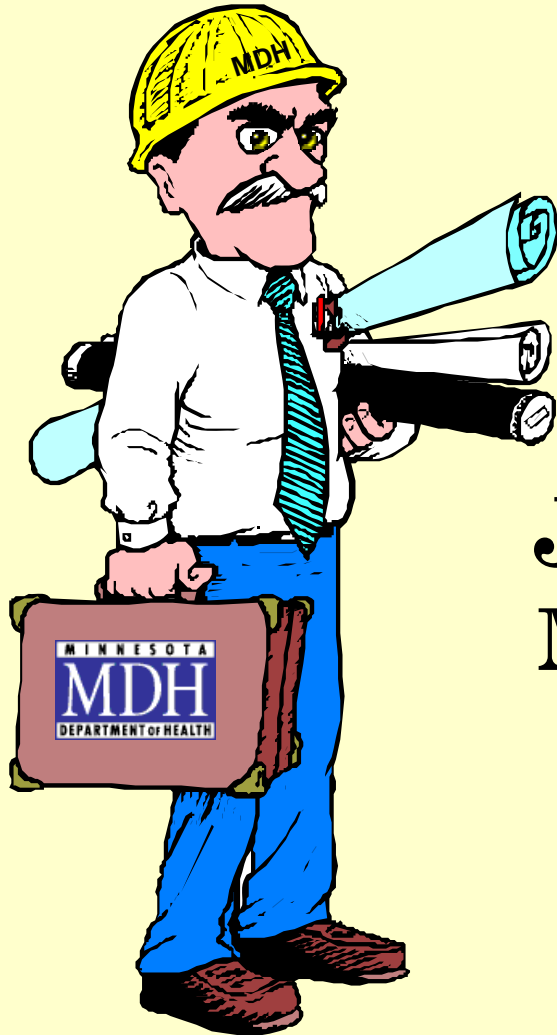
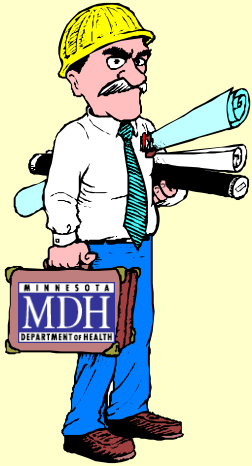


# WHAT'S NEW WITH LIFE SAFETY CODE COMPLIANCE?

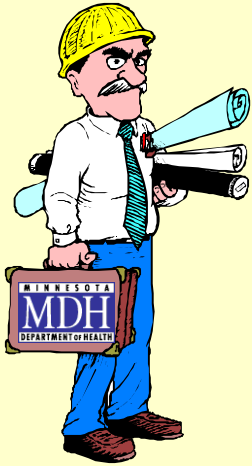


**James P. Loveland P.E.  
MN Department of Health**



# TODAY'S TOPICS INCLUDE:

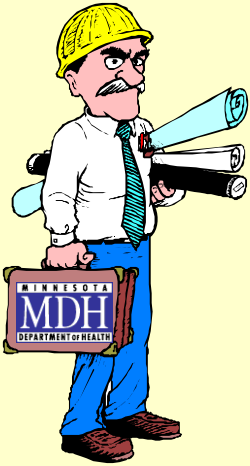
- Storage of liquid oxygen (30-minute limit)
- Locking devices on doors in the means of egress
- Remote monitoring of emergency generators
- Changes in gap requirements for door assemblies



# Storage of Liquid Oxygen

- **CMS Guidance: S &C-07-10**
- **Applicable to all types of medical gases, including liquid oxygen**

