



Park Brake Cable Assembly Technical Specification

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 Scope. This specification establishes the quantitative requirements for park brake cables that are to be used in General Motors vehicles.

This document must only be used when invoked by a program technical specification. References to the program technical specification are included in this document where program requirements are expected to exist.

Note: The program technical specification may include additional program requirements that are not referenced in this document and may supercede any requirements included in this document. In the case of any conflicts between this document and the program technical specification, the program technical specification takes precedence.

1.2 Mission/Theme. The park brake cables transfer hand or foot lever force and travel into force and travel to the rear foundation brake subsystem.

1.3 Classification. See program technical specification for particular content of the park brake cable system.

The specification applies to the design of the park brake cables comprised of the following content.

- Cable assemblies, including coated conduit, plastic inner liner, coated strand, and end fittings.
- Support clips/guides, if applicable.
- Protective sleeves, if applicable.
- Sound insulating sleeves, if applicable.
- Connecting clips, if applicable.
- Equalizer, if applicable.
- Body pass-through sealing grommet.
- Threaded adjustment rod, if applicable.

2 References

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

2.1 External Standards/Specifications.

SAE J405

2.2 GM Standards/Specifications.

GMP.PA612.009	GMW14089	GMW14528	GMW15272
GMW3059	GMW14173	GMW14573	GMW15347
GMW3172	GMW14178	GMW14937	GMW15813
GMW8518	GMW14376		

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September 2013

Page 1 of 9

2.3 Additional References.

- CG2319 Program Technical Specification
- Global Legal Database V2.6
- Labels and Literature Website
- Packaging "Green" Requirements Best Practice - The supplier shall work with the GM responsible engineer to comprehend this requirement
- Park Brake Best Practice Mathvac 73 through 75 and 78 - The supplier shall work with the GM responsible engineer to comprehend this requirement
- Squeak and Rattle Noise Glossary
- Targets for Excellence

3 Requirements

Note: Failure to meet any requirement in Section 3 must be corrected in the design, and the corrective action must be recorded through a retrievable engineering document at the source and/or at GM.

3.1 Environment Definition. No component function specified in this standard shall be compromised when subjected to the environmental conditions as specified in 3.1.1 through 3.1.8.

3.1.1 Mechanical Vibrations. The park brake cable system shall encounter 400 h of mechanical vibration along each axis, using the power spectral density shown in Figure A1 (Appendix A).

3.1.2 Mechanical Shock. Park brake cables shall be exposed to 40 half sine wave mechanical shocks in the upward, rearward, and both lateral directions based on Table 1.

Table 1: Mechanical Shock

Component Location	Maximum G Level (Zero-to-Peak)		Total Duration (milliseconds)
	Upward, Rearward	Left, Right	
Passenger Compartment	18	9	10

3.1.3 Component Drop. Park brake cables must withstand a 1 m drop in any direction onto concrete without degrading part function or assembly, as outlined in this document.

3.1.4 Atmospheric Pressure. The park brake cable system will be exposed to between 330 mmHg and 850 mmHg during operation and storage.

3.1.5 Shipment. Park brake cables shipped by air shall be exposed to a temperature of -50 °C and to a pressure of 127 mmHg.

3.1.6 Corrosion. Typically, cable assemblies are considered under vehicle parts with medium/low visibility and must meet the cosmetic corrosion performance and validation requirements found in GMW15272. The cable shall meet the functional requirements as described in 3.3.1.1. Independent of the design of the Park Brake Cable Assembly the mechanism of galvanic corrosion has to be considered and must be prevented, by specific design and/or material choice.

3.1.7 External Contaminants. Park brake cables must withstand prolonged exposure to: brake fluid, engine oil, transmission fluid, power steering fluid, coolant/anti-freeze, windshield washer fluid, transaxle or differential lube, water, snow, ice, salt (Sodium Chloride (NaCl)) and Calcium Chloride (CaCl₂), dirt, grit, sand, dust, ozone (O₃), car wash chemicals and detergents, engine cleaners, carpet and upholstery cleaners, coffee, soft drinks, and assembly lubricants.

See additions or deletions to this list in the program technical specification.

3.1.8 Temperature and Humidity Range. The park brake lever cable assembly shall be designed to operate under the temperature/humidity ranges shown in Table 2. The minimum temperature is the minimum

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September 2013

Page 2 of 9

temperature at which a component will be expected to operate. Temporary degradation of the component function shall be permitted, but permanent loss of function shall not result in a walk home situation.

The maximum continuous temperature is the maximum temperature a component will experience on a continuous basis and be expected to maintain design functional life. The assembly shall be able to experience 1200 h/12 000 cycles per 160 000 km of operation during continuous thermal conditions. Occupant safety shall not be compromised during continuous thermal conditions.

The maximum excursion temperature is the maximum temperature the component will experience on an infrequent basis and be expected to maintain functional life. The assembly shall be able to experience 60 h/400 cycles per 160 000 km of operation during excursion thermal conditions. Occupant safety shall not be compromised during excursion thermal conditions.

If the vehicle target life is greater than 160 000 km, the hours and cycles should be adjusted accordingly. See program technical specification.

Table 2: Temperature and Humidity Ranges

Minimum Temperature	-40 °C
Maximum Continuous Temperature	115 °C
Maximum Excursion Temperature (TMAX)	135 °C
Relative Humidity Range	0% to 100%

3.2 Interfaces. Park brake cables shall be designed to interface with the subsystems and components described below. The available packaging space will be as shown in a math file available from the GM engineering contact person. See program technical specification.

3.2.1 Interior. See CG2319.

3.2.2 Sealing. The park brake cables shall provide noise and contamination sealing where the cables exit the interior of the vehicle.

3.2.3 Park Brake Cable Mounting. The park brake cables shall be routed and mounted to the body as shown in the packaging math file noted in 3.2. Finalized routings shall comprehend full ranges of suspension travel and tire clearances.

3.2.4 Cable Reaction. The cable will provide conduit end-fittings that require less than 45 N effort to insert into the reaction elements.

3.3 Product Characteristics.

3.3.1 Performance Requirements.

3.3.1.1 Requirements, Reference GMW15347. Potential cable suppliers must complete GMW15347 prior to participation in a technical review during the GM sourcing procedure. Family or surrogate data for similar cables with similar routings may be acceptable at the discretion of the appropriate GM engineer. Failure to meet any of the following requirements for GMW15347 must be corrected in the design prior to retesting from the start.

For testing purposes the maximum service load is as shown in the program technical specification.

3.3.1.1.1. Cable System Force Efficiency. See program technical specification.

3.3.1.1.2 Cable System Deflection. See program technical specification.

3.3.1.1.3 Left/Right Symmetry. The equalizer must provide output loads (left rear vs. right rear) that do not vary by greater than 5% of the input cable force at service loads over 300 N. See program technical specification.

3.3.1.1.4 Continuously Sealed Strand. Zero (0) mL of water is allowed to wick up the strand after 15 minutes of testing.

Note: Wire ropes (i.e., 7 × 7, 7 × 19) shall be able to pass this test with an uncut strand end in the beaker.

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September 2013

Page 3 of 9

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