

Section 9

Pre-Trip Air  
Brake Inspection

## Vehicle Inspection

An air brake inspection must be carried out on every air brake equipped vehicle before you start driving it for the day.

Every driver of a commercial motor vehicle must carry out an inspection and log it as outlined in *The Highway Traffic Act* and its regulations. A commercial motor vehicle is:

- a. a motor vehicle with a GVWR of 4,500 kg or more that is a public service vehicle or commercial truck;
- b. a bus with a seating capacity of 11 or more, including the driver, that is used for transportation of persons or property on a highway for gain or compensation; or
- c. a school bus.

The inspection will take place before the vehicle's first trip of the day, and if a trip lasts more than one day, before the trip begins on the first day, and no later than the first rest stop on the second and every subsequent day.

Regardless of the maintenance policies of companies of vehicle owners, all drivers must be capable of determining if their vehicle is in safe operating condition as outlined in *The Highway Traffic Act* and its Regulations.

A person who carries out a vehicle pre-trip inspection must make a trip inspection report in legible writing that contains the following:

1. The licence plate number or unit number of the vehicle and any trailer towed by it.
2. The date of inspection.
3. A list of any safety defects.
4. If no items are defective or required to be reported on the vehicle or any trailer towed by it, a statement to that effect.
5. The name and signature of the person who carried out the inspection.

If a driver believes or suspects that there is a safety defect they must report that belief or suspicion to the carrier. If the defect poses an unreasonable risk it must be reported immediately. Any other case must be reported in a timely manner.

Every commercial vehicle driver must have a current trip inspection report in their possession for the vehicle?

Checking a vehicle before starting out, as required by law, will often prevent costly delays as well as reduce the chances of an accident resulting from a mechanical failure.

## Air Brake Practical Test

When upgrading your driver's licence from single to combination vehicles with air brakes, you will be required to satisfactorily demonstrate the complete pre-trip air brake inspection for combination vehicles.

The pre-trip air brake inspection for combination units should be completed within 30 minutes and 20 minutes for single units. Failure to complete the test within the above time limit may result in the test being discontinued.

The air reservoirs must be drained or fanned down to zero pressure prior to the pre-trip inspection to simulate that they were drained during the post trip inspection.

You are required to bring all material/tools to complete the air brake test (i.e. wrench, chalk, watch, etc.) It is recommended that you wear safety glasses and a bump cap when performing a pre-trip inspection.

Practical examination will be conducted in either the metric or imperial systems of measurement, whichever coincides with the equipment being operated.

## Pre-Trip Inspection—Combination Unit

The air brake pre-trip inspection when performed correctly will identify any malfunctioning components or problems with the system. Failure to complete a thorough pre-trip inspection of the air brake system could result in a vehicle being operated on the highway with a faulty brake system, which could potentially be deadly. Completing a thorough pre-trip inspection will allow the driver to operate the vehicle with reduced chance of break down or system malfunction. It is the driver's responsibility to ensure the air brake system is safe and functioning properly before moving the vehicle.

### Vehicle Secure

- A.1** Ensure parking brake is applied (trailer supply valve and tractor spring parking brake control valve are closed), wheels are blocked and parked on level ground.
- A.2** Check reservoir air pressure is at 0 psi and the compressor is secure, no oil or coolant leaks and drive belts for wear and tension.
- A.3** Visually inspect all brake system air hoses, glad hands, chambers, pushrods, slack adjusters, drums for damage and are mounted properly and secure.

### Compressor and Warning Devices Check

- A.4** Start the engine and check that the gauges are functioning properly and low air pressure warning devices are operating.
- A.5** Build air pressure at high idle, ensure reservoir air pressure builds from 50 to 90 psi within three minutes.
- A.6** Low air pressure warning devices must operate to a minimum of 60 psi.

- A.7** At 90 psi or above, open the tractor spring parking brake control valve and the trailer supply valve, releasing the spring parking brakes. Apply and release the trailer service brakes with the trailer hand valve while listening for air to exhaust at the trailer. This will indicate if the brakes are releasing and that the glad hands are not crossed.
- A.8** Continue building air pressure and check that the governor places the compressor in the unloading stage between 115 psi and 135 psi, (the air pressure gauges will stop rising).
- A.9** Fan the service brake pedal until the air pressure drops to 90 psi and no lower than 80 psi. Stop fanning to see if the governor has placed the compressor in the loading stage (the reading on the air pressure gauge should increase).
- A.10** Continue fanning the service brake pedal. Low air pressure warning devices must operate at a minimum of 60 psi and the trailer supply valve must close at a minimum of 20 psi.

