SGS ACADEMY | TRANSFORMING PEOPLE AND BUSINESSES

HAZARDOUS SUBSTANCES, CHEMICAL AND BIOLOGICAL SAFETY

WHEN YOU NEED TO BE SURE

SGS

THE SGS GROUP

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Swiss company – corporate head office in Geneva

- **Established since 1878 & is a global leader in**
  - Inspection
  - Verification
  - Testing, &
  - Certification
- **In Numbers**
  - 100,000+ Employees, 11000+ Offices, 350+ Laboratories
  - Operating in 145+ countries around the world
  - 125,000+ certificates issued worldwide
- **SGS Pakistan**
  - Operational in Pakistan since 1952 with 900+ Employees
  - Geographical Coverage

    Karachi / Lahore / Islamabad / Multan / Faisalabad / Sialkot / Gujranwala / Peshawar

FORMS OF CHEMICAL AGENT

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- The physical form greatly affects the hazard presented and the route of entry into the body:

  - Solid
  - Dust.
  - Fibre.
  - Fume.
  - Gas.
  - Mist.
  - Vapour.
  - Liquid.

CLASSIFICATION OF CHEMICALS HAZARDOUS TO HEALTH

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Toxic

Harmful (Xn)

Carcinogenic

Respiratory Sensitiser

Irritant (Xi)

Corrosive

CLASSIFICATION OF CHEMICALS HAZARDOUS TO HEALTH

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- **Toxic**
  - Small doses cause death or serious illness.
- **Harmful**
  - Larger doses cause death or serious illness. *Air freshener, pesticides*
- **Corrosive**
  - Destroys living tissue. *HCL etc*
- **Irritant**
  - Inflames skin or mucous membranes. *cement*

- **Carcinogens**
  - Cause cancer. *Asbestos*
- **Respiratory sensitizers**
  - Cause asthma, e.g. flour dust, isocyanates.
- **Skin sensitizers**
  - Cause allergic dermatitis, e.g. epoxy resin.
- **Mutagens**
  - Causes hereditary genetic mutation. *Nitrous acid*
- **Toxic for reproduction**
  - Causes sterility, or is harmful to unborn child. *Lead*

ROUTES OF ENTRY

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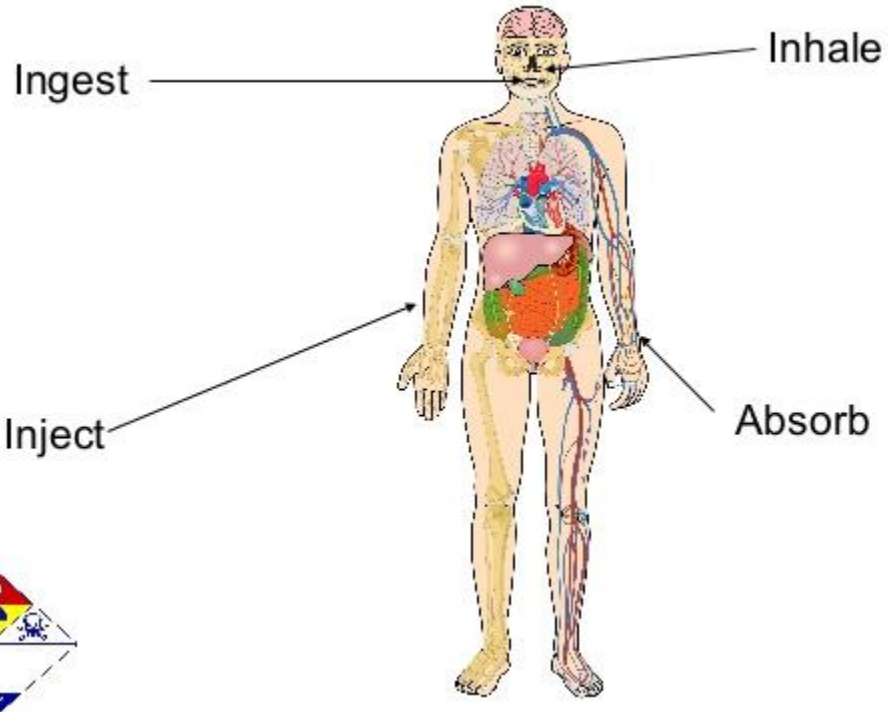
- Inhalation:
  - Inhalable dust.
  - Respirable dust (<7microns).
- Ingestion.
- Absorption through the skin.
- Injection through the skin:
  - Needle-stick.
  - Cuts and grazes.
  - Bites.