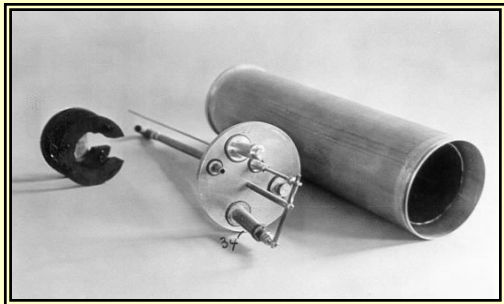




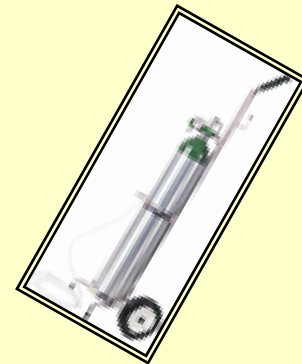
# Storage of Liquid Oxygen

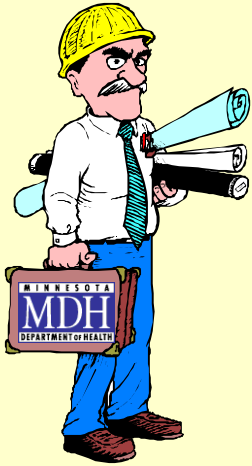
(continued)

Containers, regardless of size, may remain in resident's bedroom under certain conditions



1926 liquid oxygen tank

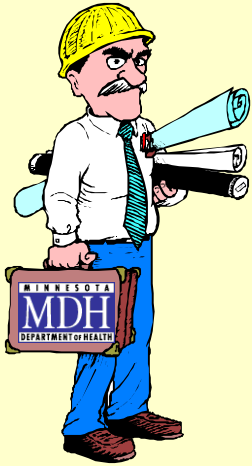




# Storage of Liquid Oxygen

(continued)

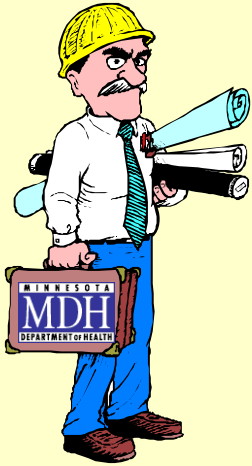
- Resident must have a physicians order for liquid oxygen stating “**PRN**” (as needed)
- Containers(s) do not remain unused for more than three (3) days (72 hours)
- When not in use, the container must be secured to prevent tipping or damage to the container



# Storage of Liquid Oxygen

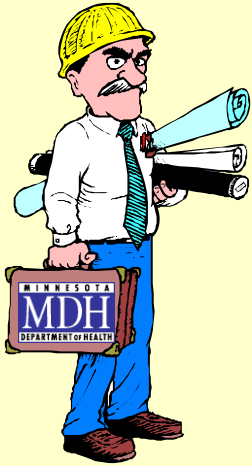
(continued)

At their discretion, the **SFM** inspector may ask to see the physician orders for any or all residents using liquid oxygen



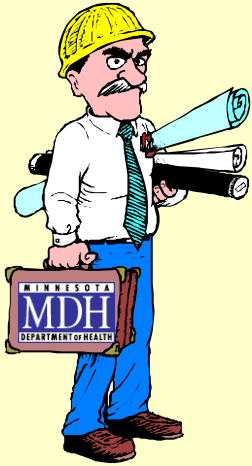
# Locks on Doors in the Means of Egress

- Cooperatively, **MDH** and the **SFM** have been approving the installation of various types of locks on doors in the means of egress
- In addition to locks on doors defining a special care unit, locks have been installed on stairwell and remotely located exit doors (among others)



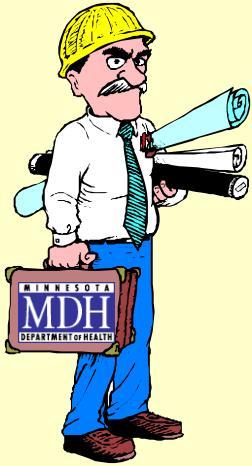
# Locks on Doors in the Means of Egress (continued)

- The installation of locks has generally not been cited during survey (K038)
- No waiver has been required for continued use
- All of that has *now changed dramatically*



# Locks on Doors in the Means of Egress (continued)

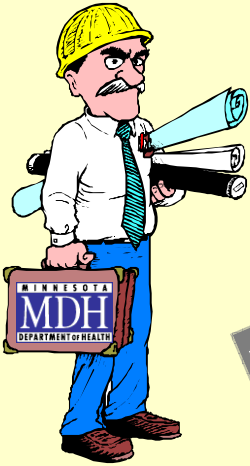
CMS is requiring that the **SSA** cite date tag **K038** when we observe locks on any doors in the means of egress that do not comply with **LSC** 18/19.2.2.2.



