



Hydraulic Brake Hose 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 Purpose. This document establishes requirements for the Hydraulic Brake Hose Assemblies (HBHA) for General Motors vehicles.

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

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

1.2 Applicability. This standard applies to all hydraulic brake hose assemblies.

1.3 Remarks. The brake apply system must quickly, repeatedly, and efficiently convert the driver's pedal force and travel inputs into hydraulic fluid displacement and pressure. The HBHA work in conjunction with the brake apply system and foundation brakes to provide the vehicle with smooth, safe deceleration, retardation and retention performance under all driving conditions.

2 References

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

2.1 External Standards/Specifications.

AIS-037	CMVSS 106	FMVSS 106	IS 7079
Article 90	CNCA-02C-057	GB16897	SAE J1737
CMVR 1989			

2.2 GM Standards/Specifications.

GMW3056	GMW14573	GMW15105	GMW15862
GMW3059	GMW14871	GMW15272	GMW16072
GMW14089	GMW14872	GMW15386	

2.3 Additional References.

- GM Part Numbers:

11518683	11569589	11569590
17999821	21012386	11569670

- GM Global Legal Database

GM Confidential

© Copyright 2016 General Motors Company All Rights Reserved

December 2016

Page 1 of 12



Documents

Document Sharing Hub

3 Requirements

3.1 Component Assembly Definition. The HBHA is a flexible conduit manufactured for use in a brake system to transmit or contain the fluid pressure used to apply force to a vehicle's brakes. The HBHA must survive the life of the vehicle. In doing so it must take into account suspension movement from jounce to rebound, steering inputs from steer lock to steer lock, brake lining wear, thermal inputs, tire and wheel profile, and component clearance. See Appendix A, Figure A1 Brake Hose Functional Context Diagram.

3.1.1 Appearance. The HBHA assembly shall be black in appearance. Identification shall conform to government regulations as specified in GMW3056, including China Compulsory Certification (CCC) markings for production and service hose assemblies sold in China. Attachment brackets shall be black in appearance and handedness shall be identified on the bracket.

3.1.2 Content. The required physical and functional content for the HBHA are identified in 3.1.2.1 through 3.1.2.2.

3.1.2.1 Physical Content. The HBHA typically includes the following sub-components:

- Hose
- Female Fitting
- Banjo Block
- Bracket
- Retainer
- Washer
- Bolt

3.1.2.2 Functional Content. The HBHA primary function is to allow for the conveyance of brake fluid to the caliper without leak. The HBHA shall be designed to allow for suspension and steering inputs without the loss of primary function.

3.1.3 Ambient Environment. The HBHA will be capable of operating in an under hood/body environment under the following conditions:

- Minimum Temperature: -40 °C
- Maximum Continuous Temperature: 125 °C
- Maximum Excursion Temperature: 150 °C
- Maximum Internal Brake Fluid Temperature: 105 °C
- Relative Humidity Range: 4% to 100%

The minimum temperature is the minimum temperature at which a component will be expected to operate. Assisted vehicle starting shall be permitted. 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 vehicle 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 vehicle 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 specific technical specification. (Stakeholders: 20.04 Brakes; 0D.02 Thermal Management.)

3.1.4 Interfaces.

3.1.4.1 Brake Hose to Caliper Interface. The brake hose to caliper attachment flow bolt torque to seal and torque to failure shall be evaluated per GMW14871.

3.1.5 Usage Definition. Not applicable.

GM Confidential

© Copyright 2016 General Motors Company All Rights Reserved

December 2016

Page 2 of 12



Documents

Document Sharing Hub

3.1.6 Regulatory. This section list known regulatory requirements for brake hose assemblies.

3.1.6.1 China Compulsory Certification (CCC): It is the supplier's responsibility to meet all applicable Chinese regulatory requirements, including but not limited to, CCC regulations according to CNCA-02C-057 for all impacted parts. The GM math data or parts specific drawing general notes will have "If this part can be on a vehicle built in or imported into China, then this part shall be China Compulsory Certification compliant." Supplier shall obtain proper authorization and mark all salable production and service parts with the approved CCC symbol. Supplier shall upload a copy of the CCC certificate and marking approval certificate into Global Quality Tracking System (GQTS) prior to Production Part Approval Process (PPAP) or at Start of Regular Production (SORP) minus 2 months, whichever is sooner. Once achieved, certification must be kept current at all times including, but not limited to, any updates that are required due to regulation changes, factory moves, part changes, required conformity of production testing, annual factory inspection or annual marking approval certificate renewals. All costs in obtaining or maintaining compliance to these regulations shall be the responsibility of the supplier.

