AN AT-A-GLANCE GUIDE TO IMPORTANT PHYSICAL AND HEALTH HAZARDS OF CHEMICALS COMMONLY FOUND IN THE WORKPLACE

CHEMICAL HAZARDS

GENIUM PUBLISHING CORPORATION
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LIQUIDS

Chemical Name	Hazard Rating H	F	R	S	C	Target Organs Skin	Eye	Resp	Other	Carcinogen IARC	NTP	OSHA	ACGIH TLV TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Physical Hazard	Flash Point CC (closed cup) unless marked OC (open cup) °F	°C	Autoignition °F	°C	LEL %vol	UEL %vol	Storage and Handling
Acetaldehyde	3	4	2		•	•	•	•	Liver, Kidney	2B	2				C25	C45	CIAFL; R	-36	-38	347	175	4	60	N; keep away from I, [A, B (P)]; R
Acetic Acid	3	2	0		•	•	•	•	Kidney, Blood, Teeth, GI				10	25	15	37	CIICL; Corr; A	103	39	800	426	5.4	16	S; keep away from W(H), B, M; attacks C
Acetone	1	3	0			•	•	•					750*	1780*	1000*	2380*	CIBFL	0	-18	869	465	2.6	12.8	S; keep away from A, I, OX; attacks Pl
Acetonitrile	2	3	0			•	•	•	CNS, Kidney, Liver				40	67	60	101	CIBFL	42	5.6	975	524	4.4	16	S; keep away from A, I
Acetophenone	1	2	0			•	•		CNS				10	49			CIIIACL	170	77oc	1058	570			S; keep away from I, OX
Acrolein	4	3	3			•	•	•	CNS, CVS	3			0.1	0.23	0.3	0.69	CIBFL; P	-15	-26	455	235	2.8	31	S, K; keep away from I, [A,B,sun,heat (P)]; R
Acrylonitrile	4	3	2		•	•	•	•	CNS, CVS, Kidney, Liver	2A	2	•	2	4.3			CIBFL; P	32	0	898	481	3.1	17	S; K; keep away from A, I, OX, [heat, B (P)]
Adiponitrile	4	2	1			•	•	•	CNS, CVS				2	8.8(S)			CIIIBCL	200	93	1022	550	1		S; keep away from I, OX, A
Ammonium Hydroxide	3	1	0		•	•	•	•					25**	17**	35**	24**	Corr; B			1202*	650*	16*	25*	keep away from I (gas), A, L, M
sec-Amyl Acetate	1	3	0		•	•	•	•	CNS, Liver				125	665			CICFL	89	32			1	7.5	S; keep away from I, OX, A, B, nitrates
Aniline	3	2	0		•	•	•	•	CNS, CVS, Blood, Kidney, Liver	3			2(S)	7.6(S)			CIIIACL	158	70	1139	615	1.3	11	S; keep away from I, OX, A, B, alkaline M
Automotive Gasoline	1	3	0		•	•	•	•	CNS,	2B			300	890	500	1480	CIBFL	-45	-43	536	280	1.3	6	S; keep away from I, OX
Benzene	2	3	0		•	•	•	•	CNS, Blood, Bone marrow	1	1	•	10*	32*			CIBFL	12	-11.1	928	498	1.3	7.1	S; keep away from I, OX
Benzyl Alcohol	2	1	0			•	•	•	CNS, Blood, Kidney, Liver								CIIIBCL	200	93	817	436			S; keep away from I, A; attacks Pl
Benzyl Chloride	3	2	1		•	•	•	•	CNS, GI	2B			1	5.2			CIIIACL; Corr; P	153	67	1161	627	1.3	7.1	S, K; keep away from I, M
Bis(chloromethyl)Ether	3	3	3		•		•	•		1	1	•	0.001	0.0047			CIBFL	<66	<19					S; keep away from I, A
Boron Trichloride	3	0	3	₩		•	•	•									Corr							keep away from OX, W(T), AC, Am; attacks C
Bromine	3	0	0	OX		•	•	•	CNS, GI				0.1	0.66	0.2	1.3	OX, Corr							D; keep away from O, W(T), M
Bromine Trifluoride	4	0	3	OX, ₩		•	•	•	GI								OX, Corr							D; keep away from W(T), M, L, O; attacks glass
1,4-Butanediol	1	1	0				•	•	CNS								CIIIBCL	250	121oc	671	355			S; keep away from I, OX, A