# Locks on Doors in the Means of Egress (continued)

LSC (00), 18/19.2.2.2.4

- Exception #1 Addresses doors defining the limits of a special care unit
- Exception #2 addresses the use of delayed egress locks
- Exception #3 addresses access-controlled egress doors

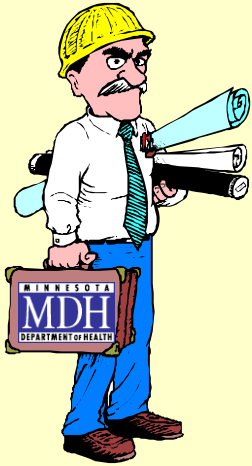


# Locks on Doors in the Means of Egress (continued)



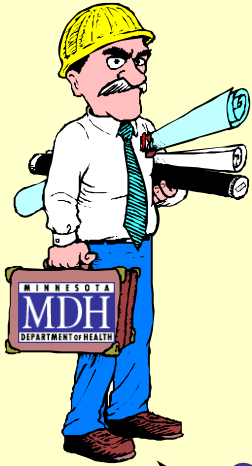
- “Locks” includes, but is not limited to, keyed locks, locks using an electronic strike plate, and push-button or keypad override magnetic locks





# Locks on Doors in the Means of Egress (continued)

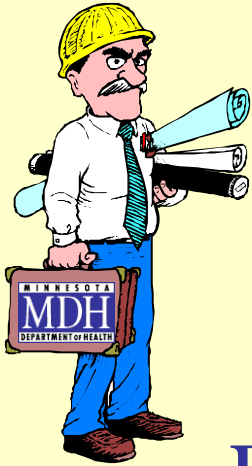
- Continued use of non-complying locks requires an annual waiver from **CMS**
- The facility must submit a K084 page (waiver request) with their plan of correction



# Remote Monitoring of Generators



- Some type of remote monitoring has been required since 1965
- The type and complexity of the monitoring varies with the edition of applicable codes
- The generator must remain in compliance with the applicable codes in effect on the date of installation



# Remote Monitoring of Generators (continued)

Five specific time periods for date of installation

- October 22, 1970 to May 31, 1976
- June 1, 1976 to December 3, 1980
- December 4, 1980 to May 8, 1988
- May 9, 1988 to March 10, 2003
- March 11, 2003 to Present

## **GENERATORS INSTALLED BETWEEN 10/22/70 and 5/31/76**

### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 1967 edition)

NFPA 70 (National Electrical Code, 1967 edition), Article 700-12

### **SPECIFIC REQUIREMENTS:**

NFPA 70 (67), Article 700-12 states; “Audible and visual signal devices shall be provided, where practicable, for the following purposes:

- (a) To give warning of derangement of the emergency or auxiliary source.
- (b) To indicate that the battery or generator set is carrying load.
- (c) To indicate by a visual signal that a battery charger is functioning properly.”

In order to accomplish item (b), the transfer switch must be equipped with an auxiliary contact switch. In some cases where this switch is missing, it is not possible to retrofit the switch(s) into the transfer switch. In this case, the facility must either install a new transfer switch or apply for a waiver of K144. A waiver request will require a letter from a generator servicing company that clearly states that it is impossible to retrofit the transfer switch with the required auxiliary contact switch(s).

Make sure that the battery charger is connected to both the utility power source and the emergency power circuits. This advice applies to ALL emergency generator installations.

NFPA 76 (Essential Electrical Systems for Health Care Facilities, 1967 edition), Article 12, paragraph 121 specifically states that the requirements of that code are not applicable to nursing homes.

Neither NFPA 101 (67) nor NFPA 70 (67) has requirements addressing the location of the remote annunciator.

NFPA 76 (67), article 64, although not applicable, does have requirements regarding location of the remote annunciator.

Updated 5/25/07

## **GENERATORS INSTALLED BETWEEN 6/1/76 and 12/3/80**

### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 1973 edition)  
NFPA 70 (National Electrical Code, 1971 edition), Article 700-12  
NFPA 76A (Essential Electrical Systems for Health Care Facilities, 1973 edition),  
Articles 83 and 84

### **SPECIFIC REQUIREMENTS:**

NFPA 70 (71), Article 700-12 states; “Audible and visual signal devices shall be provided, where practicable, for the following purposes:

- (a) To give warning of derangement of the emergency or auxiliary source.
- (b) To indicate that the battery or generator set is carrying load.
- (c) To indicate by a visual signal that a battery charger is functioning properly.”

