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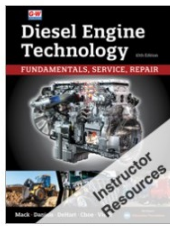
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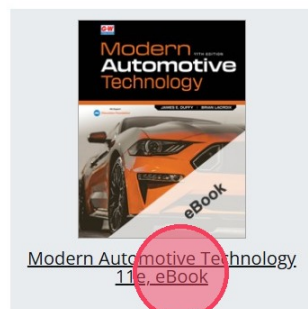
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Modern Automotive Technology 11e, eBook

Author: James E. Duffy and Brian LaCroix

**Modern Automotive Technology** is a comprehensive solution that will take your students from basic to advanced. Correlated to all three levels of the latest ASE Education Foundation Task Lists (MLR, AST, and ASEP), it details the construction, operation, diagnosis, service, and repair of late-model automobile systems. Updated by new author Brian LaCroix, this edition features new pedagogy and hundreds of illustrations reflecting the latest advancements in automotive system technology and service. New chapters include: Advanced Driver Assistance Systems (ADAS); Automotive Oils, Coolants, Lubricants, and Fluids; Cleaning; Detailing; Controller Area Network (CAN) Systems; and EPA 609 Certification.

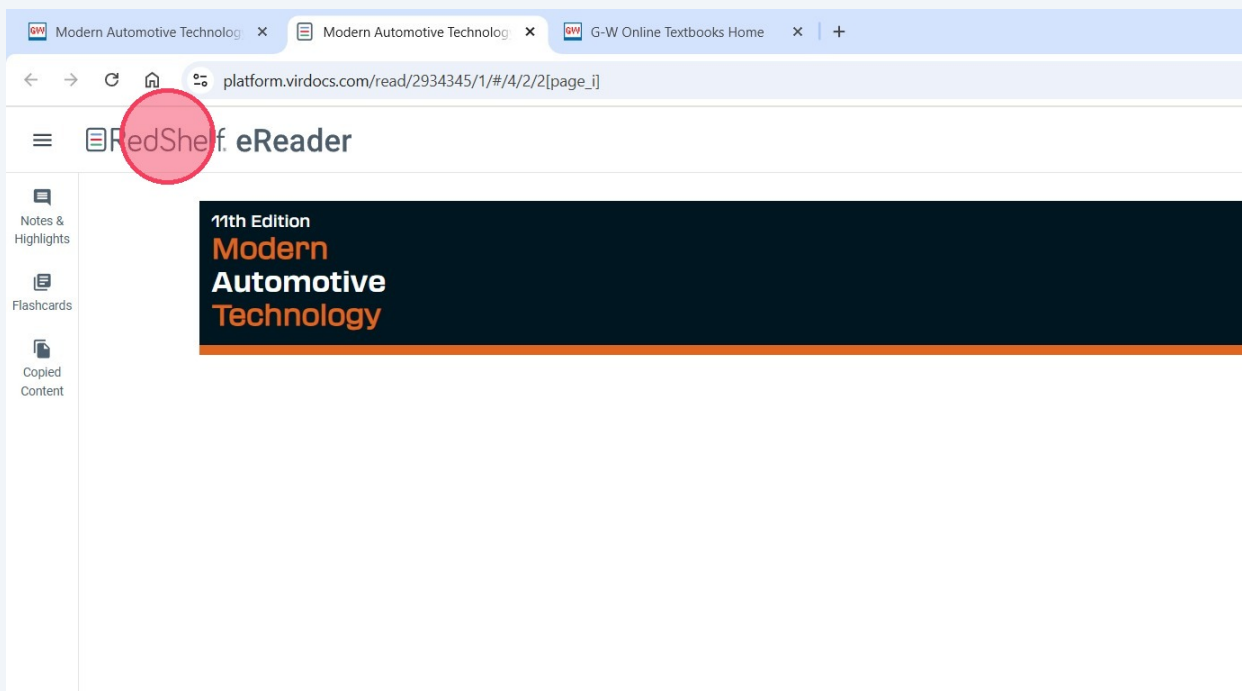
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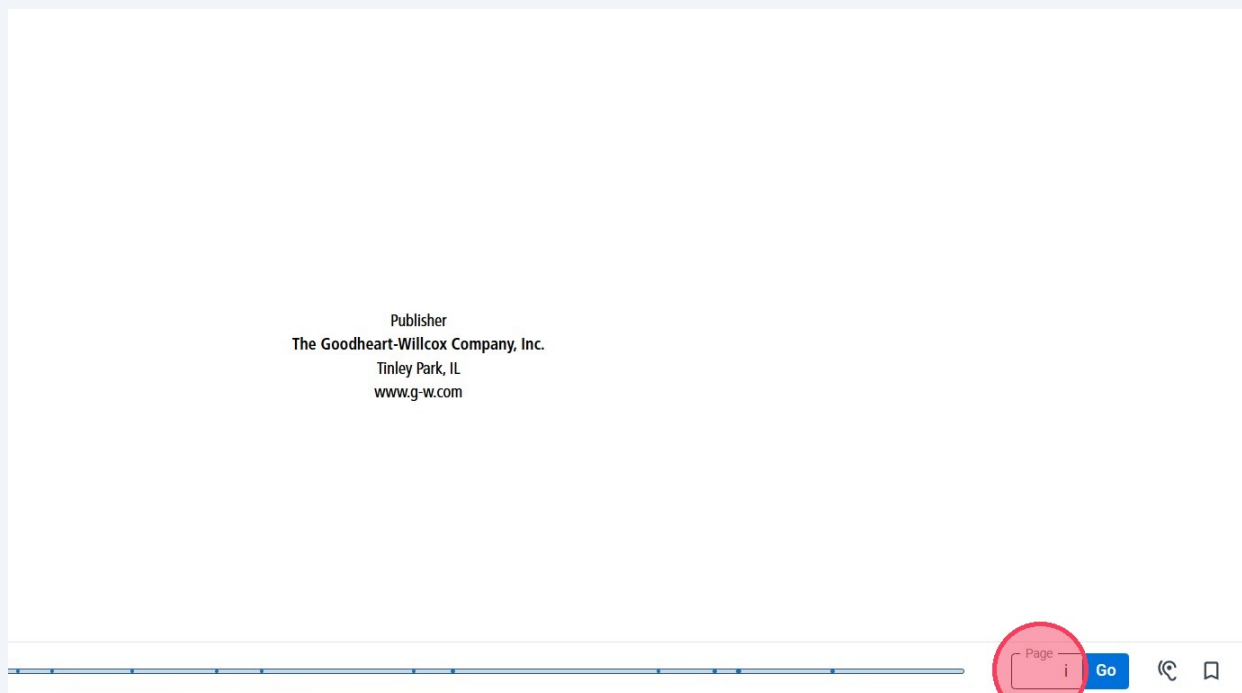
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**Figure 2-1.** A well-maintained automotive shop can be an enjoyable place to work. Always do your part to keep the shop clean and well organized. Shop layouts vary, but the majority of shop space.