**Note:** Tractor spring parking brake control may—or may not—also close.

### Tractor and Trailer Emergency Systems Check

- A.11** Ensure the trailer supply valve and tractor spring parking brake control valve are closed, applying the spring parking brakes. Exit the cab and disconnect the supply (emergency) line glad hands. No air should escape from either of the glad hands.

**A.12** Enter the cab and ensure the reservoir air pressure is between 115 psi to 135 psi, shut-off the engine. Open the trailer supply valve. Air loss from disconnected glad hand will either stop immediately or bleed down to no lower than 20 psi when the trailer supply valve closes and the air loss stops.

**A.13** Ensure trailer supply valve and tractor spring parking brake control valve are closed, applying the spring parking brakes. Start engine to rebuild to full reservoir air pressure between 115 psi and 135 psi. Exit the cab and re-connect the supply (emergency) line glad hands.

### Tractor Protection Valve Check

**A.14** Enter the cab and at or above 90 psi, open the trailer supply valve. Exit the cab and disconnect the control (service) line glad hands. No air should escape from either of the glad hands.

**A.15** Enter the cab, ensure full reservoir air pressure between 115 psi and 135 psi, open the tractor spring parking brake control valve. Shut off the engine.

**A.16** Make a full service brake application and hold it. Air should escape from the control (service) line to no lower than 20 psi, the tractor protection valve will close and the air loss will stop. Release the service brake application.

**A.17** Close the tractor spring parking brake control valve and ensure the trailer supply valve is closed, if not, close it manually. Start the engine and rebuild air pressure. At or above 90 psi, make a trailer service brake application with trailer hand valve. No air should escape from the disconnected control (service) line. Release the hand valve application.

**A.18** Exit the cab and re-connect the control (service) line glad hands.

**A.19** Enter the cab and at or above 90 psi, open the tractor spring parking brake control valve and trailer supply valve, continue building air pressure to between 115 psi to 135 psi. Once at full pressure, shut off the engine.

### Air Leak Check

**A.20** Make a full service brake application with the foot valve and hold it for one minute. Air pressure must not drop more than 4 psi.

**A.21** Listen for audible air leaks. Release the service brake application, start the engine and rebuild to full system air pressure between 115 psi and 135 psi.

### Brake Adjustment—Combination Unit

**Note:** For checking if your brakes are in adjustment you will require a second person to apply and hold the service brakes on or a device to apply and hold the service brakes on.

**A.22** Ensure the tractor spring parking brake control valve and trailer supply valve are open. (For vehicles equipped with automatic slack adjusters, make a full service brake application and release. Repeat this process 6 times, ensure reservoir air pressure is above 90 psi for each full brake application).

**A.23** Ensure reservoir air pressure is above 90 psi, shut off the engine. (For added security, place manual transmission in low gear.)

## Brake Adjustment Verification for Automatic or Manual Slack Adjusters

For safety reasons inspect the tractor or trailer brakes separately. This will allow the spring parking brake to be applied on the brakes that are not being inspected preventing the vehicle from moving. Measurements for slack adjustment are for type 30 standard stroke brake chambers.

- A.24** Exit the cab and make a chalk mark on the push rod where it enters the brake chamber. Repeat for all chambers.
- A.25** Enter the cab and ensure reservoir pressure is between 90 psi and 100 psi. With a brake pedal assisting device or a second person, make a 90 psi to 100 psi service brake application and hold.
- A.26** Return to the brake chambers and measure the pushrod travel by checking the distance from the chamber to the chalk mark on the pushrod. Ensure the pushrod travel is correct for the size and type of brake chamber based on manufacturer's specifications. Also, brake chambers which share the same axle must have a pushrod travel measurement within  $\frac{1}{4}$  inch of each other.

**Note: For automatic slack adjusters, the slack adjuster must be replaced if measurements are not within the above specifications.**