NFPA 76A (73), Article 83, paragraph 831 states; “Internal combustion engines serving generator sets shall be equipped with:

- (a) A sensor device plus visual warning device to indicate a water jacket temperature below those required in 823.
- (b) Sensor devices plus visual pre-alarm warning device to indicate:
  - (1) High engine temperature (above manufacturer’s recommended safe operating temperature range)
  - (2) Low lubricating oil pressure (below manufacturer’s recommended safe operating range)
- (c) An automatic engine shutdown device plus visual device to indicate that a shutdown took place for:
  - (1) Overcrank (failed to start)
  - (2) Overspeed
  - (3) Low lubricating oil pressure
  - (4) Excessive engine temperature
- (d) A common audible alarm device to warn that any one or more of the pre-alarm or alarm conditions exist.”

NFPA 76A (73), Article 83, paragraph 832 states; “Prime movers, other than internal combustion engines, serving generator sets shall have appropriate safety devices plus visual and audible alarms to warn of alarm or approaching alarm conditions.”

NFPA 76A (73), Article 83, paragraph 833 states; “Liquid fuel supplies for emergency or auxiliary power sources shall be equipped with a sensor device to warn that the main fuel tank contains less than a three-hour operating supply.”

NFPA 76A (73), Article 84, paragraph 841 states; “A remote annunciator, storage battery powered, shall be provided to operate outside of the generating room in a location readily observed by personnel at a regular work station, (see Section 700-12, NFPA 70, 1971 edition). Where a regular work station may be unattended periodically, an appropriately labeled derangement signal shall be exhibited at the telephone switchboard. The annunciator shall indicate alarm conditions of the emergency or auxiliary power source as follows:

- (a) Individual visual signals shall indicate:
  - (1) When the emergency or auxiliary power source is operating to supply power to the load.
  - (2) When the battery charger is malfunctioning.
- (b) Individual visual signals plus a common audible signal to warn of an engine-generator alarm condition shall indicate:
  - (1) Low lubricating oil pressure
  - (2) Low water temperature (below those required in 823)
  - (3) Excessive water temperature
  - (4) Low fuel – when the main fuel storage tank contains less than a three-hour operating supply.
  - (5) Overcrank (failure to start)
  - (6) Overspeed.”

Updated 5/25/07

## **GENERATORS INSTALLED BETWEEN 12/4/80 and 5/8/88**

### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 1981 edition)  
NFPA 70 (National Electrical Code, 1981 edition), Article 700-7  
NFPA 76A (Essential Electrical Systems for Health Care Facilities, 1977 edition),  
3-3.6 and 3-3.7

### **SPECIFIC REQUIREMENTS:**

NFPA 70 (81), Article 700-7 states; “Audible and visual signal devices shall be provided, where practicable, for the following purposes:

- (a) Derangement. To indicate derangement of the emergency source.
- (b) Carrying Load. To indicate that the battery or generator set is carrying load.
- (c) Not Functioning. To indicate that the battery charger is not functioning.
- (d) Prime Mover. To indicate derangement of the prime mover starting equipment.

Make sure that the prime mover is in the auto-start circuit.

NFPA 76A (77), 3-3.6 states; “Internal combustion engines serving generator sets shall be equipped with:

- (a) A sensor device plus visual warning device to indicate a water jacket temperature below those required in 3-3.5.3
- (b) Sensor devices plus visual pre-alarm warning device to indicate:
  - (1) High engine temperature (above manufacturer’s recommended safe operating temperature range)
  - (2) Low lubricating oil pressure (below manufacturer’s recommended safe operating range)
- (c) An automatic engine shutdown device plus visual device to indicate that a shutdown took place for:
  - (1) Overcrank (failure to start)
  - (2) Overspeed
  - (3) Low lubricating oil pressure
  - (4) Excessive engine temperature
- (d) A common audible alarm device to warn that any one or more of the pre-alarm or alarm conditions exist.

