

— MINE GASES. —

COMMON NAME	PROPER NAME	CHEMICAL FORMULAE	COMPOSITION (MOLECULAR)	DENSITY	SP GR.	CHARACTER	EFFECT	COMBUSTIBILITY	EXPLOSIVE	CAUSED BY	TEST FOR	WHERE FOUND.
MARSH GAS, MIXED WITH AIR MAKES FIREDAMP, OFTEN CALLED "FIREDAMP"	METHANE; HYDROGEN CARBIDE; CARBURETED HYDROGEN	CH ₄	12 Pts. C 4 " H	8	0.5590	NO COLOR. NO TASTE. NO SMELL.	SUFFOCATES. WILL NOT SUPPORT LIFE.	BURNS IN AIR. ALONE, OR PURE, EXTINGUISHES FLAME.	1 PT. GAS TO 2.39 OR 17 OF AIR TAKES FIRE. 1 PT. GAS TO 13 OR 5 OF AIR EXPLODES. 1 PT. GAS TO 9.57 OF AIR EXPLODES MOST VIOLENTLY.	IS NATURAL PRODUCT LIKE OIL OR COAL AND IS FOUND IN PROXIMITY TO BOTH.	OIL SAFETY LAMP. 2% GIVES CAP. 6% LONG FLAME.	RISES TO ROOF AND HIGHEST PARTS OF MINE. PRESENT IN POWDER SMOKE.
WHITE DAMP	CARBON MONOXIDE OR CARBONIC OXIDE.	CO	12 Pts. C 16 " O	14	0.9670	NO COLOR. NO TASTE. NO SMELL.	POISONOUS AS ARSENIC OR PRUSSIC ACID. 0.05%, 30 MIN., GIDDY. 0.10%, 30 MIN., CANNOT WALK. 0.20%, 30 MIN., UNCONSCIOUS. 1%, 30 MIN., DEATH.	COMBUSTIBLE ALONE.	EXPLOSIVE AT 2 VOLUMES CO TO 5 VOL. AIR. INCREASES DANGER OF DUST EXPLOSION, OF FIRE DAMP EXPLOSION, AND OF SMOKE EXPLOSION.	EXPLOSION OF CH ₄ . SOME EXPLOSIVES. COAL BURNING WITH INSUFFICIENT AIR. FORMS LARGE % OF POWDER SMOKE.	MOUSE OR BIRD AFFECTED MORE QUICKLY THAN A MAN.	AFTER GAS (CH ₄) OR DUST EXPLOSION. AFTER BLASTING WITH CERTAIN EXPLOSIVES. GOB OR COAL FIRES IN MINE.
MIXED WITH NITROGEN, FORMS BLACKDAMP, OR CHOKEDAMP	CARBON DIOXIDE. CARBONIC ACID GAS.	CO ₂	12 Pts. C 32 " O	22	1.5290	ACID TASTE WHEN MOIST; PURE, - NO SMELL; NO COLOR.	3.5% BREATHING DEEPENS. 6%, MARKED PANTING. 10%, SEVERE DISTRESS. 15%, PARTLY UNCONSCIOUS; SHOULD NOT BE BREATHED LONG. 18 TO 25%, DEATH.	LIGHTS STILL BURN. LIGHTS STILL BURN. CANDLE WEAKENS. LIGHTS GO OUT.	NON-EXPLOSIVE AT ANY MIXTURE WITH AIR. REDUCES DANGER OF EXPLOSIONS.	EXPLOSION OF GAS CH ₄ . BLASTING. BREATHING OF MEN AND ANIMALS. GOB-FIRES.	ORDINARY LIGHT GOES OUT AT 15%. HYDROGEN LAMP STILL BURNS. MAKES LIMEWATER WHITE. DISCHARGES COLOR OF MIXTURE OF SOLUTIONS OF PHENOLPHTHALEIN AND CARBONATE OF SODA.	IN AFTERDAMP OF EXPLOSIONS. IN GOB AND OLD WORKINGS AND SHAFTS. IN POWDER SMOKE. HEAVIER THAN AIR. MAY SINK TO FLOOR OR LOW PART OF MINE.
STINKDAMP	HYDROGEN SULPHIDE SULPHURETED HYDROGEN	H ₂ S	2 Pts. H 32 " S	17	1.1912	SMELL OF ROTTEN EGGS.	POISONOUS WHEN PURE. DILUTED CAUSES HEADACHE AND GIDDINESS.	COMBUSTIBLE. ALONE, PUTS OUT FLAME.	EXPLOSIVE. INCREASES DANGER FROM FIREDAMP AND DANGER OF SMOKE EXPLOSION.	INDICATES HEATING OF COAL OR GOB BEFORE OR BY MINE FIRES. INDICATES SPONTANEOUS COMBUSTION ABOUT TO OCCUR.	SMELL OF ROTTEN EGGS BLACKENS SILVER.	VICINITY OF GOB OR MINE FIRES. HEATING COAL OR GOB. IN POWDER SMOKE.
N } - BLACKDAMP CO ₂ }	NITROGEN	N		14	0.9713	NEUTRAL	SUFFOCATES WHEN LARGE QUANTITY IS PRESENT. WILL NOT SUPPORT LIFE. NO OXYGEN.	NON-COMBUSTIBLE.	NON-EXPLOSIVE.	EXPLOSION OF CH ₄ OR DUST ABSORBS O OF AIR. NITROGEN REMAINS.	NO TEST	AFTER EXPLOSIONS IN AFTERDAMP, ALSO IN POWDER SMOKE. BEING AIR MINUS O. ABSORBED BY EXPLOSION. GIVEN OUT IN LARGE QUANTITIES IN SOME COALS.