**Parts Department**

Service departments at vehicle dealerships commonly have an adjoining parts department. Parts department employees often handle two counters: one for technicians while the other is a sales-only counter for walk-in customers, owners servicing their own vehicles, or sales to other businesses. The entire department is responsible for organizing, storing, managing, and retrieving the parts required to complete vehicle service and repairs, including handling common over-the-counter sales. It is important to have common manufacturer parts in stock to ensure fast repairs on their manufacturer's models.

**Vehicle Traffic Lanes**

Most shops have designated traffic lanes for vehicles to be driven in and out of the shop through centralized garage doors. It is important to keep these lanes clear of obstacles to prevent accidents and not disrupt the overall productivity of the shop.

**Walking Lanes**

Automotive shops also have designated walking lanes for technicians, service writers, or other employees to travel that are clear of vehicle traffic and are indicated with painted or taped lines on the shop floor and provide routes from the service bays to the service counter, parts department, toolroom, classroom, and other areas.

**Repair Area**

The *repair area* includes any location in an automotive shop where service and repair operations are performed, such as the service bay, vehicle lift, and other areas. Pathways in the shop are also categorized as part of the repair area. It typically includes every area except the classroom, locker room, restroom, and toolroom.

**Service Bay**

Next

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### CHAPTER 1 Review and Assessment

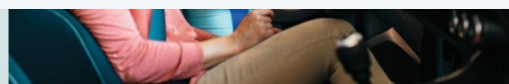
#### SUMMARY

- An automotive part, or component, can be removed from a vehicle but not disassembled. An automotive assembly is a set of fitted parts, which a technician can disassemble and reassemble during service, that is designed to complete a specific task on a vehicle. Automotive systems are groups of related components and assemblies that work together to perform a specific function. (1.1)
- A vehicle's paneled body structure provides safety to the occupant(s) and encloses the vehicle. A strong metal frame provides a mounting place for all vehicle's chassis and drive train components, as well as for the body structure. Unibody construction is the most common type of passenger vehicle construction. (1.2)
- General specifications for vehicles include fuel efficiency, curb weight, gross vehicle weight rating, weight distribution, wheelbase, track width, and wheel length, width, and height. Vehicles are categorized as full-size, midsize, compact, and minicompact based on their size. Sedans, convertibles, hatchbacks, wagons, pickup trucks, vans, sport utility vehicles, and crossover utility vehicles are some of the vehicle body types available. (1.2)
- Automotive engines are multicylinder engines that use the four-stroke cycle to provide dependable, efficient power for vehicle propulsion. The fuel system provides the correct mixture of air and fuel for efficient and complete engine combustion. The cooling system maintains a constant engine operating temperature for improved combustion efficiency. The lubrication system reduces friction between moving parts inside the engine and carries heat away from the engine. The exhaust system routes hot exhaust gases out of the vehicle and quiets engine noise. Emission control systems reduce air pollution produced by the engine and fuel system. (1.3)
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- Suspension, steering, and brake systems support and control vehicle handling, maneuvering, and deceleration. (1.7)

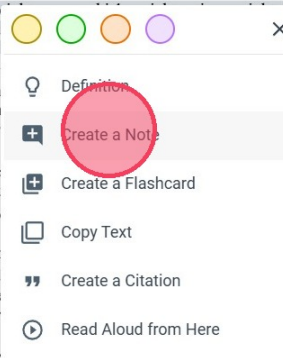
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- 12 select a specific color, *Add a Note*, and select **Save**.

### d Assessment

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Important for Quiz 1

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Page 20 Go

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### d Assessment

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- 14 Notice the "Text-to-Speech" features on the bottom of the screen including the *Play* button, *Volume*, and more.

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- 15 Select the **Bookmark** icon to tag a specific page for later reference.

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- 16 Select the **Notes & Highlights** feature to view all the highlighted text and notes created throughout the eBook.

The screenshot shows the RedShelf eReader interface. On the left, a sidebar titled 'Notes & Highlights' is open, showing a list of notes. The first note is on 'Section 1 Introduction to Automotive Technology and Foundational Workplace Skills (10)' and contains text about the origin of the word 'automobile'. The second note is on 'Page 4' and contains text about the design, construction, service, maintenance, and repair of modern passenger vehicles. The main content area displays a photograph of a hybrid drive train with labels for the 'Internal combustion engine' and 'Motor-generator/transaxle assembly'. Below the photo is a caption for Figure 1-22 and a description of the hybrid drive train. At the bottom of the page, there is a 'WORKPLACE SKILLS' section.

- 17 To turn off the **Text-to-Speech** feature, select the icon once again.

The screenshot shows a document viewer interface. On the left, there is a vertical image of a car's interior. Below the image, there is a black redaction bar. The main content area displays text about automatic transmissions. At the bottom, there is a text-to-speech interface with a play button and a 'Text-to-Speech Controls' button. The page number 487 is visible in the bottom right corner.

18

Select the *bullet point* icon to view the **Table of Contents** and select a chapter or unit to link directly to that page in the book.

The screenshot shows a web browser window with the address bar displaying a URL. The page title is 'G-W Online Textbooks Home'. A red circle highlights the 'bullet point' icon in the top right navigation bar. A 'Contents' sidebar is open, showing a 'Table of Contents' with links to various sections like 'Tools for Student and Instructor Success', 'Brief Contents', and 'Contents'. The main content area shows a section titled 'd Assessment' with highlighted text about automotive assemblies and safety.

19


Users may conduct a page or keyword search throughout the book. Select the **Search** icon, enter a keyword search and select *Go* or *Enter*.