NFPA 76A (77), 3-3.6.2 states: Prime movers, other than internal combustion engines, serving generator sets shall have appropriate safety devices plus visual and audible alarms to warn of alarm or approaching alarm conditions.

NFPA 76A (77), 3-3.6.3 states: “Liquid fuel supplies for emergency or auxiliary power sources shall be equipped with a sensor device to warn that the main fuel tank contains less than a three-hour operating supply.”

NFPA 76A (77), 3-3.7 states: “A remote annunciator, storage battery powered, shall be provided to operate outside of the generating room in a location readily observed by personnel at a regular work station (see section 700-12, NFPA 70, 1978 edition).

The annunciator shall indicate alarm conditions of the emergency or auxiliary power source as follows:

- (a) Individual visual signals shall indicate:
  - (1) When the emergency or auxiliary power source is operating to supply power to load.
  - (2) When the battery charger is malfunctioning.
- (b) Individual visual signals plus a common audible alarm to warn of an engine-generator alarm condition shall indicate:
  - (1) Low lubricating oil pressure
  - (2) Low water temperature (below those required in 3-3.5.3)
  - (3) Excessive water temperature
  - (4) Low fuel – when the main fuel storage tank contains less than a three-hour operating supply.
  - (5) Overcrank (failure to start)
  - (6) Overspeed

Where a regular work station may be unattended periodically an audible and visual derangement signal, appropriately labeled, shall be established at a continuously monitored location. This derangement signal shall activate when any of the conditions in 3-3.7(a) and (b) occur, but need not display the conditions individually.”

Updated: 5/25/07

## **GENERATORS INSTALLED BETWEEN 5/9/88 and 3/10/03**

### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 1985 edition)

NFPA 70 (National Electrical Code, 1984 edition), Article 700-7

NFPA 99 (Health Care Facilities, 1984 edition), 8-2.3.5 and 8-2.3.6

### **SPECIFIC REQUIREMENTS:**

NFPA 70 (84), Article 700-7 states; “Audible and visual signal devices shall be provided, where practicable, for the following purposes:

- (a) Derangement. To indicate derangement of the emergency source.
- (b) Carrying Load. To indicate that the battery or generator set is carrying load.
- (c) Not Functioning. To indicate that the battery charger is not functioning.
- (d) Prime Mover. To indicate derangement of the prime mover starting equipment.
- (e) Ground Fault. To indicate a ground fault in solidly grounded wye emergency systems of more than 150 volts to ground and circuit protective devices rated 1000 amperes or more. The sensor for the ground-fault signal devices shall be located at, or ahead of, the main system disconnecting means for the emergency source, and the maximum setting of the signal devices shall be for the ground-fault current of 1200 amperes. Instructions on the course of action to be taken in the event of indicated ground-fault shall be located at or near the sensor location.”

Make sure the prime mover is in the auto start circuit.

NFPA 99 (84), 8-2.3.5.1 states; “Internal combustion engines serving generator sets shall be equipped with:

- (a) A sensor device plus visual warning device to indicate a water jacket temperature below those required in 8-2.3.4.3.
- (b) Sensor devices plus visual pre-alarm warning device to indicate:
  - (1) High engine temperature (above manufacturer’s recommended safe operating temperature range)
  - (2) Low lubricating oil pressure (below manufacturer’s recommended safe operating range)
- (c) An automatic engine shutdown device plus visual device to indicate that a shutdown took place for:
  - (1) Overcrank (failure to start)
  - (2) Overspeed
  - (3) Low lubricating oil pressure
  - (4) Excessive engine temperature
- (d) A common audible alarm device to warn that any one or more of the pre-alarm or alarm conditions exist.”

NFPA 99 (84), 8-2.3.5.2 states; “Other Types of Prime Movers. Prime movers, other than internal combustion engines, serving generator sets shall have appropriate safety devices plus visual and audible alarms to warn of alarm or approaching alarm conditions.”

NFPA 99 (84), 8-2.3.5.3 states; “Liquid Fuel Supplies. Liquid fuel supplies for emergency or auxiliary power sources shall be equipped with a sensor device to warn that the main fuel tank contains less than a three-hour operating supply.”

