.3	1.0
334 mm hg.	120 mg. hg.	17.5 mm hg.
2.9	1.5	0.6
1000 ppm	350 ppm	1000 ppm
Non-flammable	Non-flammable	Non-flammable

* Available with red dye indicator or ultraviolet indicator

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MILITARY/GOVERNMENT SPECIFICATIONS

Aerosol

MS-122	Release Agent Dry Lubricant	NSN9150-00-349-9290 *MIL-L-60326A Type V Class 2 Aerosol
MS-122 Red	Release Agent Dry Lubricant	
MS-136	Release Agent Heated Molds	

Bulk for Brush, Dip, Spray Gun Application

MS-143	Release Agent Dry Lubricant	*MIL-L-60326A Type IV Class 1
MS-143-20.0	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type I Class 1 20.05% Solids
MS-143-5.0	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type II Class 1 5.0% Solids
MS-143-2.5	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type III Class 1 2.5% Solids
MS-143-3.0	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type IV Class 1 3.0% Solids
MS-143-1.0	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type V Class 1 1.0% Solids
MS-143-1.0	Fluorocarbon Telomer Dispersion	*MIL-L-60326A Type V Class 1 (Class 2 See Aerosol above)

*Proposed changes Naval Sea Systems Command (05) Draft Dated 31 July 1985, subject to modification. Not to be used for acquisition purposes (project No 9150-0761) Superseding MIL-L-60326 (MU) 10 February 1965 and Amendment 30 April 1965.