The screenshot shows a web browser window with the address bar displaying a URL. The page title is 'G-W Online Textbooks Home'. A red circle highlights the 'Search' icon in the top right navigation bar. A 'Search' sidebar is open, showing a search input field with the text 'engine' and a magnifying glass icon. The main content area shows a section titled 'Case' with text about transmission components and a diagram of a transmission case.

## 20 Scroll down to view the search results

Methods to transmit power: fluid, friction, and gears.  
Power from the engine to the transmission. The bands and clutches use *friction* to lock or hold parts together. The transmission converts torque.

**Case**  
Constructed with a few main components: bell housing, case, pan, and extension housing. These parts support, enclose, and protect the internal components of the transmission. The case is made of aluminum. It supports the transmission pump, surrounds the torque converter, maintains proper crankshaft/transmission alignment, and provides rough holes in the bell housing and attach to the engine block. The bell housing uses dowels for proper alignment. It also supports the input shaft, gears, gearsets, and inner ends of the transmission shafts. The bell housing bolts to the front of the aluminum case, and the extension housing bolts to the bottom of the case. The pan or the *pan*, collects and stores a supply of transmission oil. The pan is usually made of thin, stamped steel or cast iron. The input shaft and, depending if the vehicle is two-wheel, four-wheel, or all-wheel drive, supports the drive shaft with an input shaft. A gasket is used on the front of the housing and a seal or gasket at the rear to prevent fluid leakage. The housing is made of cast iron.



**Search**

About the Authors

Chevrolet CRC Industries, Inc. Cummins **Engine** Co., Inc. Cy-lent Timing Gears

Acknowledgments

Senus Auto Volkswagen Volvo Waukesha **Engine** Div., Dresser Industries, Inc. ZF

Acknowledgments

the basics of different automotive **engine** oils, coolants, lubricants, and chemicals

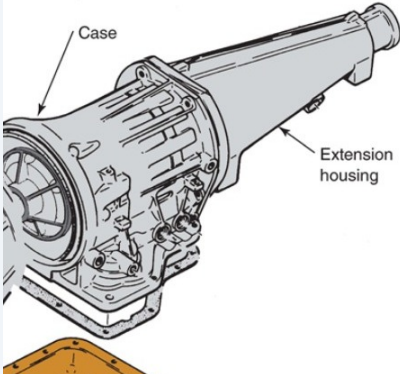
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16 Engine Timing Components 17 **Engine** Size and Performance Measurements 18

## 21 and select the section of text you wish to continue reading.

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must always replace a manufacturer-developed **engine** oil with the same one

Section 1 Introduction to Automotive Technology and Foundational Workplace Skills

It often has a smaller **engine** and gets better fuel economy

Section 1 Introduction to Automotive Technology and Foundational Workplace Skills

substitute to avoid damaging the **engine** and its systems or experiencing

Section 1 Introduction to Automotive Technology and Foundational Workplace Skills

type of oil. Start the **engine** and make sure the oil

Section 1 Introduction to Automotive Technology and Foundational Workplace Skills