NFPA 99 (84), 8-2.3.6 states; “Alarm Annunciator. A remote annunciator, storage battery powered, shall be provided to operate outside of the generating room in a location readily observed by personnel at a regular work station (see NFPA 70, National Electrical Code, Section 700-12).

The annunciator shall indicate alarm conditions of the emergency or auxiliary power source as follows:

- (a) Individual visual signals shall indicate:
  - (1) When the emergency or auxiliary power source is operating to supply power to load.
  - (2) When the battery charger is malfunctioning.
- (b) Individual visual signals plus a common audible alarm to warn of an engine-generator alarm condition shall indicate:
  - (1) Low lubricating oil pressure
  - (2) Low water temperature (below those required in 8-2.3.4.3)
  - (3) Excessive water temperature
  - (4) Low fuel – when the main fuel storage tank contains less than a three-hour operating supply.
  - (5) Overcrank (failure to start)
  - (6) Overspeed

Where a regular work station may be unattended periodically, an audible and visual derangement signal, appropriately labeled, shall be established at a continuously monitored location. This derangement signal shall activate when any of the conditions in 8-2.3.6(a) and (b) occur, but need not display the conditions individually.”

Updated: 5/25/07

## **GENERATORS INSTALLED BETWEEN 3/11/03 and present**

### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 2000 edition)  
NFPA 70 (National Electrical Code, 1999 edition), Article 700-7  
NFPA 99 (Health Care Facilities, 1999 edition), 3-4.1.1.14 and 3-4.1.1.15  
NFPA 110 (Standard for Emergency and Standby Power Systems, 1999 edition),  
3-5.5 and 3-5.6

### **SPECIFIC REQUIREMENTS:**

NFPA 70 (99), Article 700-7 states; “Audible and visual signal devices shall be provided, where practicable, for the following purposes:

- (a) Derangement. To indicate derangement of the emergency source.
- (b) Carrying Load. To indicate that the battery or generator set is carrying load.
- (c) Not Functioning. To indicate that the battery charger is not functioning.
- (d) Prime Mover. To indicate derangement of the prime mover starting equipment.
- (e) Ground Fault. To indicate a ground fault in solidly grounded wye emergency systems of more than 150 volts to ground and circuit protective devices rated 1000 amperes or more. The sensor for the ground-fault signal devices shall be located at, or ahead of, the main system disconnecting means for the emergency source, and the maximum setting of the signal devices shall be for the ground-fault current of 1200 amperes. Instructions on the course of action to be taken in the event of indicated ground-fault shall be located at or near the sensor location.”

Make sure prime mover is in auto-start circuit.

NFPA 99 (99), 3-4.1.1.14 states; “Requirements for Safety Devices.

- (a) “Internal combustion engines serving generator sets shall be equipped with the following:
  - 1. A sensor device plus visual warning device to indicate a water jacket temperature below those required in 3-4.1.1.9.
  - 2. Sensor devices plus visual pre-alarm warning device to indicate the following:
    - (a) High engine temperature (above manufacturer’s recommended safe operating temperature range)
    - (b) Low lubricating oil pressure (below manufacturer’s recommended safe operating range)
    - (c) Low water coolant level

3. An automatic engine shutdown device plus visual device to indicate that a shutdown took place due to the following:

- (a) Overcrank (failed to start)
- (b) Overspeed
- (c) Low lubricating oil pressure
- (d) Excessive engine temperature

4. A common audible alarm device to warn that any one or more of the pre-alarm or alarm conditions exist.”

(b) Other Types of Prime Movers. Prime movers, other than internal combustion engines, serving generator sets shall have appropriate safety devices plus visual and audible alarms to warn of alarm or approaching alarm conditions.”

(c) Liquid Fuel Supplies. Liquid fuel supplies for emergency or auxiliary power sources shall be equipped with a sensor device to warn that the main fuel tank contains less than a 3-hour operating supply.”

NFPA 99 (99), 3-4.1.1.15 states; “Alarm Annunciator. A remote annunciator, storage battery powered, shall be provided to operate outside of the generating room in a location readily observed by personnel at a regular work station (see NFPA 70, National Electrical Code, Section 700-12).

