

# Air Bags

## OBJECTIVES

- Describe the purpose and function of air bags.
- Identify features, warnings, and markings related to air bags for frontal and side impacts.
- Identify features of inflatable seat belts.
- Locate air bag information in owner's manuals and vehicles.
- Explain best practices about air bags to caregivers.

## INTRODUCTION TO AIR BAGS: AUTOMATIC CRASH PROTECTION

**Automatic crash protection** includes many safety features that are built into the vehicle that do **NOT** require occupants to do anything to be protected. In other words, **NO** occupant action is required. Many people are unaware of the automatic systems in a vehicle, particularly all of the air bags that are designed to protect them in a crash.

**Examples:** Laminated windshields, instrument panel padding, door trim padding, and air bags that open (deploy) when the vehicle determines there has been a crash.

## PURPOSE AND FUNCTION OF AIR BAGS

An **air bag** is a vehicle safety device made up of a flexible fabric envelope designed to rapidly deploy (open) when the vehicle determines there has been a crash.

*The purpose of an air bag is to help reduce the occupant's speed during a collision and reduce the possibility of injury.*

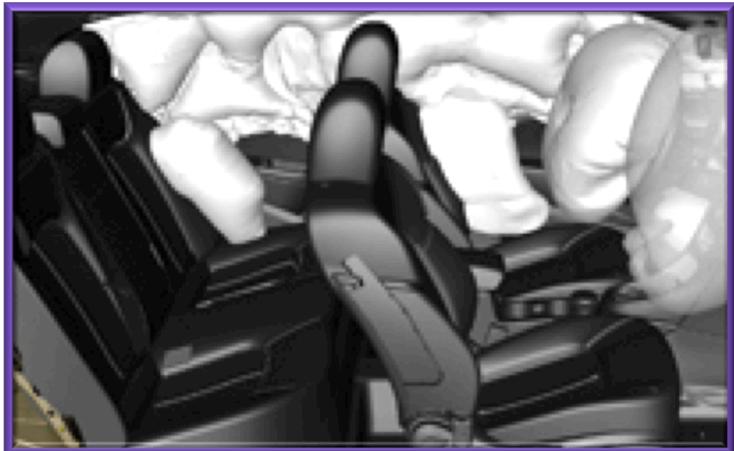
Air bags can be:

- Found in most vehicles on the road today. Every vehicle should be checked for air bags. The owner's manual should be reviewed for locations and specific instructions for the air bags in that vehicle.
- Almost anywhere in a vehicle. Proper positioning and use of car seats, booster seats, and seat belts are needed to prevent injury when a crash occurs and an air bag suddenly opens.

## How Do Air Bags Work?

An air bag can only deploy once and **MUST** be replaced after a crash.

Using the air bag with the seat belt allows the crash forces to spread over a large part of the occupant's body instead of concentrating the crash forces on a smaller part of the body.



*Air bags are found in most vehicles on the road today*

## How Do Air Bags Work? (continued)

- Air bags do **NOT** deploy in every crash.
- Seat belts also provide protection in crashes that do **NOT** deploy air bags, such as rear impacts, some rollovers, sudden stops, or less severe crashes. Use your seat belt whether or not there is an active air bag.

Important considerations related to air bags include to:

- Never put a rear-facing car seat in front of an active frontal air bag.
- Avoid leaning against an air bag's opening or putting other objects in front of an air bag's opening.
- Always sit in an upright position, correctly buckled into the seat belt.
- Read the owner's manual carefully. It has information about air bags and instructions for their use.
- Assume all air bags are fully active unless the owner's manual says differently.

*Each vehicle manufacturer places labels in different positions and may call their air bag systems something different.*



*Seat belts & air bags work together to provide protection to vehicle occupants*

## AIR BAGS FOR FRONTAL IMPACT

Driver and front passenger air bags offer powerful protection to front seat occupants who are correctly seated and restrained. Frontal crash air bags work with seat belts to protect front seat occupants. The air bags add extra protection to the adult head and chest in a crash.

There are several kinds of air bags for frontal crashes:

- Driver air bags are found in the steering wheel.
- Front seat passenger air bags are found in the instrument panel, over the glove box. While some passenger air bags cover both the middle and right front passenger seating positions, others only cover the right front seating position.
- Knee air bags may be present in the vehicle.

## Classifications of Front Passenger Air Bags

Passenger air bags can be classified as one of three types:

1. Air bags that are always on or active in the vehicle
2. Air bags that can be turned on and off using a manual switch
3. Air bags that are automatically turned on and off by the vehicle based on the occupant seated in the front passenger seat

Each of the three types has unique features and characteristics.