## Adjustment for Manual Slack Adjusters Only

For driver's with "S" air brake endorsement

- M.1** Enter the cab and remove the brake pedal assisting device releasing the service brakes. Ensure reservoir pressure is at or above 90 psi.
- M.2** Return to the slack adjuster requiring adjustment and locate the adjustment bolt. With the proper wrench, disengage the adjustment bolt locking mechanism. Turn the adjustment bolt until the brake lining comes into contact with the brake drum. If this can not be confirmed by visually seeing the lining and brake drum due to the dust cover, observe the direction of the S-cam shaft while turning the adjustment bolt. The S-cam shaft should turn in the same direction as it would when a brake application is being made.
- M.3** After tightening the adjustment bolt, turn the adjustment bolt in the opposite direction  $\frac{1}{4}$  to  $\frac{1}{2}$  a turn. Remove the wrench and ensure the locking device returns to the "locked" position. Failure to engage the locking device could result in the adjustment bolt turning and causing the brake to become out of adjustment with the application of the brakes. Complete these steps for all slack adjusters.
- M.4** Enter the cab; ensure reservoir air pressure is above 90 psi and make a 90 psi to 100 psi service brake application and hold. Use a brake pedal assisting device or a second person to hold the application.
- M.5** Return to the brake chambers and measure the pushrod travel to ensure travel is within  $1\frac{1}{2}$  inches or within manufacturer's specifications. Also brakes which share the same axle must have a pushrod travel measurement within  $\frac{1}{4}$  inch of each other.

**Note: If one slack adjuster requires adjustment then all slack adjusters must be adjusted.**

## Brake Response Tests

- A.27** Ensure the tractor and trailer spring parking brakes are applied and remove the wheel blocks.
- A.28** Enter the cab and start the engine. Open the tractor spring parking brake control valve and place the vehicle in a low forward gear. Gently tug against the applied trailer spring parking brakes. They must hold the vehicle.
- A.29** Close the tractor spring parking brake control valve and open the trailer supply valve. Gently tug against the applied tractor spring parking brakes. They must hold the vehicle.
- A.30** Open the tractor spring parking brake control valve and apply the trailer service brakes using the trailer hand valve. Gently tug against the trailer service brakes. They must hold the vehicle.
- A.31** Release the trailer service brake application, move the vehicle ahead slowly and make a service brake application with the foot valve to check brake response.

## Suggested Driving Practices

At the end of the final trip of the day inspect your vehicle for any damage or problems that may have developed on the road. Complete a trip inspection report and note any defects found during this inspection.

This could include the following:

- Park the vehicle on level ground, apply the spring parking brakes, shut off the engine and leave it in gear.
- Visually inspect all brake system air hoses, chambers, pushrods, slack adjusters, drums for damage and are mounted properly and secure.
- Open the drain valves on all air reservoirs and allow all air pressure to escape then close the drain valves.

## Pre-Trip Inspection—Single Unit

(Not for air-over-hydraulic brake systems.)

The air brake pre-trip inspection when performed correctly will identify any malfunctioning components or problems with the system. Failure to complete a thorough pre-trip inspection of the air brake system could result in a vehicle being operated on the highway with a faulty brake system, which could potentially be deadly. Completing a thorough pre-trip inspection will allow the driver to operate the vehicle with reduced chance of break down or system malfunction. It is the driver's responsibility to ensure the air brake system is safe and functioning properly before moving the vehicle.

### Vehicle Secure

- B.1** Ensure the spring parking brake control valve is closed applying the spring parking brakes, wheels are blocked and parked on level ground.
- B.2** Check reservoir air pressure is at 0 psi and the compressor is secure, no oil or coolant leaks and drive belts for wear and tension.
- B.3** Visually inspect all brake system air hoses, chambers, pushrods, slack adjusters, drums for damage and are mounted properly and secure.

### Compressor and Warning Devices Check

- B.4** Start the engine and observe the gauges are functioning properly and low air pressure warning devices are operating.
- B.5** Build air pressure at high idle, ensure reservoir air pressure builds from 50 to 90 psi within three minutes.
- B.6** Low air pressure warning devices must operate to a minimum of 60 psi.

- B.7** Continue building air pressure and check that the governor places the compressor in the unloading stage between 115 psi and 135 psi. (the air pressure gauges will stop rising.) Open the spring parking brake control valve, releasing the spring parking brakes.
- B.8** Fan the service brake pedal until the air pressure drops to 90 psi and no lower than 80 psi. Stop fanning to see if the governor has placed the compressor in the loading stage (the reading on the air pressure gauge should increase.)
- B.9** Continue fanning the service brake pedal. Low air pressure warning devices must operate at a minimum of 60 psi. Build reservoir air pressure at fast idle to full air pressure between 115 psi and 135 psi.
- B.10** Ensure the spring parking brakes are released by opening the spring parking brake control valve and then shut off the engine.

### Air Leak Check

- B.11** Make a full service brake application with the foot valve and hold it for one minute. Air pressure must not drop more than 3 psi.
- B.12** Listen for audible air leaks. Release the service brake application, start the engine and rebuild to full system air pressure between 115 psi and 135 psi.

