

H₂SH₂SH₂SH₂SH₂SH₂SH₂SH₂SH₂S

Silent Killer Gas

Hydrogen Sulfide Gas

Done By
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H₂S

Hydrogen Sulfide Gas



- The Chemical formula: H_2S
- Consist of 2 Hydrogen atoms and 1 sulfur Atom
- Definition: a colorless, poisonous, flammable, and corrosive gas.
- In Low concentrations ↓ H_2S can be smelled like Rotten Eggs.
- In High concentrations ↑ H_2S cannot be smelled.



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Hydrogen Sulfide Gas

- The Properties:

- ❖ Highly Toxic
- ❖ Colorless
- ❖ Havier than Air
- ❖ Highly Flammable
- ❖ Moved & Mixed with the Wind
- ❖ Dissolved in Water.
- ❖ Highly Corrosive for the Pipelines
- ❖ Explosive



Danger
Toxic gases

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- **Can be Found in**

- ❖ **Production Areas**
- ❖ **Confined Spaces**
- ❖ **Sulfur removal Areas**
- ❖ **Heaters & Coolers**
- ❖ **Maintenance**
- ❖ **Steam Injections**
- ❖ **Reservoir Wells**

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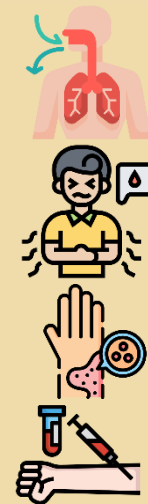
- **Factors Influencing TOXIC ACTION**

- ❖ **Rate of Entry**
- ❖ **State of Health**
- ❖ **Age**
- ❖ **Route of Exposure**
- ❖ **Any previous Health Issues**

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- **Primary Routes of Entering to the Body:**

1. **Inhalation** → Through the Nose (Breathing)
2. **Ingestion** → Through the Mouth (swallowing)
3. **Absorption** → Through the Skin
4. **Injection** → Through the Blood Stream



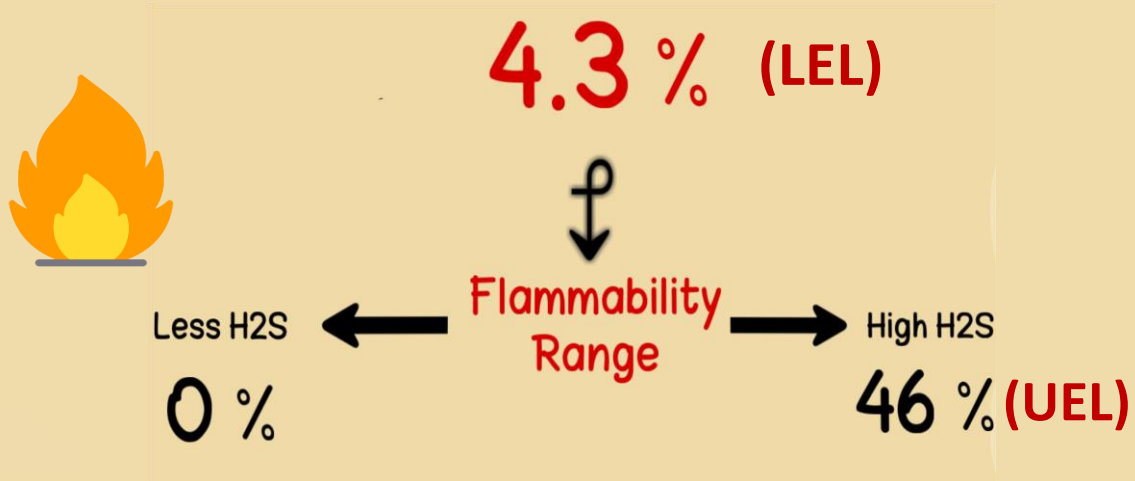
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- **Exposure Limits & Symptoms:**

