GM	WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW3086

Plastic Fuel Tank

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This specification covers the material requirements for blow moldable plastic fuel tanks. Component testing and full vehicle system validation is required prior to material approval.

1.2 Applicability. Fuel tanks used for fuel storage in the recommended temperature limits of +90 °C continuous and +110 °C excursion. The excursion limit is for localized external hot spots which may result from exhaust routing, failed exhaust testing, etc.

1.3 Remarks.

1.3.1 Material Description.

1.3.1.1 Type 1. Coextruded Polyethylene based multilayer tank design for lower permeation.

1.3.1.2 Type 2. Monolayer Polyethylene based tank for use in developing markets. These tanks shall be fluorinated and documented as described in 3.2.2.1.

1.3.2 Symbols. Marking of plastic fuel tanks shall follow requirements defined in GMW14106.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

(EC) No. 661/2009	ASTM D1603	ASTM E1131	UN R 34

2.2 GM Standards/Specifications.

GMW16	GMW14846	GMW14853	GMW15802
GMW3059	GMW14847	GMW14860	GMW18199
GMW3221	GMW14848	GMW15449	
GMW14106	GMW14849	GMW15450	
GMW14800	GMW14850	GMW15801	

2.3 Additional References.

- CG2015 Validation Cross Reference Index (ID)

(ID) = This standard is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

3 Requirements

3.1 Requirements on Test Specimens. Testing should be performed in a controlled atmosphere per GMW3221, Code A, when applicable.

3.2 Constructions. The type of construction shall be defined on the part drawing and the following.

Tank manufacturers must use material sources listed in the GM Materials Approved Source List for the materials making up their construction.

3.2.1 Type 1. Six-Layer Construction. Refer to Table 1 and Figure 1 for Typical Coextrusion Layer Structure.

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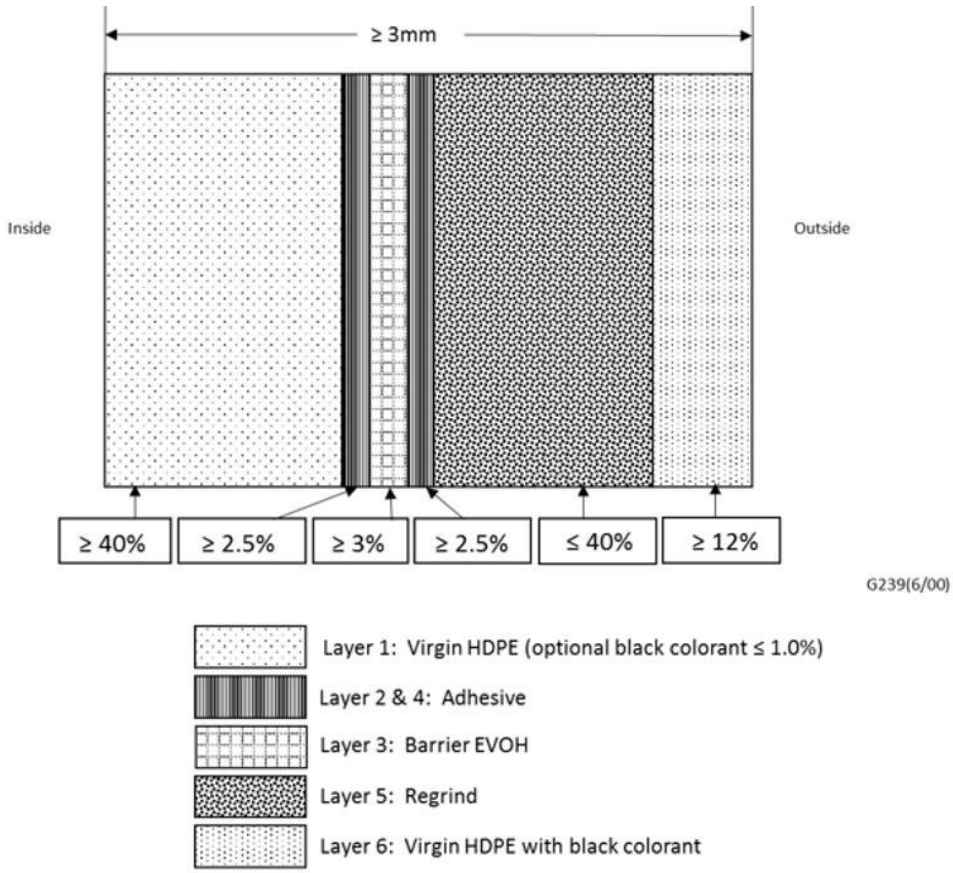
Table 1: Typical Coextrusion Layer Structure