n-Butyl Acetate	1	3	0			•	•	•	CNS				150*	713*	200	950	CIBFL	72	22	797	425	1.7	7.6	S; keep away from I, OX, A, B
Butyl Acrylate	2	2	2		•	•	•	•	CNS	3			10	52			CIICL; P	103	39	534	279	1.3	9.9	S; keep away from A, B, I, [heat, sun, OX, PX(P)]; K
n-Butyl Alcohol	1	3	0		•	•	•	•	Ears (hearing loss)						C50(S)	C152(S)	CICFL	84	28.9	650	343	1.4	11.2	S; keep away from I, OX, PX; attacks C
Butyl Cellosolve	2	2	0			•	•	•	CNS, Blood, Kidney, Liver								CIIIACL	143	62	460	238	1.1	12.7	S; keep away from I, OX; R; attacks C
Butyl Mercaptan	2	3	0					•	CNS				0.5	1.8			CIBFL	35	1.67oc					S; keep away from I, OX, A
t-Butyl Peroxide	3	2	4	OX		•	•	•									CIBFL; PX; ShS	65	18oc					D; S; keep away from I, OX, O, Sh
n-Butyraldehyde	3	3	2			•	•	•	CNS								CIBFL, P	-8	-22	425	218	1.9	12.5	N; keep away from I, OX [A, B (P)]; R
Butyronitrile	3	3	0			•	•										CICFL	76	24	935	501	1.65		S; keep away from I, OX
Carbon Disulfide	3	4	0		•	•	•		CNS, PNS, CVS, Kidney, Liver				10(S)	31(S)			CIBFL	-22	-30	194	90	1.5	50	S; keep away from I, OX, L, alkaline M
Carbon Tetrachloride	3	0	0		•	•	•	•	CNS, Kidney, Liver	2B	2		5	31	10	63								keep away from alkaline M
Chlorine	4	0	0	OX	•	•	•	•	CNS, Teeth				0.5	1.5	1	2.9	OX							D; keep away from AC, Am, Md, O, W(T); attacks C
Chlorobenzene	2	3	0		•	•	•	•	CNS, Kidney, Liver				10	46			CICFL	82	28	1099	593	1.3		S; keep away from I, OX
Chloroform	2	0	0		•	•	•	•	CNS, CVS, Kidney, Liver	2B	2		10	49										keep away from B, OX, alkaline M
Coal Tar Creosote	2	2	0		•	•	•	•	CNS, Kidney, Bladder								CIIIACL	165.2	74	637	336			S; keep away from I, OX,
Cresol (mixed isomers)	3	2	0		•	•	•	•	CNS, Kidney, Liver, GI				5(S)	22(S)			CIIIACL; Corr	178-187	81-86	1038	558	1.1-1.4		S; keep away from I, OX, A
Cyclohexane	1	3	0		•	•	•	•	CNS				300	1030			CIBFL	-4	-20	473	245	1.3	8.4	S; keep away from I, OX
Cyclohexanol	1	2	0		•	•	•	•	CNS, CVS, Kidney, Liver				50(S)	206(S)			CIIIACL	154	68	572	300	2.4		S; keep away from A, I, OX
Dibutyl Phthalate	0	1	0				•		CNS					5			CIIIBCL	315	157	757	402	0.5		S; keep away from I, OX, A, B, L, nitrates
Dichloroethyl Ether	3	2	1		•	•	•	•	CNS, Kidney, Liver				5(S)	29(S)	10(S)	58(S)	CIICL	131	55	696	369	2.7		S; keep away from I, OX, A; R; attacks C
Diesel Fuel Oil No. 2-D	1	2	0		•	•			CNS								CIICL	125	52	>500	>260	0.6	7.5	S; keep away from I, OX
Diethyl Carbitol	1	2	0			•	•										CIIIACL	180	82oc					S; keep away from I, OX; R
Dimethylformamide	1	2	0			•	•	•	CVS, Kidney, Liver	2B			10(S)	30(S)			CIICL	136	57.8	833	445	2.2	15.2	S; keep away from I, OX, organic nitrates
Epichlorohydrin	3	3	2		•	•	•	•	CNS, Kidney, Liver	2A	2		2(S)*	7.6(S)*			CICFL; P	88	31oc	772	411	3.8	21	S; K; keep away from I, M, OX, [A, B(P)]; attacks C
Epoxy Resins	1	1	0			•	•	•		*	*	*					CIIIBCL; P	> 200	>93					S; keep away from I, OX; [polyamides, AA, Al (P)]
Ether	1	4	1		•	•	•	•	CNS, Blood, Liver				400	1210	500	1520	CIAFL	-49	-45	320	160	1.9	36	S; keep away from A, L, I, OX; R
