

# HYDROGEN SULFIDE

HDS

## CAUTIONARY RESPONSE INFORMATION

|   |   |           |   |
|---|---|-----------|---|
| <b>Common Synonyms</b><br>Sulfuretted hydrogen<br>Sulphuretted hydrogen   | Gas   | Colorless | Rotten egg odor, but odorless at poisonous concentrations |
| Sinks and boils in water. Poisonous, flammable, visible vapor cloud is produced.  |   |           |   |
| Keep people away. Avoid contact with gas.<br>Wear goggles and self-contained breathing apparatus.<br>Shut off ignition sources and call fire department.<br>Evacuate area in case of large discharges.<br>Stay upwind and use water spray to "knock down" vapor.<br>Notify local health and pollution control agencies.<br>Protect water intakes. |   |           |   |
| <b>Fire</b>   | FLAMMABLE.<br>Flashback along vapor trail may occur.<br>May explode if ignited in an enclosed area.<br>Wear goggles and self-contained breathing apparatus.<br>Stop flow of gas if possible.<br>Cool exposed containers and men effecting shutoff with water.<br>Let fire burn. |           |   |
| <b>Exposure</b>   | CALL FOR MEDICAL AID.<br><br>VAPOR<br>POISONOUS IF INHALED.<br>Irritating to eyes.<br>Move to fresh air.<br>If breathing has stopped, give artificial respiration.<br>If breathing is difficult, give oxygen.<br>IF IN EYES, hold eyelids open and flush with plenty of water.  |           |   |
| <b>Water Pollution</b>  | HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.<br>May be dangerous if it enters water intakes.<br>Notify local health and wildlife officials.<br>Notify operators of nearby water intakes.   |           |   |

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| <b>1. CORRECTIVE RESPONSE ACTIONS</b><br>Dilute and disperse<br>Stop discharge  | <b>2. CHEMICAL DESIGNATIONS</b><br>2.1 CG Compatibility Group: Not listed.<br>2.2 Formula: H <sub>2</sub> S<br>2.3 IMO/UN Designation: 2.0/1053<br>2.4 DOT ID No.: 1053<br>2.5 CAS Registry No.: 7783-06-4<br>2.6 NAERG Guide No.: 117<br>2.7 Standard Industrial Trade Classification: 52242 |
| <b>3. HEALTH HAZARDS</b>  |   |
| 3.1 <b>Personal Protective Equipment:</b> Rubber-framed goggles; approved respiratory protection.<br>3.2 <b>Symptoms Following Exposure:</b> Irritation of eyes, nose and throat. If high concentrations are inhaled, hyperpnea and respiratory paralysis may occur. Very high concentrations may produce pulmonary edema.<br>3.3 <b>Treatment of Exposure:</b> INHALATION: remove victim from exposure; if breathing has stopped, give artificial respiration; administer oxygen if needed; consult physician. EYES: wash with plenty of water.<br>3.4 <b>TLV-TWA:</b> 10 ppm<br>3.5 <b>TLV-STEL:</b> Not listed.<br>3.6 <b>TLV-Ceiling:</b> 15 ppm<br>3.7 <b>Toxicity by Ingestion:</b> Hydrogen sulfide is present as a gas at room temperature, so ingestion not likely.<br>3.8 <b>Toxicity by Inhalation:</b> Currently not available.<br>3.9 <b>Chronic Toxicity:</b> Currently not available<br>3.10 <b>Vapor (Gas) Irritant Characteristics:</b> Vapor is moderately irritating such that personnel will not usually tolerate moderate or high vapor concentrations.<br>3.11 <b>Liquid or Solid Characteristics:</b> Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.<br>3.12 <b>Odor Threshold:</b> 0.0047 ppm<br>3.13 <b>IDLH Value:</b> 100 ppm<br>3.14 <b>OSHA PEL-TWA:</b> Not listed.<br>3.15 <b>OSHA PEL-STEL:</b> 50 ppm, 10 minute peak once per 8 hour shift.<br>3.16 <b>OSHA PEL-Ceiling:</b> 20 ppm.<br>3.17 <b>EPA AEGL:</b> Not listed |   |