## Brake Adjustment—Single Unit

(Buses with low ground clearance must be adjusted by a qualified mechanic)

For testing purposes, applicants operating buses with low ground clearance will not be allowed to manually adjust the brakes on the bus.

**Note: For checking if your brakes are in adjustment you will require a second person to apply and hold the service brakes on or a device to apply and hold the service brakes on. Measurements for slack adjustment are for type 30 standard stroke brake chambers.**

- B.13** Ensure the spring parking brake control valve is open. (For vehicles equipped with automatic slack adjusters, make a full brake application and release. Repeat this process 6 times, ensure reservoir air pressure is above 90 psi for each full brake application).
- B.14** Ensure reservoir air pressure is above 90 psi and shut off the engine. (For added security, place manual transmission in low gear.)

## Brake Adjustment Verification for Automatic or Manual Slack Adjusters

- B.15** Exit the cab and make a chalk mark on the push rod where it enters the brake chamber. Repeat for all chambers.
- B.16** Enter the cab and ensure reservoir pressure is between 90 psi and 100 psi. With a brake pedal assisting device or a second person, make a 90 to 100 psi service brake application and hold.
- B.17** Return to the brake chambers and measure the pushrod travel by checking the distance from the chamber to the chalk mark on the pushrod. Ensure the pushrod travel is within two inches for automatic slack adjusters, and within 1½ inches for manual slack adjusters or within manufacturer's specifications. Also, brake chambers which share the same axle must have a pushrod travel measurement within ¼ inch of each other.

**Note: For automatic slack adjusters, the slack adjuster must be replaced if measurements are not within the above specifications.**

## Adjustment for Manual Slack Adjusters Only

For driver's with "S" brake endorsement

- M.1** Enter the cab and remove the brake pedal assisting device releasing the service brakes. Ensure reservoir pressure is at or above 90 psi.
- M.2** Return to the slack adjusters requiring adjustment and locate the adjustment bolt. With the proper wrench, disengage the adjustment bolt locking mechanism. Turn the adjustment bolt until the brake lining comes into contact with the brake drum. If this can not be confirmed by visually seeing the lining and brake drum due to the dust cover, observe the direction of the S-cam shaft while turning the adjustment bolt. The S-cam shaft should turn in the same direction as it would when a brake application is being made.
- M.3** After tightening the adjustment bolt, turn the adjustment bolt in the opposite direction  $\frac{1}{4}$  to  $\frac{1}{2}$  a turn. Remove the wrench and ensure the locking device returns to the "locked" position. Failure to engage the locking device could result in the adjustment bolt turning and causing the brake to become out of adjustment with the application of the brakes. Complete these steps for all slack adjusters.
- M.4** Enter the cab; ensure reservoir air pressure is above 90 psi and make a 90 psi to 100 psi service brake application and hold. Use a brake pedal assisting device or a second person to hold the application.
- M.5** Return to the brake chambers and measure the pushrod travel to ensure travel is within  $1\frac{1}{2}$  inches or within manufacturer's specifications. Also, brakes which share the same axle must have a pushrod travel measurement within  $\frac{1}{4}$  inch of each other.

**Note: If one slack adjuster requires adjustment then all slack adjusters must be adjusted.**

## Brake Response Test

- B.18** Ensure the spring parking brakes are applied and remove the wheel blocks.
- B.19** Enter the cab and start the engine. With the spring parking brake control valve closed. Place the vehicle in a low forward gear. Gently tug against the spring parking brakes. They must hold the vehicle.
- B.20** Open the spring parking brake control valve, move the vehicle ahead slowly and make a service brake application with the foot valve to check brake response.

## Suggested Driving Practices

At the end of the final trip of the day inspect your vehicle for any damage or problems that may have developed on the road and note any defects found during this inspection.

This could include the following:

- Park the vehicle on level ground, apply the spring parking brakes, shut off the engine and leave it in gear.
- Visually inspect all brake system air hoses, chambers, pushrods, slack adjusters, drums for damage and are mounted properly and secure.
- Open the drain valves on all air reservoirs and allow all air pressure to escape then close the drain valves.

## Pre-Trip Inspection—Air-Over-Hydraulic (Air Actuated) Brake System

The air-over-hydraulic pre-trip inspection when performed correctly will identify any malfunctioning components or problems with the system. Failure to complete a thorough pre-trip inspection of the air brake system could result in a vehicle being operated on the highway with a faulty brake system, which could potentially be deadly. Completing a thorough pre-trip inspection will allow the driver to operate the vehicle with reduced chance of break down or system malfunction. It is the driver's responsibility to ensure the brake system is safe and functioning properly before moving the vehicle.