Ethyl Alcohol	1	3	0		•		•		CNS				1000	1880			CIBFL	55	13	685	363	3.3	19	S; keep away from A, I, OX
Ethyl Amyl Ketone	1	2	0		•		•	•	CNS				25	131			CIICL	109.4	43					S; keep away from I, OX
Ethyl Benzene	2	3	0		•	•	•	•	CNS, Blood				100	434	125	543	CIBFL	70	21	810	432	0.8	6.7	S; keep away from I, OX
Ethyl Mercaptan	2	4	0		•	•	•	•	CNS				0.5	1.3			CIAFL	-55	-48.3	572	300	2.8	18	S; keep away from I, OX, W (F)
Ethylene Chlorohydrin	4	2	0		•	•	•	•	CNS, CVS, Liver, Kidney						C1(S)	C3.3(S)	CIICL	140	60	797	425	4.9	15.9	S; keep away from I, OX, A, B, W (T)
Ethylene Glycol	1	1	0		•		•		CNS, CVS, Kidney						C50*	C127*	CIIIBCL	232	111	748	398	3.2		S; keep away from A, B, I, OX
Formaldehyde (formalin)	3	2*	0		•	•	•	•	CNS, Kidney	2A	2	•			C0.3	0.37	CIIIACL; P	182	83	806‡	430‡	7	73	S; keep away from I, OX; P; K
Formic Acid	3	2	0			•	•	•	Kidney, Liver, GI				5	9.4	10	19	CIICL; Corr; A	122	50	813	434	18	57	S; keep away from I, OX; V
Furfuryl Alcohol	1	2	1		•	•	•	•	CNS				10(S)	40(S)	15(S)	60(S)	CIIIACL; P	167	75oc	915	491	1.8	16.3	S; keep away from I, OX, A (P); N; K
Glutaraldehyde	2	0	1		•	•	•	•							C0.2	C0.82	P							P (B, heat)
Glycerol	1	1	0		•	•	•	•									CIIIBCL	390	199	698	370			S; keep away from I, OX, alkali metal hydrides
n-Heptane	1	3	0		•	•	•	•	CNS				400	1640	500	2050	CIBFL	25	-4	399	204	1.05	6.7	S; keep away from I, OX
n-Hexane	1	3	0		•	•	•	•	CNS, PNS				50	176			CIBFL	-7.6	-22	437	225	1.1	7.5	S; keep away from I, OX
Hexyl Alcohol	1	2	0		•	•	•	•	CNS								CIIIACL	145	63	559	292	1.2	7.7	S; keep away from I, OX
Hydrochloric Acid	3	0	0		•	•	•	•	GI	3					C5†	C7.5†	Corr, A							keep away from B, M; attacks C; [P (AD, epoxides)]
Hydrofluoric Acid	4	0	0		•	•	•	•	CVS, Blood, Bone, Liver, Kidney						C3†	C2.6†	Corr, A							attacks glass, B, M, Ru, concrete, silica materials
Hydrogen Peroxide	2	0	3	OX		•	•	•	CNS	3			1	1.4			OX, PX							D; keep away fromAC, Am, B, O, Md
Isoamyl Alcohol	1	2	0			•	•	•	CNS				100	361	125	452	CIICL	109	42.8	657	347	1.2	9	S; keep away from I, OX
Isophorone	2	2	0			•	•	•	CNS, Kidney						C5	28	CIIIACL	184	84	860	460	0.8	3.8	S; keep away from A, I, OX; R
Isopropyl Alcohol	1	3	0		•	•	•	•	CNS, Kidney	3			400	983	500	1230	CIBFL	53	12	750	399	2	12.7	S; keep away from A, I, OX, C, L, aluminum
Isopropyl Ether	1	3	1		•	•	•	•	CNS				250	1040	310	1300	CIBFL	-18	-28	830	443	1.4	7.9	S; keep away from I, OX, A
Jet Fuels	1	3	0			•	•	•	CNS, Liver, Kidney, Pancreas, Spleen								CIICL	100*	37.8oc*	446	230	0.6	3.7	S; keep away from I, OX, A, B, L
Kerosene	0	2	0		•	•	•	•	CNS, Liver, Kidney, Pancreas, Spleen								CIIIACL	100-162	38-72	410	210	0.7	5	S; keep away from I, OX
Methyl Alcohol	1	3	0		•	•	•		CNS, Kidney				200(S)	262(S)	250(S)	328(S)	CIBFL	52	11	867	464	6	36	S; keep away from A, I, L, OX, M
Methyl Chloroform	2	1	1			•	•	•	CNS, CVS	3			350	1910	450	2460				932	500	7	16	S; keep away from I, OX, W(T), active M, attacks Ru