|   |   |          |                |                           |   |                         |   |                           |   |
|---|---|----------|----------------|---------------------------|---|-------------------------|---|---------------------------|---|
| <b>4. FIRE HAZARDS</b><br>4.1 <b>Flash Point:</b><br>Flammable gas<br>4.2 <b>Flammable Limits in Air:</b> 4.3%-45%<br>4.3 <b>Fire Extinguishing Agents:</b> Stop flow of gas<br>4.4 <b>Fire Extinguishing Agents Not to Be Used:</b> Not pertinent<br>4.5 <b>Special Hazards of Combustion Products:</b> Toxic gases are generated in fires.<br>4.6 <b>Behavior in Fire:</b> Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back.<br>4.7 <b>Auto Ignition Temperature:</b> 500°F<br>4.8 <b>Electrical Hazards:</b> Not pertinent<br>4.9 <b>Burning Rate:</b> 2.3 mm/min. (liquid)<br>4.10 <b>Adiabatic Flame Temperature:</b> Currently not available<br>4.11 <b>Stoichiometric Air to Fuel Ratio:</b> 7.1 (calc.)<br>4.12 <b>Flame Temperature:</b> Currently not available<br>4.13 <b>Combustion Molar Ratio (Reactant to Product):</b> 2.0 (calc.)<br>4.14 <b>Minimum Oxygen Concentration for Combustion (MOCC):</b> N <sub>2</sub> diluent: 7.5%; CO <sub>2</sub> diluent: 11.5% | <b>7. SHIPPING INFORMATION</b><br>7.1 <b>Grades of Purity:</b> Purified; technical<br>7.2 <b>Storage Temperature:</b> Ambient<br>7.3 <b>Inert Atmosphere:</b> No requirement<br>7.4 <b>Venting:</b> Safety relief<br>7.5 <b>IMO Pollution Category:</b> Currently not available<br>7.6 <b>Ship Type:</b> Currently not available<br>7.7 <b>Barge Hull Type:</b> Currently not available<br><br><b>8. HAZARD CLASSIFICATIONS</b><br>8.1 <b>49 CFR Category:</b> Poison gas<br>8.2 <b>49 CFR Class:</b> 2.3<br>8.3 <b>49 CFR Package Group:</b> Not pertinent.<br>8.4 <b>Marine Pollutant:</b> No<br>8.5 <b>NFPA Hazard Classification:</b><br><table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">Category</td> <td style="text-align: right;">Classification</td> </tr> <tr> <td style="text-align: right;">Health Hazard (Blue).....</td> <td style="text-align: right;">3</td> </tr> <tr> <td style="text-align: right;">Flammability (Red).....</td> <td style="text-align: right;">4</td> </tr> <tr> <td style="text-align: right;">Instability (Yellow).....</td> <td style="text-align: right;">0</td> </tr> </table> 8.6 <b>EPA Reportable Quantity:</b> 100 pounds<br>8.7 <b>EPA Pollution Category:</b> B<br>8.8 <b>RCRA Waste Number:</b> U135<br>8.9 <b>EPA FWPCA List:</b> Yes | Category | Classification | Health Hazard (Blue)..... | 3 | Flammability (Red)..... | 4 | Instability (Yellow)..... | 0 |
| Category  | Classification  |          |                |                           |   |                         |   |                           |   |
| Health Hazard (Blue).....   | 3   |          |                |                           |   |                         |   |                           |   |
| Flammability (Red).....   | 4   |          |                |                           |   |                         |   |                           |   |
| Instability (Yellow).....   | 0   |          |                |                           |   |                         |   |                           |   |
| <b>5. CHEMICAL REACTIVITY</b><br>5.1 <b>Reactivity with Water:</b> No reaction<br>5.2 <b>Reactivity with Common Materials:</b> No reaction<br>5.3 <b>Stability During Transport:</b> Stable<br>5.4 <b>Neutralizing Agents for Acids and Caustics:</b> Not pertinent<br>5.5 <b>Polymerization:</b> Not pertinent<br>5.6 <b>Inhibitor of Polymerization:</b> Not pertinent  | <b>9. PHYSICAL &amp; CHEMICAL PROPERTIES</b><br>9.1 <b>Physical State at 15° C and 1 atm:</b> Gas<br>9.2 <b>Molecular Weight:</b> 34.08<br>9.3 <b>Boiling Point at 1 atm:</b> -76.7°F = -60.4°C = 212.8°K<br>9.4 <b>Freezing Point:</b> -117°F = -82.8°C = 190.4°K<br>9.5 <b>Critical Temperature:</b> 212.7°F = 100.4°C = 373.6°K<br>9.6 <b>Critical Pressure:</b> 1300 psia = 88.9 atm = 9.01 MN/m <sup>2</sup><br>9.7 <b>Specific Gravity:</b> 0.916 at -60°C (liquid)<br>9.8 <b>Liquid Surface Tension:</b> (est.) 30 dynes/cm = 0.03 N/m at -61°C<br>9.9 <b>Liquid Water Interfacial Tension:</b> Currently not available<br>9.10 <b>Vapor (Gas) Specific Gravity:</b> 1.2<br>9.11 <b>Ratio of Specific Heats of Vapor (Gas):</b> 1.322<br>9.12 <b>Latent Heat of Vaporization:</b> 234 Btu/lb = 130 cal/g = 5.44 X 10 <sup>5</sup> J/kg<br>9.13 <b>Heat of Combustion:</b> -6552 Btu/lb = -3640 cal/g = -152.4 X 10 <sup>5</sup> J/kg<br>9.14 <b>Heat of Decomposition:</b> Not pertinent<br>9.15 <b>Heat of Solution:</b> Not pertinent<br>9.16 <b>Heat of Polymerization:</b> Not pertinent<br>9.17 <b>Heat of Fusion:</b> 16.8 cal/g<br>9.18 <b>Limiting Value:</b> Currently not available<br>9.19 <b>Reid Vapor Pressure:</b> Currently not available  |          |                |                           |   |                         |   |                           |   |
| NOTES   |   |          |                |                           |   |                         |   |                           |   |