### Vehicle Secure

- D.1** Ensure the parking brake is applied, the wheels are blocked and parked on level ground.
- D.2** Check reservoir pressure is at 0 psi (0 kPa), the compressor is secure and it has no oil or coolant leaks and check the compressor drive belts for wear and tension. Check the hydraulic fluid reservoir level and that there is no hydraulic fluid leaks.
- D.3** Visually inspect all wheel cylinders and lines for hydraulic fluid leaks, drums for damage.

### Compressor and Warning Devices Check

- D.4** Start the engine and check that the gauges are functioning properly and low air pressure warning devices are operating.
- D.5** Build air pressure at high idle, ensure reservoir air pressure builds from 50 psi (344 kPa) to 90 psi (621 kPa) within three minutes.
- D.6** Low air pressure warning devices must operate to a minimum of 60 psi (414 kPa).

- D.7** Continue building air pressure and check that the governor places the compressor in the unloading stage between 115 psi (793 kPa) and 135 psi (931 kPa). (the air pressure gauge will stop rising). Open the spring parking brake control valve, releasing the spring parking brakes (if equipped).
- D.8** Fan the service brake pedal until the pressure drops to 90 psi (621 kPa) and no lower than 80 psi (552 kPa). Stop fanning to see if the governor has placed the compressor in the loading stage (the reading on the air pressure gauge should increase.)
- D.9** Continue fanning the service brake pedal. Low air pressure warning devices must operate at a minimum of 60 psi (414 kPa). Build reservoir air pressure at fast idle to full pressure between 115 psi (793 kPa) and 135 psi (931 kPa).
- D.10** Release the spring parking brakes if equipped. Shut off the engine.

### Air Leak Check

- D.11** Make a full service brake application with the foot valve and hold it for one minute. Air pressure must not drop more than 3 psi (21 kPa).
- D.12** Listen for audible air leaks. Release the service brake application, start the engine and rebuild to full system pressure between 115 psi (793 kPa) and 135 psi (931 kPa).

### Brake Response Test

- D.13** Ensure the parking brake is applied and remove the wheel blocks.
- D.14** Apply the parking brake and place the vehicle in a low forward gear and gently tug against the parking brake. It must hold the vehicle.
- D.15** Release the parking brake, move the vehicle ahead slowly and make a service brake application with the foot valve to check brake response.

## Suggested Driving Practices

At the end of the final trip of the day inspect your vehicle for any damage or problems that may have developed on the road and note any defects found during this inspection. The post-trip inspection can be added to the report you completed during the pre-trip inspection at the start of that day.

This could include the following:

- Park the vehicle on level ground, apply the spring parking brakes, shut off the engine and leave it in gear.
- Open the drain valves on all air reservoirs, allow all air pressure to escape and then drain valves.

## Section Summary Questions

1. What is the maximum time permitted for the compressor to build from 50 to 90 psi?
2. What is the maximum air pressure loss permitted on a full brake application with the motor shut off for combination and single units?
3. How can the holding power of the trailer brakes be tested?
4. What is the final brake test that should be made before the vehicle is put into service?
5. Is a brake adjustment part of the air brake test given by Manitoba Public Insurance?

## Metric Conversion Table

A conversion to the metric system took place in Canada on September 1, 1977, and some commonly used conversions are listed below. Numbers have been rounded and therefore are not precise equivalents.

kPa to psi		psi to kPa	
5	0.72	1	6.89
10	1.45	2	13.78
15	2.17	3	20.68
20	2.90	4	27.57
25	3.62	5	34.47
30	4.35	6	41.36
35	5.07	7	48.26
40	5.80	8	55.15
45	6.52	9	62.05
50	7.25	10	68.94
60	8.70	15	103.42
70	10.15	20	137.89
80	11.60	25	172.36
90	13.05	30	206.84
100	14.50	35	241.31
150	21.75	40	275.78
200	29.00	45	310.26
250	36.29	50	344.73
300	43.51	55	379.20
310	44.96	60	413.68
350	50.76	65	448.15
400	58.01	70	482.62
415	60.19	75	517.10
450	65.26	80	551.57
500	72.51	85	586.04
550	79.77	90	620.52
585	84.84	95	654.99
600	87.02	100	689.47
650	94.27	105	723.94
700	101.52	110	758.41
725	105.15	115	792.89
750	108.77	120	827.36
800	116.03	125	861.83
850	123.28	130	896.31
900	130.53	135	930.78
950	137.78	140	965.25
1000	145.03	145	999.73
1050	152.29	150	1034.20