Methylene Chloride	2	1	0		•	•	•	•	CNS, CVS, Blood, Liver	2B	2		50	174						1033	556	13	23	keep away from OX, M; attacks C
Methyl Isobutyl Ketone	2	3	1		•	•	•	•	CNS				50	205	75	307	CIBFL	64	18	840	448	1.2	8	S; keep away from I, OX; R
Methyl Isopropyl Ketone	1	4	0		•	•	•	•	CNS				200	705			CIBFL	43	6.1			1.22	8	S; keep away from I, OX
Mineral Spirits	1	2	0		•	•	•	•	CNS				100	525			*	>100	>38tcc	>450	>232	1	6	S; keep away from I, OX, A
Nitric Acid	3	0	0	OX	•	•	•	•	Teeth, GI				2	5.2	4	10	Corr, A, OX							D; keep away from B, O, M; attacks C; W(T, H)
Nitromethane	1	3	4		•	•	•	•	CNS				20	50			CICFL; ShS	95	35	785	418	7.3		S; keep away from I, OX, A, B, Al, M oxides, Sh
1-Nitropropane	1	3	2			•	•	•	CNS				25	91			CICFL	96	36oc	789	421	2.2		S; keep away from I, OX, Al, A, B; attacks C
Perchloric Acid	3	0	3	OX	•	•	•	•	GI								Corr, A, OX							D; keep away from O, M
Perchloroethylene	2	0	0		•	•	•	•	CNS, PNS, Liver, Kidney	2B	2		25	170	100	678								keep away from M; K
Petroleum Ether	1	4	0		•	•	•	•	CNS, CVS, PNS								**	*	*	550	287	1.1	5.9	S; keep away from I, OX, R
Phenol	4	2	0		•	•	•		CNS, Kidney, Liver	3			5(S)	19(S)				175	79	1319	715	1.8	8.6	S; keep away from A, I, OX, L
Phosphoric Acid	3	0	0		•	•	•	•	GI					1		3	Corr, A							keep away from AD, Al, AC, B, M
PCBs	2	1	0		•	•	•	•	Liver	2A	2						CIIIBCL	286-385	141-196oc	464	240			S; keep away from I, sunlight, UV light (>290nm)
Sodium Hydroxide	3	0	1	₩	•	•	•	•	GI							C2	Corr, B							keep away from W (H), A, M
Sodium Hypochlorite	3	0	0	OX		•	•	•	GI								Corr, B, OX							D; keep away from A, O, M, Al, AM
Styrene Monomer	2	3	2		•	•	•	•	CNS	2B			50(S)	213(S)	100(S)	426(S)	CICFL, Polym	88	31	914	490	0.9	6.8	S; K; N; V; keep away from I, OX, A
Sulfuric Acid	3	0	2	₩	•	•	•	•	Teeth, GI					1		3	Corr, A							keep away from B, W (H), M
Toluene	2	3	0		•	•	•	•	CNS, Kidney, Liver	3			50(S)	188(S)			CIBFL	40	4	896	480	1.27	7.1	S; keep away from I, OX, A
Toluene-2,4-diisocyanate	3	1	3	₩	•	•	•	•	CNS, GI	2B	2		0.005	0.036	0.02	0.14	CIIIBCL	260	127			0.9	9.5	S; keep away from I, OX, W(H), Al, AC, B (P); N
Trichloroethylene	2	1	0		•	•	•	•	CNS, PNS, CVS, Kidney, Liver	3			50	269	100	537	CICFL	90	32	788	420	8	10.5	S; keep away from I, OX, B, active M; dec (W, light)
Trichlorosilane	3	4	2	₩		•	•	•									CIAFL	-18	-28oc	360	182	1.2	90.5	S; keep away from I, OX, A, PX, Al, AC, W (T)
Triethylene Glycol	1	1	0			•	•										CIIIBCL	350	177oc	700	371	0.9	9.2	S; keep away from I, OX
Vinyl Chloride	2	4	2		•	•	•		CNS, Bone, Liver, Lymph, Connective tissue of the skin	1	1	•	5	13			CIAFL, Polym	-108.4	-78oc	882	472	3.6	33	S; keep away from I, OX, PX, B, M, light (P); R
Xylene (mixed isomers)	2	3	0		•	•	•	•	CNS, PNS, Kidney, Liver	3			100	434	150	651	CIBFL	63-77	17-25	982	527	0.9-1.1	6.7-7	S; keep away from I, OX, A; attacks C

