



Brake Rotor 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 document provides the standard technical requirements for the brake rotor. 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. These requirements apply to a front or a rear brake rotor, vented or solid.

Note: The program-specific technical specification may include additional program-specific 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 Mission/Theme. The brake rotor converts vehicle kinetic energy into heat energy through friction. The brake rotor provides a means for dissipating the heat energy to the atmosphere.

1.3 Classification. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059	GMW15392	GMW16284
GMW8518	GMW15398	GMW16331
GMW14984	GMW16218	GMW16394

2.3 Additional References.

General Motors Lining List

Program-specific Statement of Requirement (SOR)

Program-specific Technical Specifications

Rotor Template Drawing

SOR Appendix F7 - Geometric Dimensioning and Tolerancing

SOR Appendix N2 - Rotor Program-Specific Requirements for Metallurgy Worksheet

Squeak and Rattle Noise Glossary

3 Requirements

3.1 Definition. The brake rotor transforms caliper clamping force into braking torque and transmits the braking torque to the wheel subsystem. It also acts as a heat storage device for dissipation to the atmosphere.

3.1.1 Appearance. The appearance requirements will be included in the Architectural homeroom Program-specific Statement of Requirements (SOR) for additional requirements. Also see program-specific technical specification.

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3.1.1.1 Corrosion. The brake rotor shall meet all of the cosmetic and functional corrosion requirements in GMW16284 and the applicable Front and Rear Brake Corner Assembly Technical Specifications GMW15392 and GMW15398.

3.1.2 Content. The brake rotor is a single component. When assembled in the brake corner, the rotor contributes to the deceleration of the vehicle and provides for temporary storage and dissipation of heat.

3.1.3 Environmental Definition. The ambient and operating environments for the brake rotor are defined in the applicable Front and Rear Brake Corner Assembly Technical Specifications (Stakeholders: 0D.02:20:9).

3.1.4 Interfaces. The brake rotor will interface with other components as defined in the program-specific technical specification.

3.2 Product Characteristics. See the program-specific technical specification for exceptions to the requirements in this section.

3.2.1 Performance. The rotor shall meet the performance requirements for all regions, when accounting for regional differences in pad material. The rotor shall be able to meet the performance requirements with any lining selected from the approved General Motors Lining List.

The requirements apply to the rotor for the target life of the vehicle at the bandwidth parameters defined in the applicable Front and Rear Brake Corner Assembly Technical Specifications.

Supplier shall provide the GM engineer with test data that verifies the worst case (± 3 sigma) assembly performance will meet the requirements as stated below.

For measurements and tests where no procedure is specified, a supplier process or test, approved by GM Engineering, shall be used.

3.2.1.1 Balance. Balance shall to be accomplished by machining the outside diameter. The rotational speed for the balance equipment shall be specified by GM Engineering. This requirement is a Key Product Characteristic (KPC). See program-specific technical specification.

3.2.1.1.1 Fully Machined Rotors. The maximum imbalance of the rotating mass of the rotor, shall be less than or equal to 0.30 kg-mm.

3.2.1.1.2 Partially Machined Rotors. The maximum imbalance of the rotating mass of the rotor shall be less than or equal to 0.70 kg-mm

3.2.1.2 Thermal Cracking Test. Shall meet GMW14984 requirements.

3.2.1.3 Thermal Coning. The rotor shall not exceed 250 microns of coning at the outer diameter of the rotor per procedure specified by GM Engineering. See program technical specifications.

3.2.1.4 Modal Separation. The rotor nodal diametrical (ND) nodes that are higher in frequency than the 1st and 2nd compressional modes shall be separated by at least 300 Hz. The 3rd compressional mode and the ND modes that are higher in frequency shall be separated by at least 100 Hz. The frequency of an axial mode that is closest to any compressional mode shall be higher than that of the compressional mode when frequency separation is less than 100 Hz. GM engineering shall specify the specific boundary conditions under which the analysis and measurements are to be taken (i.e. free-free or constrained). See program-specific technical specification.

3.2.1.5 Frequency Response Variation. The rotor frequency variation shall be less than $\pm 2.5\%$. GM Engineering will specify the number and type of modes to be measured. These specified modes shall be 100% measured, recorded and controlled during Prototype phase, Production Part Approval Process and Production. Measurement is to be performed on machined rotor. The corresponding casting may be measured, if specified by GM Engineering.

3.2.2 Physical Characteristics. The following physical characteristics apply to the brake rotor. For measurements and tests where no procedure is specified, a supplier process or test, approved by GM Engineering, shall be used. All dimensions are specified in the Rotor Template Drawing.

3.2.2.1 Dimensions and Capacity. All dimensions shall be provided at each Prototype Phase, minimum of 30 piece sample size. Refer to the Statement of Requirements (SOR) Appendix F7 - Geometric Dimensioning and Tolerancing requirements.

3.2.2.1.1 Lateral Runout. The maximum lateral runout of the rotor shall be less than or equal to 0.020 mm. This requirement is a KPC.

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