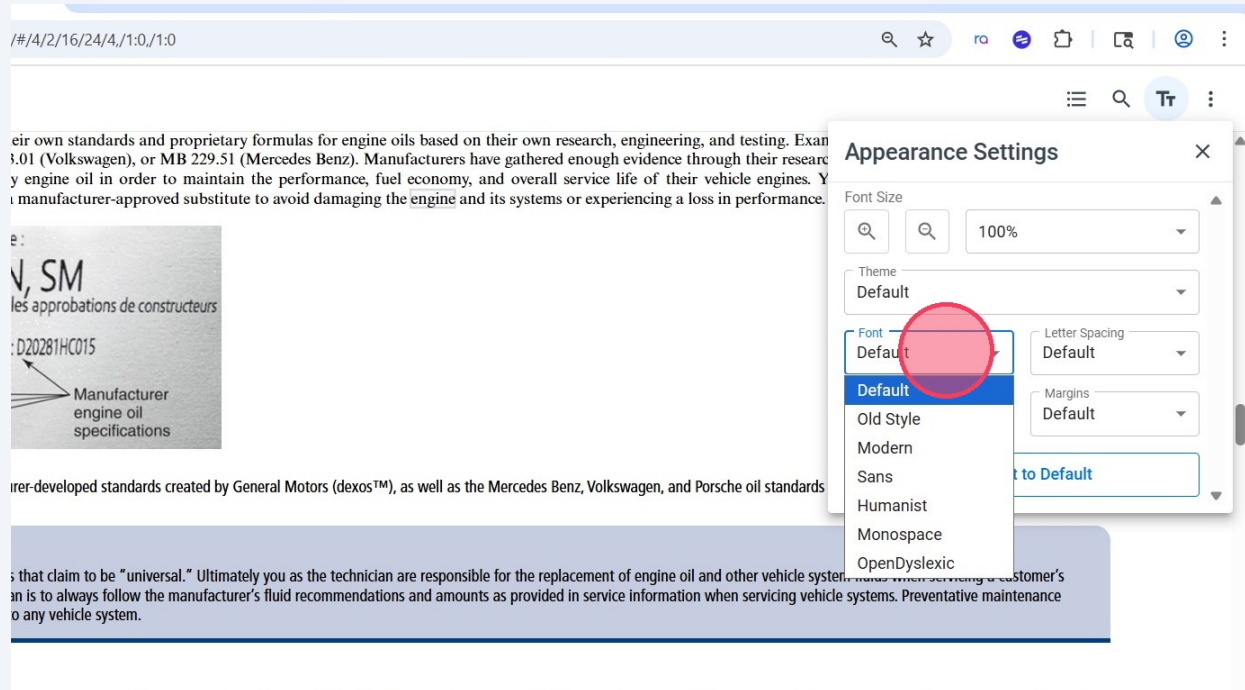
system mid-engine drive train multicylinder **engine** part rear-wheel drive (RWD) safety

Section 1 Introduction to Automotive Technology and Foundational Workplace Skills



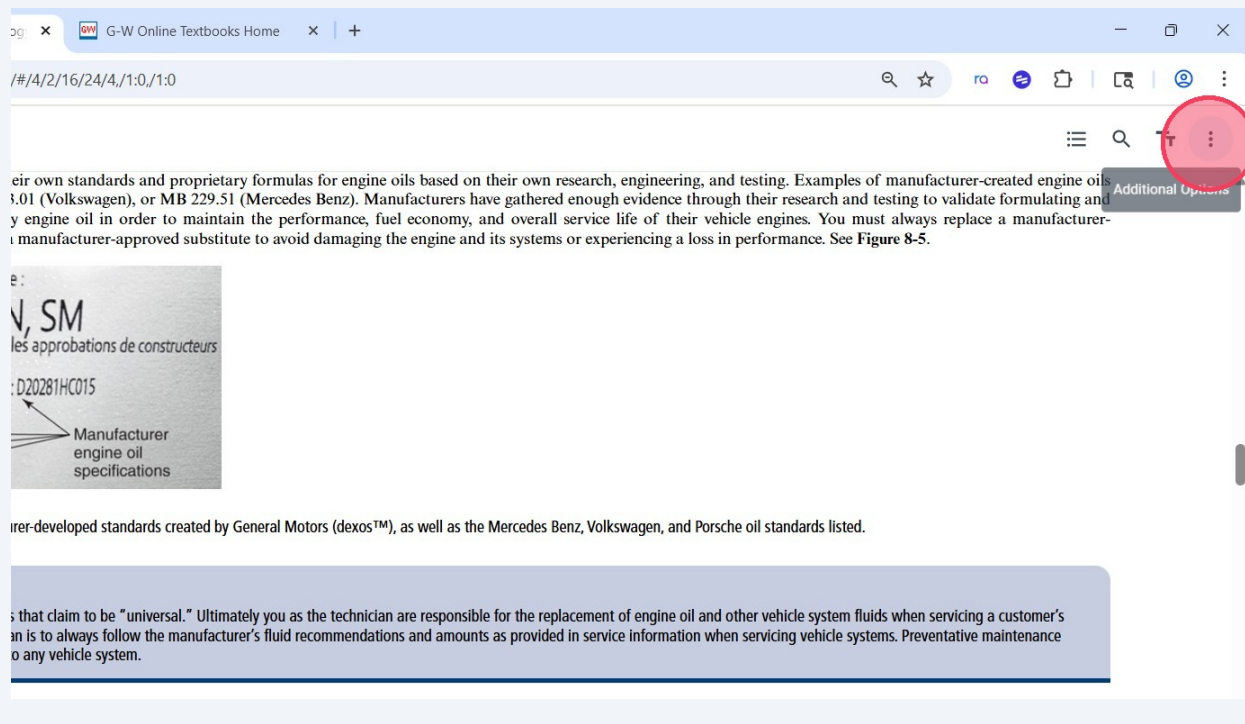
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23