SOLIDS

Chemical Name	Hazard Rating H	F	R	S	C	Target Organs Skin	Eye	Resp	Other	Carcinogen IARC	NTP	OSHA	ACGIH TLV TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Physical Hazard	Flash Point CC (closed cup) unless marked OC (open cup) °F	°C	Autoignition °F	°C	LEL %vol	UEL %vol	Storage and Handling
Acetamide	1	1	0		•	•			Liver	2B							CS							keep away from I, OX
Acrylamide	2	2	2		•	•	•	•	CNS, PNS, Kidney, Liver, Pancreas	2B	2			0.03(S)			CIIIBCL; Polym	280	138	464	240			keep away from I, OX, PX, A, Al
Aluminum	0	1†	1		•	•	•	•	Blood, CNS					10			Pyr (powder)			1202†	650†	>0.04 oz/ft³†		keep away from PX, A, L, B, M oxides
Aluminum Chloride	1	0	2	₩		•	•	•						2			Corr							W (H,T)
Aluminum Oxide	1	0	0				•	•						10										keep away from Chlorine trifluoride, Ethylene oxide
Ammonium Bicarbonate	1	0	0				•	•						10§										keep away from A, B, OX
Ammonium Chloride	1	0	0		•	•	•	•						10(F)		20(F)								keep away from A, B, nitrates
Ammonium Persulfate	1	0	1	OX		•	•	•									OX							D; keep away from M, O, PX
Anthranilic Acid	1	1	0			•	•		Blood, Liver								A							keep away from OX, sun (dec.), B
Antimony	3	1	1		•	•	•	•	CNS, CVS, Kidney, Liver					0.5						626†	330†	0.42 oz/ft³†		keep away from I, OX, L, hot A
Antimony Trioxide	2	**	0		•	•	•	•	CNS, CVS, GI					0.5										keep away from A, OX, L
Arsenic	3	††	0			•	•	•	CNS, CVS, PNS, Liver, Blood, GI	1	1	•		0.01			EX (dust)							keep away from OX, L
Arsenic Pentoxide	3	0	0			•	•	•	CNS, Blood, Kidney, Liver															keep away from A, B, M
Asbestos	3	0	0		•			•		1	1	•		0.2f/cc*										Dec. on exposure to heat or acids
Barium	2	†	3	₩		•	•	•	Blood, Muscle					0.5			Ex (dust)							keep away from I, heat, W (F), A, L
Barium Sulfate	1	0	0			•	•							10										keep away from Aluminum + Heat
Benzo(a)Pyrene	2	1	0		•	•	•	•	Bladder, Kidneys	2A	2													keep away from OX, Sunlight
Benzophenone	1	1	0			•	•	•	CNS								CS							keep away from OX
Beryllium	4	1	0		•	•	•	•	CVS, Kidney, Liver, Spleen	1	2			0.002										keep away from B, Heat, L
Bismuth	2	2	1		•				CNS, Kidney, Liver															keep away from OX, A, L
Bisphenyl A	2	1	0		•	•	•	•									CS	405coc	207					keep away from I, OX
Boric Acid	1	0	0		•	•	•	•	CNS								A							keep away from AA, B, Potassium
Cadmium	3	††	0*		•		•	•	Blood, Kidney, Liver, Bone	1	2	•		***			Pyr (powder)							keep away from OX, Am
Cadmium Chloride	3	1	0		•	•	•	•	Blood, Kidney, Liver, Bone	1	2	•		***										keep away from OX, Potassium, Zinc
Calcium	1	1	2	₩		•	•	•									Pyr							keep away from W (E), OX, A, AC, L, B; N
Calcium Chloride	2	0	1	₩		•	•	•																keep away from W (H), Zinc
Calcium Hydroxide	3	0	0		•	•	•	•	GI					5			Corr, B							keep away from A, Am salts
Calcium Oxide	3	0	1	₩	•	•	•	•	GI					2			Corr, B							keep away from A, W (H), AC, L, OX, Nitrates
Camphor	2	2	0		•	•	•	•	CNS, Liver				2	12	3	19	CS	150	65.6	871	466	0.6	3.5	keep away from I, OX
Carbaryl	3	1	0			•	•	•	CNS, CVS	3				5			CS	380	193					keep away from I, OX, B
Carbon Black Powder	1	1	0			•	•	•		3				3.5						500	260			keep away from OX, M oxides, fatty oils
Chlordane	2	1	0		•	•	•	•	CNS, Blood, Kidney, Liver					0.5(S)				†	†	‡	‡	‡	‡	keep away from OX, B; attacks C, Iron, Zinc
4-Chlorophenol	3	1	0		•	•	•	•	CNS, Blood, Kidney, Liver	2B							CIIIBCL	>230	>110oc					keep away from I, OX, organic A
Chromic Acid	3	0	1	OX	•	•	•	•	Kidney, Liver, GI					0.05			A, Corr, OX							D; keep away from AA, Am, B, O, AC, alkali M
Chromium	2	1	1		•	•	•	•		3				0.5			Pyr (powder)			752†	400†	0.23 oz/ft³†		keep away from A, B, OX
Citric Acid	2	1	0		•	•	•	•	Teeth, GI								CS			1850†	1010†	0.28†	2.29†	keep away from acetates, sulfites; attacks M
Coal Dust, bituminous	2	1	1		•			•						2			CS			>392§	>200§	>0.05 oz/ft³†		keep away from I, OX
Cobalt	1	††	0*		•	•	•	•		2B				0.02			Pyr (powder)							keep away from I, OX, liquid acetylene
Copper	2	§	0		•	•	•	•						†			Pyr (powder)							keep away from A, L, acetylene compounds
Copper Sulfate	2	0	0		•	•	•	•						1										keep away from hydroxylamine, magnesium
