



8678

TIRES, WHEELS, AND BRAKE  
ASSEMBLIES (12B)

40S/40E/40M

A Heavy Duty Equipment Technician Course



# 8678: TIRES, WHEELS, AND BRAKE ASSEMBLIES (12B) 40S/40E/40M

## Course Description

A student wanting to develop skills in the heavy duty equipment industry must have knowledge of tires, wheels, and brake assemblies. The student will be able to service tires, wheels, and brake assemblies, and diagnose and repair problems with them.

Cross-curricular learning outcomes, or essential skills from subject areas including, but not limited to, information and communication technologies, science, English language arts, and mathematics, are to be integrated into the authentic learning activities of the course.

The curriculum is not sequential. For instructional purposes, the sequence of learning outcomes can vary based on the learning activities within the course.

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**Goal 1:** Describe and apply appropriate **safety** practices for heavy duty equipment technicians.

**GLO 1.1:** Describe and apply appropriate **safety** practices for heavy duty equipment technicians.

- SLO 12B.1.1.1 Describe and apply appropriate health and safety practices as they pertain to tires, wheels, and brake assemblies.
- SLO 12B.1.1.2 Describe safety practices, Workplace Hazardous Material Information System (WHMIS), and preventative maintenance. (A1.01)
- SLO 12B.1.1.3 Describe cab, canopy, and ROP/FLOP components, and their operation, inspection, repair, and replacement procedures. (A1.02)
- SLO 12B.1.1.4 Describe the servicing of fire suppression systems. (A1.03)
- SLO 12B.1.1.5 Describe forklift operation and safety. (A1.04)
- SLO 12B.1.1.6 Describe restraint systems and their components, and inspection procedure, manufacturers' tests, and repair/replacement of them. (A1.05)
- SLO 12B.1.1.7 Demonstrate safety procedures for hydraulic hydrostatic system servicing.
- SLO 12B.1.1.8 Demonstrate safety procedures for HVAC system servicing.

SLO 12B.1.1.9	Describe the importance of using personal protective equipment (PPE). (TSA 16)
SLO 12B.1.1.10	Describe safety procedures when handling wheels, tires, and hubs. (F1.04)
SLO 12B.1.1.11	Maintain a safe and organized work environment.
SLO 12B.1.1.12	Document an understanding of the safe use of heavy duty tools and equipment.

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**GLO 1.2:** Demonstrate knowledge of the *Trade Safety Awareness Manual*.

No applicable SLOs.

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**Goal 2:** Identify, select, use, and maintain **tools, equipment, materials, and consumables**.

**GLO 2.1:** Identify, select, use, and maintain **tools, equipment, materials, and consumables**.

SLO 12B.2.1.1	Identify, select, use, and maintain tools, equipment, materials, and consumables used for working with tires, wheels, and brake assemblies.
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**Goal 3:** Describe and demonstrate equipment **access/transport** procedures.

**GLO 3.1:** Describe and demonstrate equipment **access/transport** procedures.

SLO 12B.3.1.1	Describe lifting equipment. (A2.01)
SLO 12B.3.1.2	Describe safety practices that apply to lifting and to the maintenance of lifting equipment. (A2.02)
SLO 12B.3.1.3	Describe towing, transporting, and coasting precautions. (A2.03)
SLO 12B.3.1.4	Describe manual lifting procedures using correct body mechanics. (A2.04)
SLO 12B.3.1.5	Describe lifting equipment construction, grading, sizing, and limits. (A2.05)
SLO 12B.3.1.6	Select the correct equipment for rigging typical loads. (A2.06)
SLO 12B.3.1.7	Describe wire rope applications. (A2.07)
SLO 12B.3.1.8	Describe winch design, and operational and troubleshooting procedures. (A2.08)

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**Goal 4: Diagnose and repair** problems with heavy duty equipment systems.

**GLO 4.1: Diagnose** problems with heavy duty equipment systems.

SLO 12B.4.1.1 Diagnose issues related to tires, wheels, and brake assemblies.

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**GLO 4.2: Describe and repair** problems with heavy duty equipment.

SLO 12B.4.2.1 Describe tire type, construction, and classification. (F1.01)

SLO 12B.4.2.2 Describe wheel types and mounting designs. (F1.02)

SLO 12B.4.2.3 Perform hub removal, inspection, service, and installation. (F1.03)

SLO 12B.4.2.4 Describe safety procedures when handling wheels, tires, and hubs. (F1.04)

SLO 12B.4.2.5 Describe and perform tire maintenance and service. (F1.05)

SLO 12B.4.2.6 Describe the fundamentals of hydraulic brake systems. (H1.01)

SLO 12B.4.2.7 Describe parking brakes systems and their operation; perform adjustment/repair procedures. (H1.02)

SLO 12B.4.2.8 Describe the operation and service of master and wheel cylinders. (H1.03)

SLO 12B.4.2.9 Diagnose and troubleshoot faulty brake performance. (H1.06)

SLO 12B.4.2.10 Describe hydraulic brake valves. (H1.05)

SLO 12B.4.2.11 Describe hydraulic drum brakes and repair procedures. (H1.07)

SLO 12B.4.2.12 Describe disc brake operation. (H1.08)

SLO 12B.4.2.13 Describe brake booster operation, diagnosis, and repair procedures. (H1.09)

SLO 12B.4.2.14 Describe the operation, diagnosis, and repair procedures of air-over-hydraulic brake booster systems. (H1.10)

SLO 12B.4.2.15 Describe the operation, diagnosis, and repair of hydraulic-over-hydraulic brake booster systems. (H1.11)

SLO 12B.4.2.16 Describe air brake fundamentals, design, and operation; describe and perform manufacturers' maintenance procedures for air brake systems. (H1.12)

SLO 12B.4.2.17 Describe electric brake system operation and diagnose failures. (H1.14)

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**GLO 4.3:** Perform **maintenance** on heavy duty equipment systems.