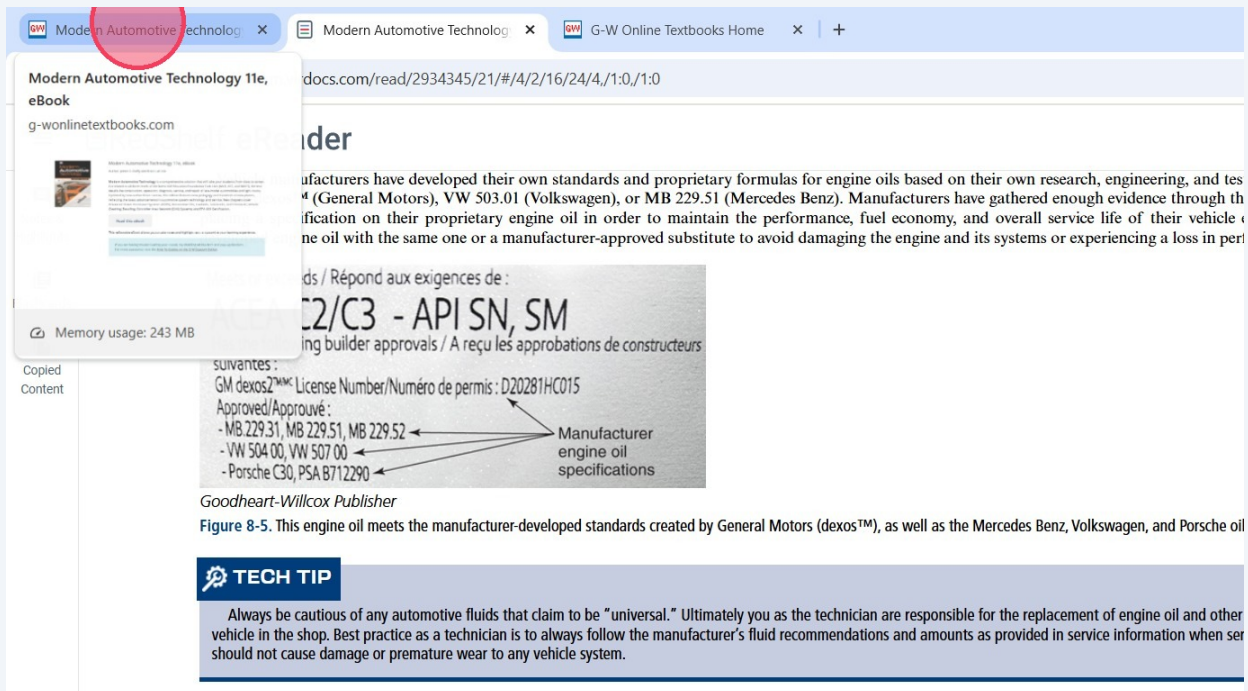
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Manufacturers have developed their own standards and proprietary formulas for engine oils based on their own research, engineering, and tests (General Motors), VW 503.01 (Volkswagen), or MB 229.51 (Mercedes Benz). Manufacturers have gathered enough evidence through their certification on their proprietary engine oil in order to maintain the performance, fuel economy, and overall service life of their vehicle with the same one or a manufacturer-approved substitute to avoid damaging the engine and its systems or experiencing a loss in performance.

Normes / Répond aux exigences de :  
API SN, SM  
Manufacturer engine oil specifications

