1. Record Nr. UNINA9910877284603321 Autore Britton Laurence G. <1951-> Titolo Avoiding static ignition hazards in chemical operations / / Laurence G. Britton New York, : Center for Chemical Process Safety of the American Pubbl/distr/stampa Institute of Chemical Engineers, c1999 **ISBN** 1-282-78331-9 9786612783319 0-470-93540-5 1-59124-591-5 0-470-93539-1 Descrizione fisica 1 online resource (304 p.) CCPS concept book Collana Disciplina 660/.2804 Soggetti **Electrostatics** Chemical plants - Safety measures Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Avoiding Static Ignition Hazards in Chemical Operations: A CCPS Concept Book: CONTENTS: Preface: Acknowledgments: 1 INTRODUCTION; 1-1. Purpose; 1-2. Exclusions; 1-3. Units; 1-4. Organization of the Book; 2 FUNDAMENTALS OF STATIC ELECTRICITY; 2-1. What Is Static Electricity?; 2-1.1. Charge Separation; 2-1.2. Magnitude of Current and Potential; 2-1.3. Concentration of Charged Species; 2-1.4. Importance of Trace Contaminants; 2-1.5. Hazard Evaluation; 2-1.6. Statistics; 2-2. Charge Generation; 2-2.1. Induction Charging: 2-2.2. Ionic Charging: 2-3. Charge Dissipation 2-3.1. Variability of Conductivity2-4. Charge Accumulation; 2-5. Ignition; 2-5.1. Effective Energy; 2-6. Static Discharges; 2-6.1. Corona Discharge; 2-6.2. Brush Discharge; 2-6.3. Bulking Brush Discharge; 2-6.4. Spark Discharge; 2-6.5. Propagating Brush Discharge (PBD); 2-6.6.

Surface Streamer; 2-7. Personnel Spark and Shock Hazards; 2-7.1. Body Capacitance and Resistance; 2-7.2. Voltage (V) and Energy (W) Attained; 2-7.3. Human Shock Response; 3 EVALUATING THE HAZARD OF STATIC ELECTRICITY; 3-1. General; 3-2. Hazard Identification

3-3.1. Conductive Objects 3-3.2. Nonconductive Objects: 3-4. Energy Estimates; 3-4.1. Charge Sharing; 3-5. Instrumentation; 3-5.1. Charge; 3-5.2. Electric Field; 3-5.3. Potential; 3-5.4. Ignition Energy; 3-5.5. Conductivity of Liquids; 3-5.6. Resistivity of Solids; 3-5.7. Resistance; 3-6. Direct Observation of Discharges; 3-7. Radio Frequency Detection of Discharges: 3-8. Measuring the Effective Energy of Nonspark Discharges; 3-8.1. Gas Composition; 4 CONTROLLING ELECTROSTATIC HAZARDS; 4-1. Bonding and Grounding; 4-1.1. Definitions; 4-1.2. Purpose of Bonding and Grounding 4-1.3. Resistance to Ground4-1.4. Bonding and Grounding Systems; 4-1.5. Ground Rods; 4-1.6. Grounding and Cathodic Protection; 4-2. Control of Charge Relaxation; 4-2.1. Increase of Conductivity; 4-2.2. Charge Neutralizers; 4-3. Control of Personnel Charging: 4-3.1. Personnel Grounding; 4-3.2. Clothing; 4-3.3. Gloves; 4-4. Control of Flammable Atmospheres: 4-4.1. Liquid Nitrogen/Liquid Air Hazards: 5 FLAMMABLE LIQUIDS, VAPORS, AND GASES; 5-1. Ignition Hazards of Liquid Vapor and Mist; 5-1.1. Flammable Liquid; 5-1.2. Flammable Limits; 5-1.3. Liquid Mist; 5-1.4. Minimum Ignition Energy (MIE) 5-1.5. Explosion Prevention Systems5-2. Generation and Relaxation (Loss) of Charge in Liquid Systems; 5-2.1. Charge Generation; 5-2.2. Charge Density; 5-2.3. Factors Influencing Charge Generation; 5-2.4. Charge Relaxation; 5-2.5. Classification of Liquids based on Conductivity; 5-2.6. Antistatic Additives; 5-2.7. Bonding and Grounding; 5-3. Flow in Pipe, Hose, and Tubing; 5-3.1. Metallic Piping Systems; 5-3.2. Nonconductive Pipe and Linings; 5-3.3. Flexible Hoses; 5-3.4. Dip Pipes; 5-3.5. Filters and Relaxation Tanks; 5-3.6. Suspended Material; 5-3.7. Valves and Other Line Restrictions 5-4. Filling Criteria for Tank Operations

Methods; 3-2.1. Decision Trees; 3-3. Charge Accumulation

Sommario/riassunto

Written by Laurence Britton, who has over 20 years' experience in the fields of static ignition and process fire and explosion hazards research, this resource addresses an area not extensively covered in process safety standards or literature: understanding and reducing potential hazards associated with static electricity. The book covers the nature of static electricity, characteristics and effective energies of different static resources, techniques for evaluating static electricity hazards, general bonding, grounding, and other techniques used to control static or prevent ignition, gases an