Cupric Chloride	2	0	0		•	•	•	•						1										keep away from A, potassium, sodium, aluminum
DDT	2	0	0		•	•	•		CNS, PNS, Liver	2B	2			1				‡	‡					keep away from I, OX, B, (iron & aluminum salts)
Diatomaceous Earth	2	0	0		•	•	•	•		3				10*										keep away from L, hydrogen fluoride
2,4-Dinitroaniline	3	1	3			•	•	•	CNS									435	224					keep away from AA, OX, A, charcoal
Dinitrobenzene	3	1	4		•	•	•	•	Blood, CNS, CVS, Liver				0.15(S)	1(S)			CIIIBCL, ShS	302	150					keep away from A, I, OX, B, M, Sh
Dinitrophenol	3	‡	†			•		•	CNS, CVS, Kidney, Liver								ShS (dry), Ex	§	§					keep away from OX, B, Am; Don't allow to dry out!
2,4-Dinitrotoluene	3	1	3		•	•	•		CNS, CVS, Blood, Liver					0.15(S)			ShS, Ex	404	207					keep away from OX, B, M, chlorates; attacks C
Ferric Chloride	2	0	0			•	•	•	GI					1										keep away from W (T), potassium, sodium
Fibrous Glass	2	0	0		•	•	•	•			2			10										keep away from hot B, Hydrochloric & Phosphoric A
Fumaric Acid	1	1	0			•	•	•									CS, A			1364	741			keep away from OX, B
Hydrazine	3	3	3		•	•	•	•	CNS, Blood, Kidney, Liver	2B	2		0.1*	0.13(S)*			CIICL	100	38			2.9	98	keep away from I, OX, A, M; attacks G, Ru
Hydroquinone	2	1	0			•	•	•						2			CIIIBCL	329	165	960	516			keep away from I, OX, B, chlorine
Iodine	2	0	0	OX		•	•	•	CVS, Thyroid						C 0.1	C 1	OX							D; keep away from Am, acetylene, O, active M
Iron	2	§	1*		•		•	•	Liver, Pancreas								Pyr (powder)							keep away from L, W (rust), Am, acetaldehyde
Lead	3	††	0		•				CNS, PNS, Blood, Kidneys					0.15*										keep away from OX, weak A (in presence of oxygen)
Lithium	3	2	2	₩		•	•		CNS, Kidney								CS, Corr			354	179			keep away from A, OX, L, M, M oxides, W (F); N
Lithium Hydride	3	2	2	₩		•	•	•	GI					0.025			Pyr, Corr			392	200			keep away from Am, O, OX, L, AC; N
Manganese	3	††	1		•			•	CNS, Blood, Kidney					5*			CS			842†	450†	0.125		keep away from Ox, L, A, W (F)
Mercuric Chloride	3	0	1		•	•	•	•	CNS, Kidney, Liver					.025(S)			Corr, ShS							keep away from B, Am, sodium, Potassium, sun; NP
Mercurous Chloride	3	0	1			•	•	•	CNS					.025(S)										keep away from B, L, Am, CN, soaps
Mercury	4	0	0			•	•	•	CNS, Kidney, Liver					.025(S)										keep away from Am, A, Chlorine, acetylene
Naphthalene	2	2	0			•	•	•	CNS, Blood, Kidney, Liver				10	52	15	79	CIIIACL	174	79	979	526	0.9	5.9	keep away from AA, I, OX
Nickel	2	1	0		•	•		•						1*			CS (powder)							keep away from OX, Am, fluorine, sulfur, phosphorus
Nickel (II) Chloride	2	0	0		•	•	•	•		1**	2**			0.1*										keep away from A, potassium
Picric Acid	3	4	4		•	•	•	•	CNS, Blood, Kidney, Liver					0.1			ShS, Ex, CIIIBCL	302	150	572	300			keep away from Am, I, OX, M; store wet! (>10% H_2O)
Polyvinyl Chloride	3	0	0			•	•	•	Blood, Liver															keep away from fluorine, heat & light (dec); K
Potassium	3	3	2	₩		•	•	•									Pyr, Corr							keep away from W (E), L, A, B, N; attacks Teflon
Potassium Chromate	3	0	0	OX	•	•	•	•	Blood, Kidney, Liver	1	1			0.05			Corr, OX							D; keep away from sulfur, PL, O, Hydrazine
Potassium Cyanide	3	0	0		•	•			CNS, CVS, Kidney, Liver							C 5(S)								keep away from A, OX
Potassium Ferricyanide	3	0	0			•	•		CNS, CVS, Kidney, Liver															keep away from OX, A, Am
Potassium Permanganate	1	2	0	OX		•	•	•									OX, Ex							D; keep away from O, AA, A, Am, Am compounds
Resorcinol	1	1	0			•	•	•	CNS, Blood				10	45	20	90	CS	261	127	1126	608	1.4		keep away from B, OX
Rosin	2	1	0		•	•	•	•									CS	370	187	734†	390†			keep away from I, OX
Sodium	3	3	2	₩	•	•	•	•									Pyr, Corr			250	121			keep away from W (E), OX, A, L
Sodium Dichromate	3	0	0	OX	•	•	•	•	Blood, Kidney, GI	1	1			0.05			Corr, OX							D; keep away from O, A, AA
Sulfur	2	1	0			•	•	•									CS	405	207	450	232			keep away from I, L, M oxides, OX
Quartz	2	0	0		•	•		•		2A	2			0.1										keep away from OX, B, hydrofluoric A & F- materials
Wood Dust	2	1	0		•	•	•	•		1***				‡			CS			††	††			keep away from I, OX
Zinc Chloride	3	0	0		•	•	•	•						1(F)		2(F)	Corr							keep away from Potassium

