

HS-4

Weatherstrip Coating

Description

HS-4 weatherstrip coating is a 3-component matte translucent solvent-based silicone coating system that thermally cures to form a resilient silicone film. This system is comprised of a milky base (HS-4A), an adhesion promoter (XC9615 is recommended for both on-line and off-line processing), and a catalyst (YC6831 tin complex or XC94-C6256 tin free). The cured coating can help to provide substrate surfaces such as EPDM rubber with lubricating water repellency and easy release characteristics. HS-4 coating is an excellent candidate to consider for colored dynamic seals such as automotive door seals or other parts where a smooth surface is preferred to impart low friction related noise generation. It can also be considered for numerous non-automotive applications, such as O-rings and other small rubber parts as an assembly aid.

Key Features and Typical Benefits

- Excellent freeze release characteristics
- Low static, dynamic CoF and smooth transition for low noise generation
- Excellent noise reduction properties
- Excellent adhesion to EPDM, TPE and many other rubber formulations
- Fast heat cure process (approx. 1 minute)
- Tin and isocyanate content free formulation (*using XC94-C6256)

Typical Physical Properties

| Property | HS-4A Silicone Base | XC9615 Adhesion Promoter | YC6831* Catalyst |
|---|------------------------|-----------------------------|---------------------|
| Color | Milky White | Colorless | Pale Yellow |
| Solids Content (%) | 27 | 15 | 28 |
| Density (@ 23°C) | 0.93 | 0.84 | 0.99 |
| Viscosity (DIN 4 cup @ 23°C (seconds)) | 20 | 13 | 12 |
| Viscosity (mPas, Brookfield #2 @ 30 rpm) | 550 | | |
| Solvent | Xylene | IPA | Toluene |

Typical properties are average data and are not to be used as or to develop specifications.

Typical Cured Product Properties

| Property | Test Method | Value |
|---|----------------|---------------|
| Coefficient of friction (Static and Dynamic) | DIN 53375 | < 0.3 |
| Abrasion Resistance (Crockmeter 900 g load) | Dry Crockmeter | > 500 cycles |
| Abrasion Resistance (Crockmeter 200 g load) | Dry Crockmeter | > 5000 cycles |
| Freeze Release | TL 523 45 | Pass |
| Repaintability | TSM 1701 G | Pass |
| Paint Staining | TSM 1701 G | Pass |

Typical properties are average data and are not to be used as or to develop specifications.

Typical Cure Schedule

Complete cure in any specific application is a function of coating thickness, part geometry and the heat transfer characteristics of the substrate to which the coating is being applied.

Although the prepared coating will cure at an ambient temperature, it is not recommended as the adhesion and full abrasion performance may not be realized. An absolute minimum part temperature range of 80-120°C at the point of application is

recommended in order to achieve the full coating performance. Higher substrate temperatures are preferred in order to achieve best adhesion and appearance of the coating.

NOTE: If curing at ambient temperature, the adhesion of coating to the substrate and visual appearance can be compromised.

| Part Temperature (actual not oven set point) | | | | | |
|---|----------|-----------|-----------|------------|-------------|
| Cure Temperature (°C) | 180°C | 150°C | 100°C | 80°C | 25°C |
| Cure Time (at temperature) | 1 minute | 2 minutes | 5 minutes | 10 minutes | 5 hours min |

Sample Coating System¹ Preparation

The following sample formulation is provided as a suggested starting point for spray applications.

| Component | Loading by Weight | |
|------------------------------------|--------------------------|------------------------|
| HS-4A | 100 parts | Supplied as 15 kg pail |
| XC9615 | 50 parts | Supplied as 15kg pail |
| YC6831 | 7.5 parts | Supplied as 1 kg can |
| Diluting Solvent (1) (if required) | 0 – 400 parts | (2) |

1. Compatible solvents include Hexane ,Heptane, White Gasoline, Mineral Spirits and Toluene
2. Further dilution with a solvent may be desired according to the part temperature, type of substrate, required dry film thickness, and application method. The final formulation needs to be established by trials on the end user's production equipment.

¹ Product formulations are included as illustrative examples only. Momentive makes no representation or warranty of any kind with regard to any such formulations, including, without limitation, concerning the efficacy or safety of any product manufactured using such formulations.

General Considerations for Use

It is vitally important to thoroughly mix the HS-4A component to ensure any settled ingredients are well redispersed before use, as settling of the matting agent and friction modifier can occur during storage. Once fully mixed (be sure that no sediment remains in the pail), the base is ready to use. Then add the solvent if required (see above) and finally the catalyst (YC6831 or XC94-C6256). The coating is now ready to use.

CAUTION: The order of addition is important.

The bath should be kept under constant agitation to prevent settling of the active powders and to ensure maximum bath life. For best results, the substrate should be clean and dry and have a minimum temperature of 80°C, as lower application temperatures can adversely affect the adhesion and appearance of the coating. In general, temperatures of 200°C or higher will not affect the coating and may actually lead to productivity gains.

For optimum coating adhesion and performance, ensure all surfaces are clean and dry before applying the coating solution. The substrate temperature should be between 80 – 230°C for on-line application and a minimum of 80°C part temperature at the time of coating for off-line applications, including drum/tumble coating where a suitable drying schedule must be used between each application.

HS-4 weatherstrip coating is recommended to be spray coated.

This coating is typically applied using HVLP spray guns with an aircap diameter < 1.0mm. To avoid blocking of the guns the coating should be filtered through a 200 micron mesh after the coating is prepared. It is good practice to install a further filter between the holding tank and spray guns. Most on-line applications use multiple spray guns to achieve even coverage of the profile during extrusion.

It is important to apply sufficient material to achieve an initial wet look in order to help ensure continuous coverage and good coating adhesion. It is also possible to employ multiple spray heads in tandem to help ensure sufficient coating is applied and no areas are left uncoated during the application process.

Typical bath life is 12 hours in a partially closed container. Continuous slow speed agitation of the coating bath is recommended to reduce the possibility of settling of the matting agents and friction modifiers.

The resulting coating thickness will depend on the application method and the required end-use requirements.

Dry film thicknesses are typically between 6 and 10 microns.

Current Packaging

| | |
|--------|---------------------------|
| HS-4 | 15 liter metal pails |
| XC9615 | 15 liter pails 14 kg fill |
| YC6831 | 1 kg metal cans |

Patent Status

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