ACUTE AND CHRONIC HEALTH EFFECTS

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- **Acute**
  - High levels of exposure.
  - Short exposure time.
  - Quick effect.
  - E.g. high concentration of chlorine gas.

- **Chronic**
  - Lower levels of exposure.
  - Longer exposure time.
  - Long-term effect.
  - E.g. repeated exposure to solvents.

SAFETY DATA SHEET CONTENTS

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- Details of substance and supplier.
- Composition of substance.
- Hazard identification.
- First-aid measures.
- Fire-fighting measures.
- Accidental release measures.
- Handling and storage.
- Exposure controls/PPE.
- Physical/chemical properties.
- Stability and reactivity.
- Toxicological information.
- Ecological information.
- Disposal requirements.
- Transport information.
- Regulatory information.
- Other information.

CONTROL MEASURES

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- Change the Process – Elimination (if possible)
  Solvents based paints vs Water based
- Prevention of Exposure – Reduce the exposure time
  Job rotations
- Safe System of work – SOPs / Work Instructions
  i.e. Safe Handling of Wastes
- Enclosure or Segregation)
  Totally enclose the substance / Keep people away
- Local Exhaust Ventilation or Dilution Ventilation
  Engineering Controls
- Personal Hygiene and Personal Protective Equipment
  Hand Wash and Respiratory Protective Equipment
- Information, Instruction, Training and Supervision

BIOLOGICAL AGENTS

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- **Fungi**
  - e.g. Farmer's lung.
- **Bacteria**
  - e.g. legionnaire's disease, leptospirosis.
- **Viruses**
  - e.g. HIV, Hepatitis B.

BLOOD-BORNE VIRUSES

- **HIV/AIDS.**

- **Hepatitis A:**
  - **Hepatitis** A usually **spreads** when a person unknowingly ingests the virus from objects, food, or drinks contaminated by small, undetected amounts of stool from an infected person. **Hepatitis** A can also **spread** from close personal contact with an infected person such as through physical contact or caring for someone who is ill. e.g. sewage workers.

- **Hepatitis B:**
  - The **hepatitis B** virus is **spread** when blood, semen, or other body fluid infected with the **hepatitis B** virus enters the body of a person who is not infected. ... Birth (**spread** from an infected mother to her baby during birth) Sex with an infected partner. Sharing needles, syringes, or drug preparation equipment
  - Transmitted in body fluids, e.g. blood.
  - Health-care workers, fire-fighters, police.

BLOOD-BORNE VIRUSES

- Typical controls:
  - PPE: gloves, eye protection.
  - Disposal of material as clinical waste.
  - Prevention of needle-stick injuries.
  - Decontamination and disinfection.
  - Vaccination.
  - Accident procedures, e.g. needle-stick injuries.

LEGIONELLA BACTERIA

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- **Legionnaires' disease** is a severe form of pneumonia — lung inflammation usually caused by infection. **Legionnaires' disease** is caused by a bacterium known as legionella. You can't catch **legionnaires' disease** from person-to-person contact. Instead, most people get **legionnaires' disease** from inhaling the bacteria

- Source: Water-loving soil bacteria.
- Route of Entry: Inhalation hazard / Ingestion
- High Risk: Mists particularly high risk (Cooling Towers / HVAC / Chillers)
- Health Effects: Flu-like fever, pneumonia
- Water sampling and analysis.

LEGIONELLA BACTERIA

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- **Typical controls**
  - Enclosing water systems.
  - Water treatment, e.g. Chlorination.
  - Hot water >60^{o}C.
  - Biocides (treatment chemicals).
  - Prevention of lime scale. (limescale is deposists of calcium carbonate)
  - Routine cleaning of cooling towers.

LEPTOSPIRA BACTERIA

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Leptospirosis

- is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus **Leptospira**. In humans, it can cause a wide range of symptoms, some of which may be mistaken for other diseases. Some infected persons, however, may have no symptoms at allInfected urine from: rats, mice, cattle and horses.
- Contaminated water in contact with cuts, grazes, etc.
- Dairy farmers, sewage workers, water-sports instructors.
- Flu-like symptoms, jaundice, liver damage (Weil's disease).

LEPTOSPIRA BACTERIA

Typical controls

- Preventing rat infestation – good housekeeping, pest control.
- Good personal hygiene.
- PPE, especially gloves.
- Covering cuts and grazes.
- Issuing ‘at-risk cards’ to workers.

PERSONAL HYGIENE AND PROTECTION

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❑ Vaccination

- Against biological agents, e.g.:
  - Hepatitis B.
  - Tetanus.
  - Typhoid.

❑ Limitations

- Worker consent required.
- Immunity not always achieved.
- False sense of security.