GASES

Chemical Name	Hazard Rating H	F	R	S	C	Target Organs Skin	Eye	Resp	Other	Carcinogen IARC	NTP	OSHA	ACGIH TLV TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Physical Hazard	Flash Point CC (closed cup) unless marked OC (open cup) °F	°C	Autoignition °F	°C	LEL %vol	UEL %vol	Storage and Handling
Acetylene	0	4	3						Asphyxiant								FG, Ex	0	-17.8	581	305	2.5	100	keep away from I, L, M, nitric acid
Arsine	4	4	2						CNS, CVS, Blood, Kidney, Liver				0.05	0.16			FG, ShS					5.1	78	keep away from A, OX, L
1, 3-Butadiene	2	4	2			•	•	•	CNS	2A	2		2	4.4			FG, Ex, Polym	-105	-76	788	420	2	11.5	keep away from OX; R; K
Butane	1	4	0						Asphyxiant				800	1900			CIAFL	-76	-60	550	287	1.9	8.5	keep away from I, OX
Carbon Dioxide	1	0	0			•		•	CNS, CVS				5000	9000	30000	54000								keep away from M
Carbon Monoxide	3	4	0		•				CNS, CVS, Blood				25	29			FG			1292	700	12.5	74	keep away from I, OX, L
Chlorodifluoromethane	1	0	0		•			•	CNS				1000	3540						1170	632			keep away from A, alk M, some elastomers
Cyanogen	4	4	2			•	•	•					10	21			FG					6.6	32	keep away from I, A, L
Dichlorotetrafluoroethane	2	0	0		•			•	CNS, CVS				1000	6990										keep away from active M, A; attacks C
Ethyl Chloride	1	4	0		•			•	CNS, CVS	3			1000*	2640*			FG	-58	-50	966	519	3.8	15.4	keep away from I, OX, active M, W (T)
Ethylene Oxide	3	4	3		•		•	•	CNS, PNS, Blood, Kidney, Liver	2A	2	•	1	1.8			FG, Polym	-4	-20	804	429	3	100	keep away from I, OX, A, AC, Am, Al, metal halides
Fluorine	4	0	4	OX, ₩	•	•	•	•	Bone				1	1.6	2	3.1	OX							keep away from O, alk M, L, W (T)
Helium	1	1	0						Asphyxiant															Chemically inert
Hydrogen	0	4	0						Asphyxiant								FG			932	500	4	75	keep away from I, L, M
Hydrogen Bromide	3	0	0			•	•	•							C 3	C 9.9								keep away from Am, ozone, flourine
Hydrogen Cyanide	4	4	2		•		•	•	CNS, Thyroid						C4.7(S)	C5(S)	FG	0	-17.8	1000	538	5.6	40	keep away from I, Acetaldehyde
Hydrogen Sulfide	4	4	0				•	•	CNS				10	14	15	21				500	260	4	44	keep away from M
Methane	1	4	0						Asphyxiant								FG	-213	-136	999	537	5	15	keep away from I, L
Nitrogen	0*	0	0						Asphyxiant															keep away from Ozone; reacts with some M + heat
Nitrogen Dioxide	3	0	0	OX	•	•	•	•	CVS				3	5.6	5	9.4	OX, Corr							keep away from O, B, M, Am, L, ozone; store in SSC
Nitrogen Trifluoride	1	0	1	OX			•	•	CNS, Blood				10	29			OX, Ex							keep away from O, Am, Hydrogen sulfide; DP
Oxygen	0*	0	0	OX					CNS (at pressures > 2 atm)								OX							keep away from O; (AC, Hydrazine, powdered M)*
Ozone	3	0	1	OX	•			•	CNS, Blood				*	*	C0.1*	C0.2*	OX, Ex ***							keep away from O, L; accelerates Ru decomposition
Phosgene	4	0	1		•	•	•	•					0.1	0.4			Corr							keep away from M, Isopropanol
Propane	1	4	0						Asphyxiant								FG, Ex	-156	-105	842	450	2.1	9.5	keep away from OX, Chlorine dioxide
Radon	1	0	0	☢	•	•		•	Kidney	1	1						Radioactive							Reacts with fluorine
Sulfur Dioxide	3	0	0		•	•	•	•					2	5.2	5	13								keep away from A, L, M, W (T)

HAZARD RATING

These ratings have been assigned according to the criteria set forth by the NFPA.

H = Health

4 = Materials, that on very short exposure, could cause death or major residual injury.
3 = Materials, that on short exposure, could cause serious temporary or residual injury.
2 = Materials, that on intense or short exposure, could cause temporary incapacitation or possible residual injury.
1 = Materials, that on short exposure, could cause irritation, but only mild, residual injury.
0 = Materials, that on short exposure under fire conditions, would offer no hazard beyond that of ordinary combustible materials.
* Liquefied gas = 3