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| 9.20<br>SATURATED LIQUID DENSITY                             |                       | 9.21<br>LIQUID HEAT CAPACITY                                       |  | 9.22<br>LIQUID THERMAL CONDUCTIVITY |  | 9.23<br>LIQUID VISCOSITY   |            |
|--|-----------------------|--|--|-------------------------------------|--|----------------------------|------------|
| Temperature<br>(degrees F)                                   | Pounds per cubic foot | Temperature<br>(degrees F)   | British thermal unit per<br>pound-F  | Temperature<br>(degrees F)          | British thermal unit inch<br>per hour-square foot-F          | Temperature<br>(degrees F) | Centipoise |
| N<br>O<br>T<br><br>P<br>E<br>R<br>T<br>I<br>N<br>E<br>N<br>T |                       | -96<br>-94<br>-92<br>-90<br>-88<br>-86<br>-84<br>-82<br>-80<br>-78 | 0.430<br>0.430<br>0.430<br>0.430<br>0.430<br>0.430<br>0.430<br>0.430<br>0.430<br>0.430 |                                     | N<br>O<br>T<br><br>P<br>E<br>R<br>T<br>I<br>N<br>E<br>N<br>T | -111                       | 0.510      |

| 9.24<br>SOLUBILITY IN WATER                                  |                                   | 9.25<br>SATURATED VAPOR PRESSURE  |  | 9.26<br>SATURATED VAPOR DENSITY   |  | 9.27<br>IDEAL GAS HEAT CAPACITY  |   |
|--|-----------------------------------|---|--|---|--|--|---|
| Temperature<br>(degrees F)                                   | Pounds per 100 pounds<br>of water | Temperature<br>(degrees F)  | Pounds per square inch   | Temperature<br>(degrees F)  | Pounds per cubic foot  | Temperature<br>(degrees F)   | British thermal unit per<br>pound-F   |
| N<br>O<br>T<br><br>P<br>E<br>R<br>T<br>I<br>N<br>E<br>N<br>T |                                   | -80<br>-75<br>-70<br>-65<br>-60<br>-55<br>-50<br>-45<br>-40<br>-35<br>-30<br>-25<br>-20<br>-15<br>-10<br>-5<br>0<br>5<br>10<br>15<br>20<br>25<br>30<br>35<br>40<br>45 | 13.260<br>15.210<br>17.400<br>19.820<br>22.520<br>25.500<br>28.780<br>32.390<br>36.360<br>40.700<br>45.440<br>50.600<br>56.210<br>62.290<br>68.879<br>76.000<br>83.669<br>91.919<br>100.799<br>110.299<br>120.500<br>131.299<br>143.000<br>155.299<br>168.500<br>182.400 | -80<br>-75<br>-70<br>-65<br>-60<br>-55<br>-50<br>-45<br>-40<br>-35<br>-30<br>-25<br>-20<br>-15<br>-10<br>-5<br>0<br>5<br>10<br>15<br>20<br>25<br>30<br>35<br>40<br>45 | 0.11090<br>0.12560<br>0.14170<br>0.15950<br>0.17890<br>0.20000<br>0.22300<br>0.24800<br>0.27510<br>0.30430<br>0.33570<br>0.36960<br>0.40590<br>0.44480<br>0.48630<br>0.53060<br>0.57780<br>0.62800<br>0.68130<br>0.73770<br>0.79730<br>0.86040<br>0.92680<br>0.99680<br>1.07000<br>1.14800 | 0<br>25<br>50<br>75<br>100<br>125<br>150<br>175<br>200<br>225<br>250<br>275<br>300<br>325<br>350<br>375<br>400<br>425<br>450<br>475<br>500<br>525<br>550<br>575<br>600 | 0.236<br>0.237<br>0.239<br>0.240<br>0.241<br>0.242<br>0.244<br>0.245<br>0.246<br>0.248<br>0.249<br>0.251<br>0.252<br>0.254<br>0.255<br>0.257<br>0.258<br>0.260<br>0.262<br>0.264<br>0.265<br>0.267<br>0.269<br>0.271<br>0.273 |