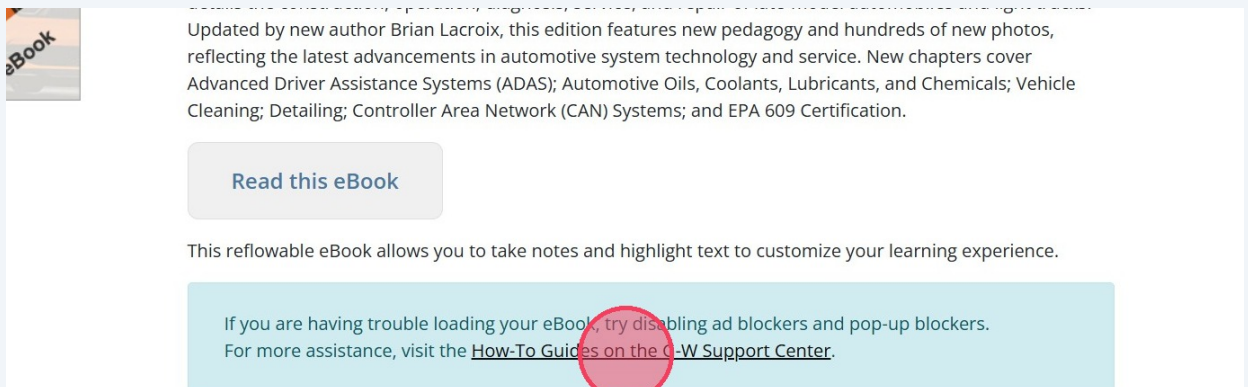
Goodheart-Willcox Publisher

**TECH TIP**  
Always be cautious of any automotive fluids that claim to be "universal." Ultimately you as the technician are responsible for the replacement of engine oil and other vehicle in the shop. Best practice as a technician is to always follow the manufacturer's fluid recommendations and amounts as provided in service information when ser should not cause damage or premature wear to any vehicle system.

Figure 8-5. This engine oil meets the manufacturer-developed standards created by General Motors (dexos™), as well as the Mercedes Benz, Volkswagen, and Porsche oil

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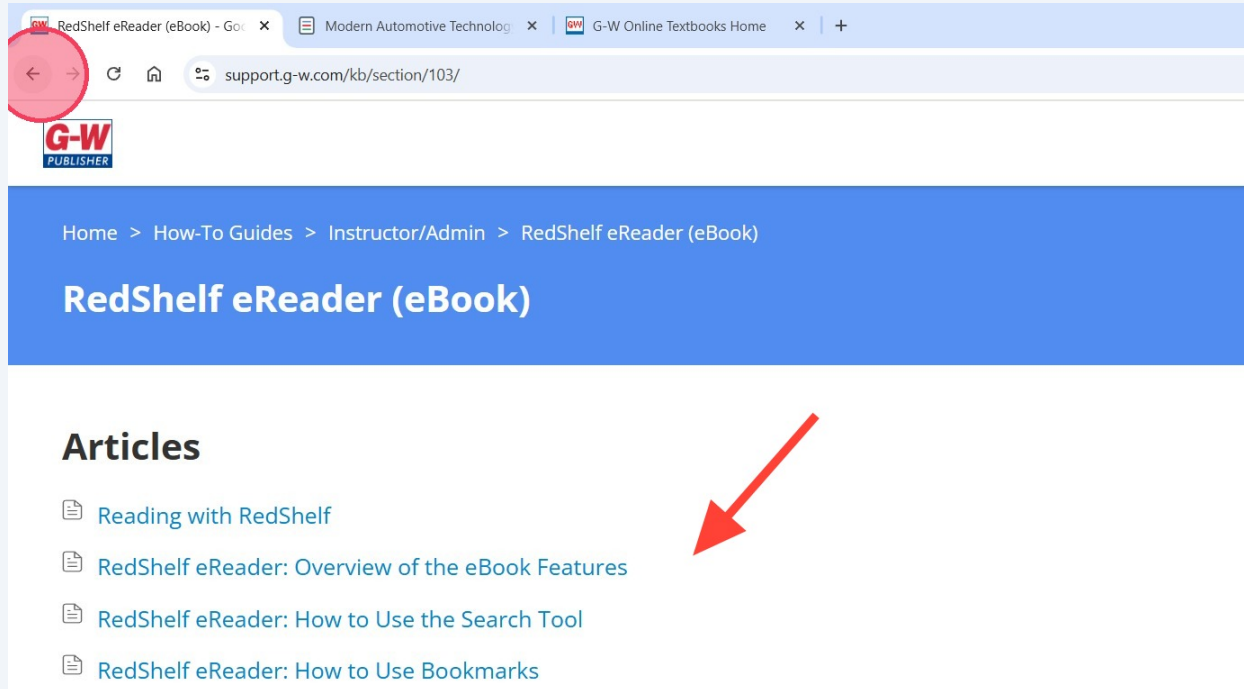
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