

Technical Bulletin



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Subject: **Air Brake System - Cold Weather Operation Tips**

As the cold weather approaches, operators and fleets alike begin to look to their vehicles with an eye toward winterization, and particularly what can be done to guard against air system freeze-up. Here are some basic tips for operation in the cold weather.

Engine Idling

Avoid idling the engine for long periods of time. In addition to the fact that most engine manufacturers warn that long idle times are detrimental to engine life, winter idling is a big factor in compressor discharge line freeze-up. Discharge line freeze-ups account for a significant number of compressor failures each year. The discharge line recommendations *shown under "Discharge Lines"* are important for all vehicles, but are especially so when some periods of extended engine idling can not be avoided.

Discharge Lines

The discharge line should slope downward from the compressor discharge port without forming water traps, kinks, or restrictions. Cross-overs from one side of the frame rail to the other, if required, should occur as close as possible to the compressor.

Dryer Inlet Temperature

The dryer inlet air temperature should typically be within the range of no more than 160°F and no less than 45°F above low ambient (surrounding) temperature to prevent freeze-ups. (For example, if low ambient is minus 40°F, the dryer inlet must be above 5°F.) Lower dryer inlet temperatures should be avoided to minimize the risk of freeze-up upstream of the air dryer. Higher temperatures should also be avoided to minimize the risk of heat damage to the air dryer seals and to avoid a loss of drying performance.

Compressor Line Size

The line size and length is established by the vehicle manufacturer and should not be altered without the vehicle manufacturers approval. As a reference, the line length from the compressor to the air dryer should be less than 16 feet and the minimum line sizes should be as follows:

Minimum Length	Minimum I.D.	Application
6 ft.	1/2 in.	Low Compressor Duty Cycle Applications (0-20%)
10 ft.	5/8 in.	High Compressor Duty Cycle Applications (20-40%)

Line Insulation

To guard against freeze-ups in low duty cycle applications, the discharge line can be insulated if it is greater than 9 feet in length. The line can only be insulated back to 9 feet and a maximum of 3 feet. For example, if the line is 10 feet in length, insulate the fitting and the last one foot of the line. If the line is 15 feet, insulate the fitting and the last 3 feet of the line.

System Leakage

Excessive system leakage causes the compressor to “pump” more air and also reduce the life of the air dryer desiccant cartridge.

Reservoir Draining (System with an Air Dryer)

Daily reservoir draining should not be performed on systems with an air dryer. This practice will cause the dryer to do excessive work (e.g. build pressure from 0-130 psi instead of the normal 110-130 psi).

Reservoir Draining (System without an Air Dryer)

Routine reservoir draining is the most basic step in reducing the possibility of freeze-up. All reservoirs in a brake system can accumulate water and other contamination and must be drained. The best practice is to drain all reservoirs daily if the air brake system does not include an air dryer. When draining reservoirs, turn the engine off and drain all air from the reservoir. Additionally, open the drain cocks on all reservoirs and leave them open over night to ensure all contamination is drained (*reference Service Data Sheet SD-04-400 for Bendix® reservoirs*). If automatic drain valves are installed, check their operation before the weather turns cold (*reference Service Data Sheet SD-03-2501 for Bendix® DV-2™ automatic drain valves*). It should be noted that, while the need for daily reservoir draining is eliminated through the use of an automatic drain valve, periodic manual draining is still required.

Alcohol Evaporator or Injector Systems

Bendix Commercial Vehicle Systems LLC discourages the use of alcohol in the air brake system as a means of preventing system freeze-up in cold temperatures. Studies indicate that using alcohol and alcohol-based products sold for this purpose removes the lubrication from the components of the air braking system. In addition, the materials used for the internal seals of the air system components may be adversely impacted by the residue that some anti-freeze additives leave behind. Both are detrimental to air system component life expectancy, causing premature wear. Because of this, Bendix® air system components warranty will be void if analysis shows that alcohol was added to the air brake system.

Alcohol is not an acceptable substitute for having adequate air drying capacity. If the air dryer is maintained in accordance with the manufacturer’s recommended practices and moisture is found to be present in the system reservoirs, more drying capacity is required. Bendix has several viable options including extended purge air dryers, extended purge tandem dryers in parallel with a common control, and air dryers arranged to provide continuous flow as with the Bendix® EverFlow® continuous flow air dryer module. To address concerns with contaminants in trailer air brake systems, the Bendix® Cyclone DuraDrain® water separator and the Bendix® System-Guard® trailer air dryer are available. *Refer to Bendix Technical Bulletin TCH-008-042 “Alcohol in the Air Brake System” for additional information.*

Air Dryers

Check the operation and function of the air dryer using the appropriate Service Data Sheet for the air dryer.

Bendix® Air Dryer	Service Data Sheet
AD-2® air dryer	SD-08-2403
AD-9® air dryer	SD-08-2412
AD-9si® air dryer	SD-08-2433
AD-IP® air dryer	SD-08-2414
AD-IS® air dryer	SD-08-2418
AD-IS® EverFlow® air dryer	SD-08-2417
AD-SP® air dryer	SD-08-2415
Cyclone DuraDrain® water separator	SD-08-2402
PuraGuard® QC system filter	SD-08-187B
Trailer System-Guard® air dryer	SD-08-2416

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