3.1.6.2 India Type Approval. India Brake Hose regulation as per Central Motor Vehicle Rules (CMVR 1989)

- Brake Hose approval certificate (IS-7079)
- Conformity of Production for Safety Critical Components (AIS-037); frequency every 2 years

3.2 Product Characteristics.

3.2.1 Performance Requirements.

3.2.1.1 Material. Unless otherwise specified the requirements of GMW3056 are valid.

3.2.1.2 Routing. Unless otherwise specified the requirements for brake hose routing of GMW15105 are valid.

3.2.1.3 Attachment. Unless otherwise specified the attachment scheme will follow existing GM practices.

3.2.1.4 Corrosion Resistance. The requirements for the corrosion resistance of the component are given in 3.2.1.4.1 through 3.2.1.4.2.1. The requirements apply for exposure up to and including the severe high-corrosive environments of the Northeastern USA, Southeastern Canada, and Southern USA coastal areas.

3.2.1.4.1 Lab-Based Corrosion Resistance Test.

The Brake Hose Assembly shall meet the corrosion performance and validation requirements of GMW15272. Lab testing shall be to GMW14872, Underbody, All, 4 sp, Method 1/2/3, Exposure E (15 year functional evaluation for underbody components). Evaluate at 100% of exposure. Test samples must be complete assemblies including all routing aids, and each hose assembly (in particular the end fittings) must be tested in vehicle orientation. End of Test (EOT) samples shall be measured for corrosion pitting/penetration into the crimp area and the projected life (time until perforation) must exceed 15 years.

3.2.1.4.2 Vehicle-Based Corrosion Resistance. As stated in 3.2.3.3, the hose must remain functional for a projected 15 years in a severe high-corrosion environment.

3.2.1.4.2.1 All accelerated corrosion tests require careful interpretation since not all corrosion mechanisms are accelerated at the same rate. Assessment of components at EOT for functional performance will be performed by the GM Lead Design Engineer (DE) and Global Corrosion Engineering. Depending on the corrosion mechanism(s) involved, EOT checks for function may not be sufficient to validate 10 year field performance. At a minimum, no metal loss (loose/flaking corrosion product or pitting of the substrate) is permitted on any components at EOT. If any metal loss or pitting is observed, additional analysis will be required, and must be conducted with the assistance of GM Corrosion and/or Materials Engineering.

3.2.1.5 Volumetric Expansion.

3.2.1.5.1 Volumetric Expansion at Ambient Temperature. Six (6) assemblies crimped at nominal hose compression shall be tested at ambient temperature to the volumetric expansion test procedure and pressure levels referenced in GMW3056. This data will not be compared to the specifications applied to standard test samples in GMW3056, but will be provided to GM to characterize the performance of each specific hose assembly.

3.2.1.5.2 Volumetric Expansion at Elevated Temperature. Six (6) assemblies crimped at nominal hose compression shall be tested at elevated (80 °C) temperature to the volumetric expansion test procedure and pressure levels referenced in GMW3056. This data will not be compared to the specifications applied to standard test samples in GMW3056, but will be provided to GM to characterize the performance of each specific hose assembly.

GM Confidential

© Copyright 2016 General Motors Company All Rights Reserved

3.2.1.5.3 Brake Fluid Compatibility. In applications where the hose assembly is used with a brake fluid that it was not validated with previously, GMW3056 shall be repeated with nominal compression hoses, using the application-specified brake fluid and the design intent brake hose configuration.

3.2.2 Physical Characteristics.

3.2.2.1 Dimensions and Capacity. The HBHA includes the content in Table 1. Use the part numbers as listed or an approved substitute. See program-specific technical specification.

Table 1: Hydraulic Brake Hose Assembly

Component	Part Number or Specification
Removable Retainer Clip	Part number 17999821 or approved substitute
Body Attachment Bracket/Brake Hose Interface Bracket	Vendor design in accordance with body mounting location
Female End-fitting	M10 x 1.0 – 6H Thread
	Steel or Brass Eyelet with conical seat. (Bill of Process compliant will be Inverted Flare)
	Error proofing attachment to the body bracket allowing for removal of the brake hose from the body bracket
Brake Hose	In accordance with GMW3056
End fitting	Either tube or block design or banjo fitting (dictated by packaging or thermal requirements)
	Banjo bolt hole diameter 10.15 mm to 10.28 mm
	Banjo block height 11.40 mm to 11.80 mm
	Block width from bolt hole centerline 9.60 mm to 9.80 mm
	Non-Serrated block
Washer and Banjo Bolt	Washer part number 21012386, OR
	If non-GM part number, washer must be: Outer diameter 14.5 mm $\pm$ 0.15 mm Inner diameter 10.3 mm $\pm$ 0.3 mm Thickness 1.61 mm $\pm$ 0.06 mm Material CDA 102 copper
	Banjo bolt part number 11569589 or 11518683 (Coarse Thread bolt)
	Banjo bolt part number 11569590 or 11569670 (Fine Thread bolt)
End-fitting Orientation	$\pm$ 7 degrees or less

3.2.2.1.1 Hose Armor. The HBHA shall consist of a hydraulic brake hose with or without armor, per the vendor's design with engineering approval.

3.2.2.1.2 Hose End Fittings.

GM Confidential

© Copyright 2016 General Motors Company All Rights Reserved

December 2016

Page 4 of 12