### 1. Air Bags that are Always On or Active in the Vehicle

Many vehicles, especially those made before the 2004 model year, have passenger air bags that are always on or active in the vehicle. The passenger air bag in these vehicles **CANNOT** be turned off in the presence of a car seat or booster seat.

- ☑ **NEVER** place a rear-facing car seat in the front passenger seat. If the passenger air bag deploys in a crash, the child may be severely injured or killed by the force of the air bag.
- ☑ If a forward-facing child must sit in the front passenger seat, move the vehicle seat as far back from the air bag as possible and make sure the child is seated in an appropriate car seat or booster seat. Instruct the child **NOT** to lean forward in the seat toward the air bag.

### 2. Air Bags that Turn On and Off Using a Manual Switch

Some vehicles, especially those without a back seat such as some pickup trucks, or with a very small back seat, may be equipped with a manual switch to turn the passenger air bag on and off. In these vehicles:

- ☑ Caregivers must check the owner's manual to understand the proper operation of the on/off switch in their vehicle. Most are operated by the vehicle's ignition key.
- ☑ If a forward-facing child must sit in the front passenger seat, the switch must be in the "off" position. A light near the on/off switch will be lit whenever the passenger air bag has been turned off. **If the indicator is NOT lit, a child should NOT be allowed to ride in the front seat.**

**NOTE:** Forgetting to turn the switch back "on" for adult passengers is a common error made by drivers of these vehicles.

*Statistics show that children are safer in the rear seat. It is strongly recommended that all children under 13 travel in the rear seat (AAP, 2007).*



*Typical on/off switch*

## Classifications of Front Passenger Air Bags (continued)

### 3. Air Bags that Automatically Turn On and Off with An Occupant in Front Passenger Seat

Since the 2004 model year, most vehicles have been equipped with systems that automatically turn the passenger air bag on and off. Vehicle manufacturers use a variety of methods to detect the front occupant, but the following applies for every vehicle with an automatic on/off system:

- ☑ Caregivers need to understand the specific systems and indicators in their vehicle. Remind them to check their owner's manual.
- ☑ Caregivers should always assume the air bag is on if they are not sure. **NEVER** place a rear-facing car seat in a seating position with an active front air bag unless the vehicle owner's manual allows it.
- ☑ Since not all vehicles have the same system, it is important that the caregiver understands what the indicators in their vehicle mean. Caregivers must ensure that the air bag is "off" for the child sizes and conditions listed in the owner's manual. For all other occupants, the air bag should be turned "on."
- ☑ Just because a vehicle is new, do **NOT** assume the passenger air bag will have an automatic on/off system. Some newer vehicles have air bags that are always "on," just like in older vehicles.

#### TIPS FOR DISCUSSING AUTOMATIC ON/OFF SYSTEMS

- Remind caregivers to use the back seat for children, even if there is an automatic on/off system for a passenger air bag.
- Automatic on/off systems can misclassify occupants in the front seat under certain conditions – carefully check all warnings in the owner's manual.



Indicator lights

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*"Never install a rear-facing child restraint in the front seat unless it is allowed by the vehicle manufacturer and there is no other alternative. When allowed by the vehicle manufacturer, make sure the passenger air bag is off and stays off for the entire trip. Refer to the vehicle owner's manual."*

**The Alliance of Automobile Manufacturers**

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### Front Air Bag Warnings and Markings

It is important to be knowledgeable about the typical locations of air bag warnings and markings in the vehicle.

- ☑ For air bags that deploy in frontal crashes, the warning label will always be located on the sun visor and you will typically find additional markings on or near the cover of the air bag.
- ☑ Always check the vehicle owner's manual to find more information about air bags for front crashes, as each vehicle manufacturer places labels in different positions and may use different terms.

## Front Air Bag Warnings and Markings (continued)

Examples of acronyms for front air bags are:

- SRS = Supplemental Restraint System.
- SIR = Supplemental Inflatable Restraint.



*Example of front air bag label*



*Example of front air bag marking*

## AIR BAGS FOR SIDE IMPACT

Air bags that deploy for side crashes or rollovers are designed to fill the space between the occupant and the door and/or window. Side air bags:

- May be found in both the front and rear rows of vehicles.
- Are **NOT** required in all vehicles, unlike front air bags. Owner's manuals refer to optional equipment by saying "if equipped." Check the vehicle to be sure if it has a side air bag in this case.
- Are generally smaller than front air bags.