The annunciator shall indicate alarm conditions of the emergency or auxiliary power source as follows:

- (a) Individual visual signals shall indicate the following:
  - (1) When the emergency or auxiliary power source is operating to supply power to load.
  - (2) When the battery charger is malfunctioning.
- (b) Individual visual signals plus a common audible alarm to warn of an engine-generator alarm condition shall indicate the following:
  - (1) Low lubricating oil pressure
  - (2) Low water temperature (below those required in 3-4.1.1.9)
  - (3) Excessive water temperature
  - (4) Low fuel – when the main fuel storage tank contains less than a 3-hour operating supply.
  - (5) Overcrank (failed to start)
  - (6) Overspeed

Where a regular work station may be unattended periodically, an audible and visual derangement signal, appropriately labeled, shall be established at a continuously monitored location. This derangement signal shall activate when any of the conditions in 3-4.1.1.15(a) and (b) occur, but need not display the conditions individually.”

The requirements noted in NFPA 110 (99) are too numerous to detail in this handout. It is recommended that each facility have a copy of this Standard for reference. If the facility intends to purchase a new generator, it is recommended that the contract indicate that the installation will comply with all of the above stated NFPA Codes.

Updated: 5-25-07

## **REMOTE MANUAL STOP STATION**

### **CERTAIN SIZE EMERGENCY GENERATORS INSTALLED AFTER 12-4-80**

The requirement for a remote manual stop station (e-stop) first appeared in National Fire Protection Association (NFPA) Standard 37 (Stationary Combustion Engines, Gas Turbines, 1979 edition). At that time:

#### **APPLICABLE CODE:**

NFPA 101 (Life Safety Code, 1981 edition)

#### **SPECIFIC REQUIREMENTS:**

NFPA 37 (79), 3-3.1(c) requires that engines of 100 horsepower or more have “some means of shutting down the engine at a readily accessible location remote from the engine”.

This requirement became effective with the adoption of NFPA Standard 101 (Life Safety Code, 1981 edition) on 12-4-80.

#### **WHAT THIS MEANS:**

All emergency generators powered by a prime mover of 100 horsepower or more must be equipped with a means of shutting down the engine. This e-stop must be located at a readily accessible location remote from the engine.

### **CERTAIN SIZE EMERGENCY GENERATORS INSTALLED IN CERTAIN TYPES OF HEALTH CARE FACILITIES AFTER 5-9-88**

#### **APPLICABLE CODES:**

NFPA 101 (Life Safety Code, 1985 edition)

NFPA 99 (Health Care Facilities, 1984 edition), Chapter 8

NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 1984 edition)

#### **SPECIFIC REQUIREMENTS:**

NFPA 101 (85), 12-5.1.3 states; “Any health care occupancy as indicated within 12-1.1.1.2 which normally utilizes life support devices shall have electrical systems designed and installed in accordance with Chapter 8, “Essential Electrical Systems for Health Care Facilities” of NFPA 99, *Standard for Health Care Facilities*.

NFPA 99 (84), 8-1.2 makes reference to NFPA 37 (84).

NFPA 37 (84), 3-3.1, has a requirement that is identical to that stated above.

There is no requirement for an e-stop anywhere in NFPA 99 (84), Chapter 8.

**WHAT THIS MEANS:**

Although NFPA 101 (85), 12-2.8.2, 12-2.9.2, 12-2.10.2, and 12-5.1.3 requires health care facilities using life support systems to comply with NFPA 99 (84), Chapter 8, NFPA 99 (84) has no requirement regarding an e-stop. NFPA 99 (84) makes reference to NFPA 37 (84), however; NFPA 37 (84) is not on the list of Referenced Publications in Chapter 12. Therefore, an argument could be made that NFPA 37 (84) is not applicable. The requirement at NFPA 37 (84), 3-3.1(c) is applicable only to engines 100 horsepower or more.

All three code requirements taken together still results in only those generators with an engine of 100 horsepower or more requiring an e-stop. This holds true until March 11, 2003.

