



EXTRUDEABLE PELLETS, SEALER, ANTI-FLUTTER, EXPANDING

WSS-M4G371-A1

1 SCOPE

The materials defined by this specification are extrudable (delivered in pellet form) ethylene copolymer based materials which can be heat bonded to cleaned steel or aluminum using an extrusion process. The beads applied with this extrusion process are used for sealing and vibration dampening purpose.

2 APPLICATION

This specification was released originally for material that comes to Ford in pellet form. These pellets are extruded on cleaned, dry, not oily, preheated metal sheets. Before curing (ecoat oven process) the beads are solvent free, "dry to the touch" and they don't wash out in the successive baths of the e-coat process. After curing (ecoat oven process) the extruded beads can function as sealer, NVH or anti-flutter material.

3 REQUIREMENTS**3.1 SYSTEM COMPATIBILITY**

Initial approval was based on a specific material system which included the substrate, stamping lubricants and sealer. Substrate choice, stamping lubricants, stamping plant processing conditions, assembly processing condition may affect sealer performance. If any of these parameters are changed, the sealer performance must be validated using these parameters.

The material shall work with all the plant processes (cleaning operations, phosphating process, welding operations, etc.) and shall not deteriorate the performance of phosphating, electrocoat primer or other materials applications.

3.2 APPROVED SOURCES

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at www.mats.ford.com or available externally through a Ford Materials Engineer.

3.3 COMPOSITION

Ethylene copolymer filled with inert fillers and reactive expanding + curing agents.

3.4 RAW MATERIAL PROPERTIES BEFORE EXTRUSION

3.4.1	Color, Shape	Grey pellets average grain size 2.5 - 5 mm.
3.4.2	Solids (FLTM BV 150-10) (ASTM D2834, except heat at 100 +/- 2 °C for 3 h in a mechanical convection oven. Save sample for next test, para 3.4.3)	98%min
3.4.3	ASH (ISO 3491, Method A, 760 +/- 30 °C based on the solids weight)	70% max

Date	Action	Revisions	Rev. 0.0
2017 10 27	Released		J. Herl, FOE

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- 3.4.4 Density +/- 10%
(ISO 845)

The density variation for any one supplier shall be +/- 10%, based on the recorded density of their original approved production sample.

- 3.4.5 Storage Stability

Heat and moisture will accelerate aging. The materials shall be stored in sealed packages (if recommended by the supplier) away from all sources of heat and moisture. The shelf life of the material shall be 6 months from date of manufacture when stored at temperatures below 32 °C.

Ambient plant conditions may fluctuate between 15 °C and 38 °C. Materials shall be evaluated for local plants conditions to determine plant specific requirements for temperatures in excess of 32 °C.

Deviations from the shelf life requirement shall be identified and concurred upon by the plant and noted in the supplier control plan.

When materials are stored at temperatures below 23 °C, they shall be conditioned at room temperature for a minimum of 24 hours prior to application.

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| • pellets from date of manufacturing | 6 months |
| • pellets from date of delivery | 3 months |
| • extruded beads | 3 months |

- 3.4.6 Volatile Organic Compounds (VOC) Content +/- 0.05 kg/L
(EPA Method 24, Procedure B)

The VOC Content variation for any one supplier shall be +/- 10%, based on the recorded VOC Content of their original approved production sample.

3.5 CURE AND EXTRUSION REQUIREMENTS REPORT

(Define the process cure window for material cure, Report minimum and maximum time at temperature requirements to define performance boundaries)

Critical performance characteristics shall include, but are not limited to, the following:

- Volume Expansion, Adhesion,

- 3.5.1 Operating condition substrate + material bulk temperature

The following features are guide lines. Depending on the material applied, the substrate nature and geometry, the temperature ranges may be extended. It is the responsibility of the person who makes the changes to validate that they don't alter the material properties. Pellet Melt temperature (°C)

Pellet Melt temperature (°C)	95-105 °C
Substrate temperature (°C)	95 – 115 °C

Test procedure

The substrate temperature must be measured using a contact thermocouple applied at the surface of the substrate, at the time when the substrate reaches the extruder.

The pellet melt (bulk) temperature shall be measured by plunging a thermocouple in the melt material when it flows out of the extruder.

Maximum working conditions

Maximum temperature = 110 °C (peak temperature),

Maximum shear rate in extrusion process = 1000 s-1