# Section 6, Classifying Lease Areas According to Fire an

- 1. If a spark occurs in a mixture of gas and air, the mixture might
- 2. So, it is safer to place \_\_\_\_\_\_ equipment away from sources of gas and flammable vapors.
- 3. But, this is not always possible. Often, electrical equipment must be installed in or near areas where flammable gases or vapors are present.

Equipment used in such areas (must meet rigid design requirements / can be the same as equipment used other places on a lease ).

4. To help maintenance personnel in safely placing electrical equipment, the National Electrical Code, NEC, has divided fire and explosion hazards into three classifications.

#### CLASS I

AREAS WHERE FLAMMABLE GASSES OR VAPORS ARE, OR MAY BE, PRESENT IN QUANTITIES SUFFICIENT TO PRODUCE EXPLOSIVE OR IGNITABLE MIXTURES.

### CLASS II

AREAS IN WHICH COMBUSTIBLE DUST IS PRESENT

## CLASS III

AREAS IN WHICH EASILY IGNITABLE FIBERS OR MATERIALS PRODUCING COMBUSTIBLE FLYINGS (SUCH AS LINT) ARE HANDLED, MANUFACTURED, OR USED.

Class I areas contain \_\_\_\_\_\_ or \_\_\_\_\_ that can explode or burn if a source of ignition is present.

5. Flammable gases or vapors are present in an oil field.

So, lease personnel would be concerned about Class (  $\rm I/II/III$  ) areas.

6. If an electrical device must be used in a Class I area, the device must meet certain requirements.

And to show that it meets these requirements, the piece of equipment must be clearly \_\_\_\_\_\_ for that area.

7. Each Class has two divisions. Here are the two divisions for Class I.

CLASS I DIVISION 1

THE HAZARDOUS CONCENTRATIONS OF FLAM-MABLE GASES OR VAPORS EXIST CONTINUOUSLY, INTERMITTENTLY, OR PERIODICALLY UNDER NORMAL OPERATING CONDITIONS IN THIS AREA.

#### **DIVISION 2**

FLAMMABLE LIQUIDS OR FLAMMABLE GASES ARE HANDLED, PROCESSED OR USED IN THIS AREA. BUT, THESE GASES OR LIQUIDS ARE NORMALLY CONFINED IN CLOSED CONTAINERS OR CLOSED SYSTEMS. AND, ADEQUATE VEN-TILLATION IS USED TO PREVENT THE CONCEN-TRATION OF GASES OR VAPORS; OR, THE CLOSED SYSTEMS OR CLOSED CONTAINERS WILL RUPTURE ONLY UNDER ABNORMAL OPERATING CONDITIONS.

In a Class I, Division 1 area, flammable gases or vapors are present ( normally / only by accident ).

- 8. Or, they could easily be present if equipment breaks down and \_\_\_\_\_\_ must take place.
- 9. Class I, Division 2 areas also contain flammable gases or vapors.

But, the gases or vapors are kept in (open / closed) containers or systems.

- An area can also be classified as Division 2 if gases or vapors are not present in a large quantity, and if they can be easily \_\_\_\_\_\_\_ from the area.
- 11. Adequate ventilation means that the air within an area is changed completely l2 times per hour.

This change can be accomplished through the use of a mechanical \_\_\_\_\_\_ system; or, it may occur naturally, if the gases or vapors are located ( in an enclosure / outdoors ).

#### Refer now to Exhibit 5.

12. The hazards that are present in Class I areas are also identified in another way.

Gases and vapors found on leases and at petroleum processing facilities are divided into four

# GROUP CLASSIFICATIONS OF FLAMMABLE GASES AND VAPORS



NOTE: Ignition temperatures given are for the gas or vapor with the lowest ignition temperature in each group.

- 13. Each group of gases and vapors has an indicated \_\_\_\_\_\_ temperature.
- 14. This temperature has been determined by the gas or vapor in each group with the ( highest / lowest ) ignition temperature.
- 15. A motor to be used in one of these four areas must not get too
  \_\_\_\_\_\_\_\_\_\_ for the particular gas or vapor mixture in
  the air.
- Even when two gases or vapors have the same ignition temperature, they may not explode with the same amount of energy.

All gases and vapors ( have / do not have ) the same explosion properties.

- 17. So, gases and vapors are grouped according to their ignition \_\_\_\_\_\_ and according to their \_\_\_\_\_\_ properties.
- 18. As you already learned, when a motor or other piece of electrical equipment is designed for use in a hazardous lease area, the equipment must be clearly labeled.

The label must show that the equipment can be used in a Class ( 1/ II / III ) area. Then, the label must indicate whether the equipment is for use in a Division \_\_\_\_\_\_ or \_\_\_\_\_ area.

- 19. Also, the equipment must be marked with the letter of the group of \_\_\_\_\_\_ and \_\_\_\_\_ around which the equipment can be used.
- 20. Here is a drawing of a flowing well installation.





- 21. The concrete \_\_\_\_\_\_ below the ground is classified as Division \_\_\_\_\_\_.
- 22. This drawing shows beam pumping, wellhead equipment and a cellar.



The cellar is identified as a Division \_\_\_\_\_\_area.

- 23. Areas where hazardous gases can collect and which cannot easily be ventilated are identified as \_\_\_\_\_
- 24. Look again at the drawing showing the beam pumping well.

The Division 2 area extends \_\_\_\_\_\_ inches above the ground and \_\_\_\_\_\_ feet in either direction from the Division 1 area.

- 25. If an electrician is going to install electrical equipment in or near a hazardous area, he must know the \_\_\_\_\_\_ of the area which is classified as hazardous.
- 26. Suppose the installation shown in Frame 22 has no cellar.

The installation would ( not need to be classified / be classified as Division 2  $\ ).$ 

27. At any beam pumping installation, an area around the stuffing box is classified as hazardous.

If the stuffing box is not tight enough, gas and oil could