When side air bags are present, they can be found in various places such as in the door, inside the vehicle seat (seat back or under the seat) or in the roof ("inflatable curtains" or "canopies").

The front center air bag is found in the right (inside) side of the driver's seat. Front center air bags:

- Open from the right side of the driver's seat and deploy forward, between the seat and the center console.
- Are labeled on the right side of the seat.

Many vehicle manufacturers follow industry standards to minimize the risk of injury from all types of side air bags.

- Usually, children may sit near side air bags without risk of injury.
- Check the vehicle owner's manual to be sure. The owner's manual will always warn if a car seat or booster seat **CANNOT** be installed next to a side air bag.
- The owner's manual for the car seat or booster seat must also allow use near a side air bag.
- If either of the owner's manuals forbids using a car seat or booster seat next to the side air bag, put it in a different seating position in the vehicle.

## Side Air Bag Warnings and Markings

Warning labels for air bags that deploy in side crashes may be found almost anywhere in the vehicle, including:

- In the door opening.
- On the end of the instrument panel.
- Near the air bag.

Caregivers should be shown any warning labels in the vehicle and should be familiar with the specific warnings. These labels are **NOT** regulated by NHTSA, so they all look different.

Like front air bags, side impact air bags usually have a label or marking to show where the air bag comes out in a crash.

These can be found:

- On the side of the seat
- Near the edge of the roof
- On the opening or the side of the door

Always check the vehicle owner's manual to find more information about air bags for side crashes.

Examples of acronyms for side air bags are:

- SABIC = Side Air Bag Inflatable Curtain.
- SAB = Side Air Bag.



*Example of seat-mounted air bag marking*



*Example of side air bag marking*



*Example of side air bag warning*

## INFLATABLE SEAT BELTS

Another type of air bag system is an inflatable seat belt. An inflatable seat belt:

- Generally opens in frontal, side, and rollover crashes.
- Is located in the shoulder portion of the lap-and-shoulder seat belt. The lap portion of the belt is separate webbing that does **NOT** inflate in a crash.
- Has two retractors and a sewn-on latchplate. The lap belt has a switchable retractor to secure a car seat.
- Spreads belt loads over a greater area of the chest than standard seat belts and provides additional head and neck support during a crash.

Check the car seat owner's manual to determine if the car seat or booster seat can be used with an inflatable seat belt.



*Inflatable seat belt*



## Practice Activity: Locate Front and Side Air Bag Information in Owner's Manuals & Vehicles

Locate air bag information in two different owner's manuals and vehicles.

1. Work in small groups.
2. Using the owner's manuals provided, document the vehicle's air bag information.
3. In addition to information you find in the owner's manuals, locate and document missing or additional information from inside the vehicle.

Question/Instruction	Vehicle 1	Vehicle 2
1. What is the vehicle make and model?		
2. Describe the location of all labels/markings for frontal air bags.		
3. Can a rear-facing car seat be installed in the front passenger seat?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. What pages in the owner's manual discuss the frontal air bag system?		
5. Which type of passenger air bag system does the vehicle have?	<input type="checkbox"/> Always on <input type="checkbox"/> Manually switched on and off <input type="checkbox"/> Automatically switched on and off	<input type="checkbox"/> Always on <input type="checkbox"/> Manually switched on and off <input type="checkbox"/> Automatically switched on and off
6. Describe the location of all labels/markings for side impact air bags.		
7. What pages in the owner's manual discuss the side air bag system?		



## Explain Best Practices About Air Bags to Caregivers

There are key questions to answer related to air bags. Explain and demonstrate best practices to caregivers.

### Key Questions Pertaining to Air Bags

- What types of air bags are in the vehicle?
- Where are air bags found in the vehicle?
- Is the passenger air bag automatically switched on and off in the vehicle?
  - If the feature is present, where is the indicator light or lights?
  - Under what conditions does the vehicle automatically switch the passenger air bag on and off?
- How do the vehicle’s air bags affect the car seat or booster seat?

### Best Practices

Caregivers need to understand how air bags protect them, and how car seats and booster seats work when used near air bags.

- Follow both vehicle and car seat manufacturer instructions for proper installation and use of car seats and booster seats in the presence of air bags.
- Remind caregivers to look in each vehicle they use to transport children to know where all the air bags are located – even in rented vehicles. Air bags may work differently in different vehicles.



## Progress Check and Summary

1. What is the purpose of air bags?

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2. What are the crash types in which air bags are designed to deploy?

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3. What are three types of passenger air bags?

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4. What must you do with air bags after a crash?

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