AFTERDAMP IS A MIXTURE OF $\left\{ \begin{array}{l} \text{CO} - \text{CARBONIC OXIDE GAS,} \\ \text{CO}_2 - \text{CARBONIC ACID GAS,} \\ \text{N} - \text{NITROGEN (PURE) AND} \\ \text{H}_2\text{O} - \text{WATER VAPOR.} \end{array} \right\}$ AND COMBINES THE CHARACTERS ABOVE NOTED.

OTHER GASES ARE: (1) OLEFIANT GAS (ETHYLENE, ETHENE). SYMBOL, C₂H₄; SP GR. 0.9780. (2) ETHANE. SYMBOL, C₂H₆; SP GR. 1.0366. BOTH ETHYLENE AND ETHANE ARE EXPLOSIVE AND GREATLY INCREASE DANGER OF FIREDAMP EXPLOSIONS. ETHYLENE HAS SWEET TASTE AND SMELL LIKE GARLIC. ETHANE HAS PROPERTIES LIKE MARSH GAS. BOTH (PRACTICALLY) OCCUR ONLY ASSOCIATED WITH CH₄.

(3) NITROUS OXIDE (LAUGHING GAS) SYMBOL, N₂O; SP GR. 1.525. NOT EXPLOSIVE BUT IS GREAT SUPPORTER OF COMBUSTION, HENCE ITS PRESENCE ACCELERATES BURNING OF ANYTHING ON FIRE; IS A CONSTITUENT OF AFTERDAMP. PRODUCES UNCONSCIOUSNESS BUT RECOVERY IS EASY AND QUICK. (4) OXYGEN, SYMBOL, O; SP GR. 1.1056. SUPPORTER OF COMBUSTION. INCLUDED IN SMALL AMOUNTS BY SOME COALS. (5) HYDROGEN. SYMBOL, H; SP GR. 0.06926. RARELY OCCURS FREE, BUT IS ABUNDANT IN AFTERDAMP AND IS PRESENT IN POWDER SMOKE IN NOTABLE AMOUNT. IS EXPLOSIVE WITH AIR. INCREASES DANGER OF EXPLOSIONS OF AFTERDAMP AND OF SMOKE.

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COLLEGE OF MINES AND METALLURGY,
KENTUCKY STATE UNIVERSITY - BY H. D. EASTON.

WISCONSIN STEEL CO. INC.
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