**ALL EMERGENCY GENERATORS INSTALLED AFTER MARCH 11, 2003**

**APPLICABLE CODES:**

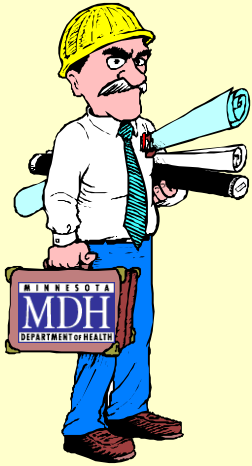
NFPA 101 (Life Safety Code, 2000 edition)

NFPA 110 (Standard for Emergency and Standby Power Systems, 1999 edition)

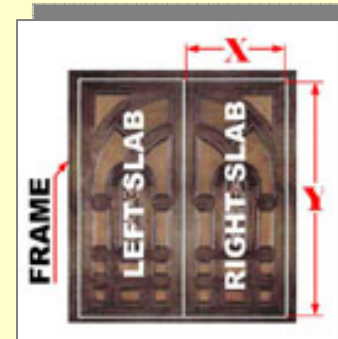
**SPECIFIC REQUIREMENTS:**

NFPA 110 (99), 3-5.5.6 states; “All Level 1 and Level 2 installations shall have a remote manual stop station of a type similar to a break-glass station located outside the room housing the prime mover, where so installed, or located elsewhere on the premises where the prime mover is located outside the building.”

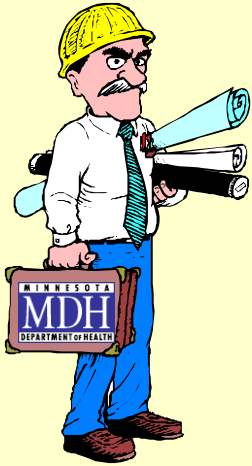
Updated 5-25-07



# Gaps Between Door Frames and Door Leaves (slabs)



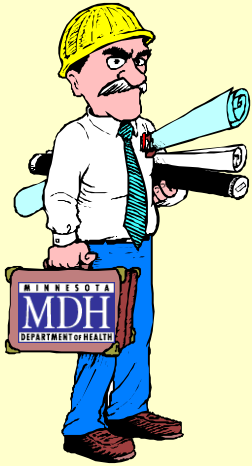
- CMS guidance : S&C-07-18
- Not applicable to doors in smoke barriers or doors in required enclosures of vertical openings, exits, and hazardous areas



# Gaps Between Door Frames and Door Leaves

(continued)

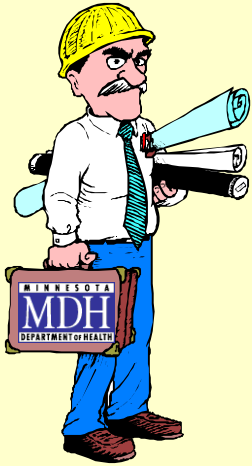
Specific requirements vary dependant upon whether or not the smoke compartment is fully sprinkled



# Gaps Between Door Frames and Door Leaves

(continued)

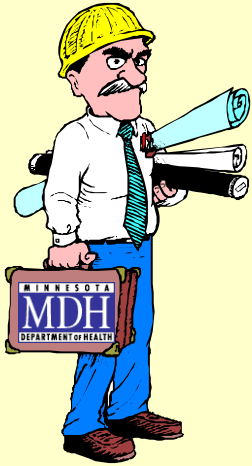
If the smoke compartment is fully sprinklered, the gap between the face of the corridor door and the door stop must not exceed 1/2-inch



# Gaps Between Door Frames and Door Leaves

(continued)

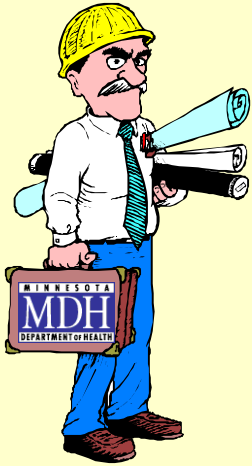
If the smoke compartment is not fully sprinkled, the gap between the face of the door and the door stop must not exceed 1/4 -inch



# Gaps Between Door Frames and Door Leaves

(continued)

- In all cases, the door latching mechanism must be functioning properly
- Protocol requires survey by smoke compartment. In partially sprinkled facilities, both measurements may be in play



# Gaps Between Door Frames and Door Leaves

(continued)

Sprinklering of closets and wardrobes will affect this determination





*Jim Loveland*

*would like to*

*“Thank You”*

*for taking the time to attend this presentation*