Layer	Material	Specification
1	Virgin High-Density Polyethylene (HDPE)	GMW16 Type 1 – See 3.2.1.1
2	Adhesive - PE based	GMW15802
3	Ethylene Vinyl Alcohol (EVOH) barrier	GMW15801
4	Adhesive – Polyethylene (PE) based	GMW15802
5	Regrind from process only	EVOH should be evenly distributed in regrind layer
6	Virgin HDPE with carbon black	GMW16 Type 1 – See 3.2.1.1

Figure 1: Typical Coextrusion Layer Structure with Depths



3.2.1.1 Colorant. At the time of sourcing, the supplier shall provide the carbon black/PE masterbatch manufacturer to be used for the tank shell material. Where carbon black will be used to apply color to the material, a shell sample shall be tested per ASTM D1603 or ASTM E1131 Thermogravimetric Analysis of Carbon Black. The percentage by weight shall be reported to GM Materials Engineering for approval and shall not exceed 1.0% carbon black by weight.

3.2.1.2 Type 1 Tank Regrind. Regrind content shall be contained in layer 5 and shall not exceed 40% by weight of shell. The maximum regrind content shall be limited to the percentage that was validated and submitted for

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Design Validation Testing (DV). The type of regrind must be of the same material that was validated and submitted for DV Testing. The regrind must be clean, dry, and free of contamination.

3.2.1.3 Dispersion of Regrind Layer. EVOH should be evenly distributed in the regrind layer to avoid delamination. Refer to Figure 2 and Figure 3 for examples of good and bad dispersions, respectively. Uniform distribution implies round particles and no evidence of elongated particles or platelets.

Figure 2: Good Dispersion

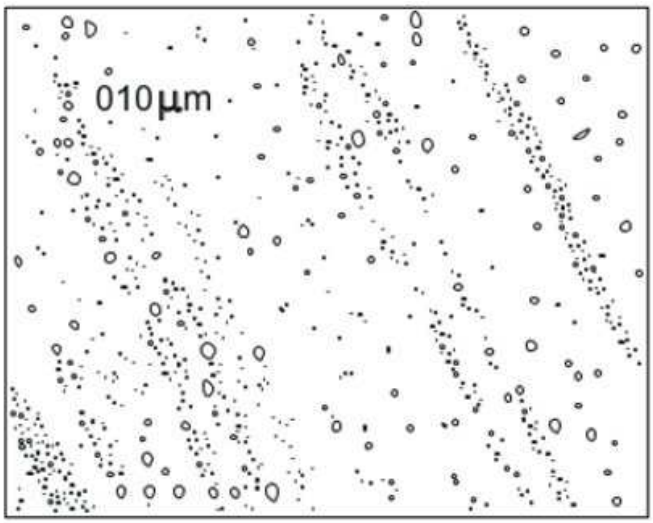
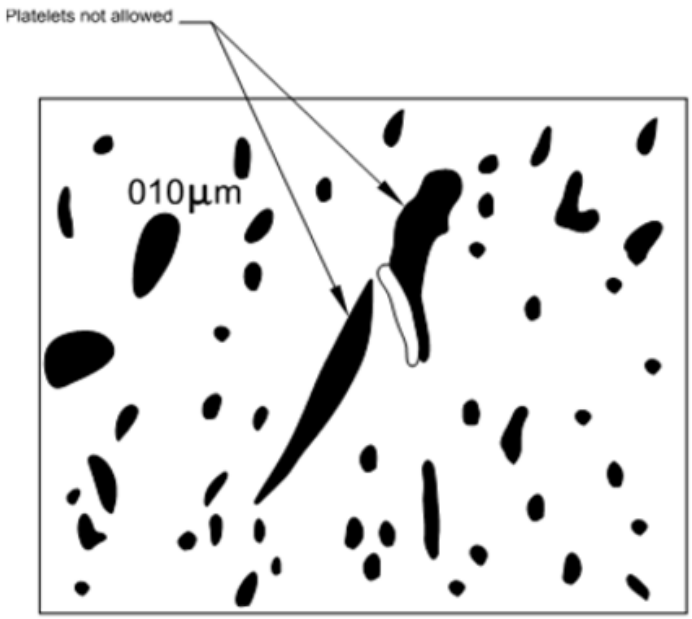


Figure 3: Bad Dispersion



3.2.1.4 Pinch Area. The EVOH barrier layer should kiss (meet) below the pinch off area. A good pinch will provide higher strength, and better permeation. Refer to Figure 4 and Figure 5 for examples of good and bad pinch-off, respectively. The parting line/pinch shall comply with 3.3.1.1.6 in GMW14106.

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