SLO 12B.4.3.1 Describe and perform maintenance on tires, wheels, and brake assemblies.

SLO 12B.4.3.2 Describe and perform maintenance on hydraulic brake lines, fluid, and bleeding, and apply procedures to remove, repair, and replace brake lines. (H1.04)

SLO 12B.4.3.3 Describe and apply procedures to remove, repair, and install air-over-hydraulic chambers. (H1.13)

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**Goal 5:** Describe and demonstrate the transferable **cross-curricular** knowledge and skills pertaining to heavy duty equipment technology.

**GLO 5.1: Read, interpret, and communicate** information relevant to heavy duty equipment technology.

SLO 12B.5.1.1 Read, interpret, and communicate information relevant to heavy duty equipment technicians' practices as they apply to tires, wheels, and brake assemblies.

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**GLO 5.2:** Apply knowledge and skills from **mathematics**.

SLO 12B.5.2.1 Apply knowledge and skills from mathematics to heavy duty equipment technicians' practices as they apply to tires, wheels, and brake assemblies.

SLO 12B.5.2.2 Demonstrate an understanding of aspect ratios.

SLO 12B.5.2.3 Calculate all aspects of tire sizes.

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**GLO 5.3:** Apply knowledge and skills from **the sciences**.

SLO 12B.5.3.1 Apply knowledge and skills from the sciences to heavy duty equipment technicians' practices as they apply to tires, wheels, and brake assemblies.

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**GLO 5.4:** Apply knowledge and skills from **information and communication technology**.

SLO 12B.5.4.1 Apply knowledge and skills from information and communication technology relevant to heavy duty equipment technicians' practices as they apply to tires, wheels, and brake assemblies.

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**Goal 6:** Demonstrate an awareness of **sustainability** as it pertains to heavy duty equipment technology.

**GLO 6.1:** Describe the heavy duty equipment industry's **sustainability practices** and its impact on the environment.

SLO 12B.6.1.1 Describe the heavy duty industry's sustainability practices with regard to tires, brakes, and wheel assemblies, and their impact on the environment.

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**GLO 6.2:** Describe the impact of the heavy duty equipment industry on **human health and well-being**.

SLO 12B.6.2.1 Describe the heavy duty equipment industry's sustainability practices with regard to tires, wheels, and brake assemblies, and their impact on human health and well-being.

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**GLO 6.3:** Describe **sustainable business practices** within the heavy duty equipment service and repair industry.

SLO 12B.6.3.1 Describe sustainable business practices within the heavy duty service and repair industry as they apply to tires, wheels, and brake assemblies.

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**Goal 7:** Demonstrate an awareness of the **ethical and legal standards** as they pertain to the heavy duty equipment service and repair industry.

**GLO 7.1:** Demonstrate an awareness of the **ethical and legal expectations** of heavy duty equipment technicians.

SLO 12B.7.1.1 Demonstrate an awareness of the ethical and legal expectations of heavy duty equipment technicians with regard to tires, wheels, and brakes.

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**Goal 8:** Demonstrate **employability skills** related to the heavy duty equipment service and repair industry.

**GLO 8.1:** Demonstrate fundamental **employability skills**.

SLO 12B.8.1.1 Demonstrate problem-solving skills.

SLO 12B.8.1.2 Demonstrate critical thinking skills.

SLO 12B.8.1.3 Demonstrate regular attendance and punctuality.

SLO 12B.8.1.4 Demonstrate accountability by taking responsibility for own actions.

SLO 12B.8.1.5	Demonstrate adaptability, initiative, and effort.
SLO 12B.8.1.6	Demonstrate the ability to accept and follow direction and feedback.
SLO 12B.8.1.7	Demonstrate teamwork skills.
SLO 12B.8.1.8	Demonstrate the ability to stay on task and to make effective use of time in class and shop environments.
SLO 12B.8.1.9	Demonstrate the ability to communicate respectfully and effectively with coworkers and customers.

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**GLO 8.2:** Demonstrate an understanding of the **business operation** of a heavy duty equipment service and repair facility.

SLO 12B.8.2.1	Demonstrate an understanding of the business operation of a heavy duty equipment service and repair facility with regard to tires, wheels, and brake assemblies.
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**Goal 9:** Understand **career opportunities** in heavy duty equipment technology and associated professions.

**GLO 9.1:** Demonstrate an understanding of **career opportunities** in heavy duty equipment technology and associated professions.

SLO 12B.9.1.1	Describe training, career opportunities, and industry groups related to tires, wheels, and brake assemblies.
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**Goal 10:** Demonstrate an awareness of the **evolution** of heavy duty equipment technology, including its **technological progression and emerging trends**.

**GLO 10.1:** Describe the **evolution** of heavy duty equipment service and repair, including its **technological progression and emerging trends**.

SLO 12B.10.1.1	Describe the evolution of heavy duty equipment service and repair, including its technological progression and emerging trends, as related to tires, wheels, and brake assemblies.
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