

Properties of Static Electricity

Static electricity is electricity at rest, but if a conductive path is present, it can result in a spark or static discharge. In propane operations, this spark can ignite and cause a fire or even an explosion. It is important to understand static electricity, where and how it can arise, and how to reduce risks of a static ignition.

FACTS ABOUT STATIC ELECTRICITY:

- ✓ Static electricity occurs when two materials touch and separate, thus creating an imbalance of electrons and a positive charge. Benign in many situations, static electricity can be extremely dangerous around propane.
- ✓ Static sparks give off energy in the form of heat or light.
- ✓ The level of static charge is affected by speed of movement, humidity, material size, and materials' electrical properties [conductive or non-conductive]. Metals, wet fabrics, wet concrete, and the human body are common conductive materials.
- ✓ Higher humidity reduces static generation significantly. However, polymeric materials such as HDPEs, PVCs, and plastic films do not retain moisture and thus can charge to extreme voltages even in high humidity.
- ✓ Even though they do not throw sparks, non-conductors can transfer their electrical energy to something or someone that can cause a spark. This is called *induction*.
- ✓ **The smallest static spark we can see or feel (about 3,000 volts) has double the energy required to ignite propane.**

CAUSES OF STATIC ELECTRICITY:

In propane operations, static electricity can be caused by a number of factors, including:

- ✓ Walking through a facility or across a carpet.
- ✓ Fuel flowing at high velocity through a small opening.
- ✓ Friction from wind blowing over cellophane or stretch wrap near cylinders.
- ✓ Putting on or removing conductive clothing.
- ✓ Picking up a charged item, without static discharge control footwear, and/or not grounding yourself after putting the item down.

WAYS TO REDUCE STATIC ELECTRICITY:

- ✓ Identify where static electricity may be coming from, and use signage and floor markers to label all static discharge control areas. Limit access to authorized personnel only.
- ✓ Use a grounding path for static charges you may develop or carry. Make sure all process and handling equipment is grounded and bonded in accordance with electric codes.
- ✓ Follow your company's guidelines on static discharge footwear and PPE, and use static-safe floor mats and other plant-supplied safety tools.
- ✓ Make sure you understand how to control static generation and provide safe grounding paths. Talk with your supervisor if you need training.

Discussion Topics

1. Which common situations and activities at your workplace can generate static electricity?
2. How might humidity levels affect a specific job task? How do your precautions change in low-humidity versus high-humidity situations?

LEARNING ACTIVITY

Display various fabrics (including uniforms or other employee clothing) and plant materials (stretch wrap, metal, etc.). Demonstrate how static can occur and which items may pose greater hazards.

Source: *Static Electricity in the Propane Industry* (PERC)

For more information about static electricity, visit propanesafety.com.

September 2015 Safety Test
Properties of Static Electricity

Name_____

Date_____

Instructions: Read and answer each of the following questions. When complete, grade the test and review incorrect answers so each employee is "armed" with the correct answers before they leave the training.

(1) People do not generate static charge so grounding does not apply to them.

- (A) True
- (B) False

(2) Static electricity is electricity at rest.

- (A) True
- (B) False

(3) Static electricity can be an ignition source for propane.

- (A) True
- (B) False

(4) Higher humidity increases static generation.

- (A) True
- (B) False

(5) Synthetic and polyester materials are not conductors of static electricity.

- (A) True
- (B) False

September 2015
Answer Key

1. B
2. A
3. A
4. B
5. B

MONTHLY SAFETY MEETING MINUTES AND ATTENDANCE RECORD

Company Name: _____

City: _____ **State:** _____

Date: _____ **Time Started:** _____ **Time Finished:** _____

Instructed By: _____ **Number Attending:** _____

Subject Covered and Comments:

By my signature below, I certify that I attended and participated in this Safety Meeting and I understand the material presented.

Employee Name (Please print)	Employee Signature	*License Expires	**Endorsements	***Physical Exam
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				

*Driver licenses may be for multiple years and require HazMat testing between license renewal periods. List expiration date.

**Check licenses for proper endorsements and re-testing. (HazMat) List endorsements in this column.

***Physical Examinations are good for 2 years from the original date of the exam or sooner by Physician's request. List original exam date in this column.

By my signature below, I hereby certify that the employees listed above have been trained in accordance with the applicable regulations and curriculum for this monthly safety meeting.

Instructor's Signature: _____ **Date:** _____