- ❖ **Exposure** → 10 ppm (Allowed only for 8 hours)
Symptoms → Eye & Breathing Irritations
- ❖ **Exposure** → 20 – 100 ppm (**NOT allowed for Direct contact # Must have PPE`S**)
Symptoms → Loss of sense of Smell, Headache, Cough, Nausea, Dizziness.
- ❖ **Exposure** → ≥ 100 ppm (**No Approaching**)
Symptoms → Cannot Breath, Unconsciousness, Couse **DEATH IMMEDIATLY.**

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- Upper & Lower Explosion limits:



- Upper & Lower Explosion limits:

- ❖ Range → 0- less than 4.3 %

- Fire → No Fire → Too lean to burn (Less H₂S concentration)

- ❖ Range → 4.3 - 46 % (Flammability Range)

- Fire → Huge & Large Fire → (High H₂S concentration)

- ❖ Range → ≥ 46 %

- Fire → No Fire → Too rich to burn (High High H₂S concentration)

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- **When H₂S Gas burns**

With blue flames, produces another very toxic gas called Sulfur Dioxide.

- **Sulfur Dioxide SO₂**

Combustion of H₂S releasing SO₂ gas to the atmosphere. This gas reacts with other substance in the air Forming Sulfuric Acid which will cause environmental crisis called Acid Rain.

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Hydrogen Sulfide Gas

Name	Concentration
Sweet Gas	< 50 ppm
Low Risk Sour	50 – 499 ppm
High Risk Sour	≥ 500 ppm

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- **H₂S Pre-requisites:**

- ❖ **Gas Testing**
- ❖ **Valid Permit to Work**
- ❖ **Valid H₂S Permit to Work**
- ❖ **Proper PPE`S Required**
- ❖ **Entry logbook**
- ❖ **Aware & Trained well on how to escape**

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- **H₂S Managing Release:**

- ❖ **H₂S Training for all workers**
- ❖ **SCBA Training**
- ❖ **Regular Gas Testing**
- ❖ **Regular Berating Apparatus Maintenance**
- ❖ **Proper Safety and Leadership**
- ❖ **Risk Assessment**

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- **Personal Protective Equipment**



- Gas Mask



- Goggles
& Helmet

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- **Personal Protective Equipment**



- Shoes



- Gloves

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- **H₂S Monitoring & Gas Detectors**

1. **Personal Monitors**



- **H₂S Monitoring & Gas Detectors**

2. **Fixed Monitors**



- **H₂S Monitoring & Gas Detectors**

3. Portable Multi-gas Detectors



- **Levels Conditions:**

- ❖ **Level** → < 10 ppm
Alarm → **Green** light (Possible Danger)
- ❖ **Level** → 10-15 ppm
Alarm → **Yellow** light & Sound Alarm (Moderate Danger)
- ❖ **Level** → > 15 ppm
Alarm → **Red** light & Noisy Sound Alarm (Extreme Danger)

NOTE #

- **Monitors Must be Calibrated Every 6 Months**

- **Respiratory Protective Equipment**

- ❖ **SCBA** → **Self Continued Breathing Apparatus**
 - Usage** → **Rescue & Escape Set**
 - Contains** → **Positive Pressure Compressed Air cylinder with different capacities 30, 40, 60 minutes**
- ❖ **SBA** → **Supplied Air Breathing Apparatus**
 - Usage** → **Fixed Rescue set**
 - Contains** → **Positive Pressure Compressed Air At the field**

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- **Respiratory Protective Equipment**



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- **H₂S Leaking**



- ❖ If a **SUDDEN LEAK** occurs

Do not Panic and try to Relax

**Take a deep breath and Hold it as possible as you can
check the Wind Direction and move Cross wind**

(Fast wear the escape set if available)

Go immediately to Assembly Point

Inform the others Rescue team & supervisors

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- **H₂S Leaking**

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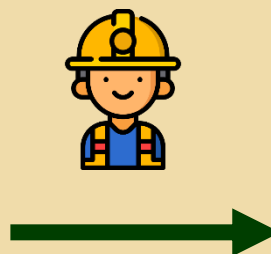
H₂S
Direction



WIND
Direction



YOUR
Direction



REMINDER #

- **PROTECT yourself First and DO NOT become
Another Victim**
 - **Let the experts do their Job**

