TWO WAY END-OF-TRAIN TELEMETRY DEVICES

In general the regulations require trains exceeding 30 miles per hour which operate on heavy grades to be equipped with such devices. There are a number of exceptions, and the definition of heavy grade encompasses two different sets of conditions as follows:

For a train operating with 4,000 trailing tons or less, a section of track with an average grade of 2% or greater over a distance of 2 continuous miles; and for a train operating with greater than 4,000 trailing tons, a section of track with an average grade of 1% or greater over a distance of 3 continuous miles.

The following types of trains are exempted from the requirement for having a two-way EOT:

1. Trains with a locomotive capable of making an emergency brake application located in the rear third of the train length.
2. Trains operating in the push mode with the ability to make an emergency brake application from the rear.
3. Trains with an operational and occupied caboose equipped with an emergency brake valve.
4. Trains operating with a secondary fully independent braking system capable of stopping the train in the event of failure of the primary system.
5. Trains that do not operate over heavy grades and do not exceed 30 miles per hour.
6. Local trains that do not operate over heavy grades. A local train is defined as one assigned to perform switching en route which operates with 4,000 trailing tons or less and travels a distance that is no greater than that which can normally be operated by a single crew in a single tour of duty.
7. Work trains that do not operate over heavy grades. A work train is defined as a non-revenue service train of 4,000 trailing tons or less used for the administration and the upkeep service of the railroad.
8. Trains that are not part of the general railroad system.
9. Passenger trains equipped with emergency brake valves on all cars and which are readily accessible to a crew member.

1 / The full text of these rules are contained in the power brake regulations, reprinted in this booklet.
10. Passenger trains that operate with a car placed at the rear of the train that is equipped with an emergency brake valve readily accessible to a crew member in radio communication with the engineer.

11. Passenger trains with 24 or fewer cars that do not have a rear car with a readily accessible emergency brake valve and operated in accordance with the following:

   (a) If the total number of cars in the passenger train is 12 or less, a car no less than halfway in the train must be equipped with an emergency brake valve readily assessible to a crew member;

   (b) If the total number of cars are between 13 and 24, and located 2/3 of the way through the train shall be equipped as in (a);

   (c) Before descending an average of 2% grade over a 2 mile distance, the engineer shall communicate with the conductor to ensure that a working two-way radio is located in the car with the rearmost readily accessible emergency brake valve; and

   (d) While the train is descending the 2% grade, a member of the train crew shall occupy the car with the rearmost accessible emergency brake valve.

   (e) Trains that must be divided into two sections in order to traverse a grade. This applies only to the extent necessary to traverse the grade and only while the train is divided.

   The two-way EOT rule sets out design and performance standards which must be met, including among other things that the rear unit on a command shall open a valve on the brake line and hold it open for a minimum of 15 seconds; and the front to rear communications link shall be checked automatically at least every 10 minutes.

   The FRA has imposed a performance standard which requires that the rear unit batteries shall be sufficiently charged at the initial terminal or other point where the device is installed and throughout the train's trip to ensure that the EOT will remain operative until the train reaches its destination. Therefore, FRA will impose a strict liability standard regarding failures due to insufficiently charged batteries, and it will be a per se violation, if a device fails en route due to insufficiently charged batteries.

   The device shall be armed and operable from the time the train departs from the point where the device is installed until the train reaches its destination. If there is a loss of communication at the location where the device is installed, the train may depart the location at restricted speed for a distance of no more than one mile to establish communication.

   If the EOT device fails en route, the speed of the train shall be limited to 30 mile per hour. A loss of communication between the front and rear units will be considered an
en route failure only if the loss of communication is for a period greater than 16 minutes and 30 seconds. In addition to the 30 miles per hour speed restriction, the train shall not operate over a section of track with an average grade of 2% or higher over a distance of 2 continuous miles unless (1) the train has an occupied helper locomotive in which there is two-way voice radio communication with the engineer on the head end of the train and they have the capability of stopping the train where there is a loss of communication; or (2) there is an occupied caboose at the end of the train with a functional brake valve capable of initiating an emergency brake application from the caboose; or (3) use of a radio-controlled locomotive in the rear third of the train under continuous control of the engineer in the head end.

If a passenger train develops an en route failure of the EOT device, it shall not operate over an area where a two way EOT device is required until an operable one is installed on the train or an alternative method of initiating an emergency brake application from the rear is achieved. In non heavy grade territory the train shall have a train crew member located in the rearmost car with a readily accessible emergency brake valve and shall be equipped with an operable two-way radio; and the engineer shall periodically make running brake tests until the EOT failure is corrected.

Each en route failure shall be corrected at the next location where repairs can be made or at the next location where a required brake test is to be performed, whichever is closer.

Regarding the inspection and testing of EOTs, before the train departs, the identification code of the front and rear unit shall be determined to be identical; the value displayed on the front unit shall be within 3 pounds per square inch of the reading on the rear; the EOT shall be tested at the initial terminal or other point of installation; and the equipment shall be calibrated for accuracy at least every 368 days.

The locomotive engineer shall be notified that a successful test of the device has occurred by any means determined appropriate by the railroad. However, a written or electronic record must be maintained in the cab of the controlling locomotive.

49 C.F.R. §§ 232.401-232.409