F = Fire

4 = Any flammable gas
Any liquid or liquefied compressed gas having a flash point < 73 °F (22.8 °C) and a boiling point < 100 °F (37.8 °C). *Class 1A Flammable Liquid*
Any pyrophoric material
3 = Any liquid with a flash point < 73 °F (22.8 °C) and a boiling point ≥ 100 °F (37.8 °C) and those with a flash point ≥ 73 °F (22.8 °C) and < 100 °F (37.8 °C). *Class 1B and 1C Flammable Liquids*
Any material that can form explosive mixtures with air: dusts of combustible solids or mists/droplets of combustible liquids.
2 = Any liquid with a flash point > 100 °F (37.8 °C) and < 200 °F (93.4 °C). *Class II and III combustible Liquids*
Any solid in fibrous, shredded or dust form that burns rapidly but does not form explosive mixtures with air.
1 = Any liquid with a flashpoint > 200 °F (93.4 °C). *Class IIIB Combustible Liquids*
Any material that will burn in air when exposed to 1500 °F (815.5 °C) for a period of 5 min. or less.
Most ordinary combustible materials.
0 = Materials that will not burn even when exposed to 1500 °F (815.5 °C) for a period of 5 min.

* Gas = 4
** Cubes = 0; Powder = 1
† Metal = 0; Powder = 3
†† Metal = 0; Powder = 1
‡ Dry = 3; Wet = 1§
§ Powder = 3

R = Reactivity

4 = Materials capable of detonation or explosive decomposition at ordinary temperature and pressures.
3 = Materials capable of detonation or explosive decomposition, but that require a strong initiating source such as heat or shock at elevated temperatures.
Materials that react explosively with water at ordinary temperatures.
2 = Materials that undergo violent chemical change at elevated temperature or pressure.
Materials that may react violently with water (generally not explosive).
1 = Materials that themselves are normally stable but may become unstable at elevated temperature or pressures (> 150 °C and < 300 °C).
Materials that decompose on exposure to light, air, or moisture.
0 = Materials that are generally stable, even under fire conditions.
Materials that do not react with water and do not exhibit an exothermic reaction at temperatures above 300 °C.

* Powder = 3
† Wet = 0; Dry = 3

S = Special

OX = Oxidizer
₩ = Reacts with water
☢ = Radioactive

C = Chronic Hazard

A "•" in this box indicates that repeated or prolonged exposure to this material can cause long-term, chronic health effects.

CARCINOGENICITY

IARC
International Agency for Research on Cancer
1 = Confirmed human carcinogen: sufficient human evidence for carcinogenicity
2A = Probable human carcinogen: limited human evidence, sufficient animal evidence
2B = Possible human carcinogen: limited human evidence, insufficient animal evidence
3 = Not classifiable as to human carcinogenicity

NTP
National Toxicology Program
1 = Known to be carcinogenic: sufficient human evidence
2 = Anticipated human carcinogen: limited human evidence, sufficient animal evidence

OSHA
Occupational Safety and Health Administration
• = Carcinogen defined without further categorization
* Epoxy resins are not considered carcinogenic *as a group*, however some individual chemicals are.
** Nickel *compounds* are considered carcinogenic, individual compounds are not listed
*** Exposures in the wood making industry *in general*.

ACGIH TLV

American Conference of Governmental Hygienists - Threshold Limit Values

TWA (Time Weighted Average): The allowable time weighted average concentration that a worker can be exposed to for a normal 8-hr day and 40-hr week without adverse health effects.

STEL (Short- term Exposure Limit): The maximum concentration that a worker can be continuously exposed to for a 15. min period. A maximum of 4 such periods are allowed per day with at least 60 min. between exposure periods.

C (Ceiling Limit): Concentration not to be exceeded at any time.

S (Skin designation): A material with this notation means that it can be absorbed through the skin and can contribute to over-all exposure.

*** Notice of Intended Changes**

Acetone: TWA: 200 ppm (476 mg/m³); STEL: 400 ppm (952 mg/m³)
Benzene: TWA: 0.3 ppm (0.96 mg/m³); skin
n-Butyl Acetate: TWA: 20 ppm (95 mg/m³)
Diatomaceous Earth: 10 mg/m³ (inhalable particulate); 3 mg/m³ (respirable particulate)
Epichlorohydrin: TWA: 0.1 ppm (0.38 mg/m³)
Ethyl Chloride: TWA: 100 ppm (264 mg/m³)
Ethylene Glycol: Ceiling: 39.4 ppm (100 mg/m³)
Hydrazine: TWA: 0.01 ppm (0.013 mg/m³)
Lead (elemental & inorganic compounds): TWA: 0.05 mg/m³
Manganese (elemental & inorganic compounds): TWA: 0.2 mg/m³
Nickel/Nickel Chloride (elemental and compounds): TWA: 0.05 mg/m³
Ozone: TWA: 0.05 ppm (0.1 mg/m³); STEL: 0.2 ppm (0.4 mg/m³)
Asbestos: At present, the limit for crocidolite is already at 0.2 f/cc; amosite is 0.5 f/cc and chrysotile and all other forms is at 2 f/cc. The proposed limit is 0.2 f/cc for all forms.

** Gaseous form
*** Cadmium (*total dust* 0.01; *respirable fraction* 0.002)
*** Cadmium chloride (*total dust* 0.01; *respirable fraction* 0.002)
† Copper (*dust & mist* 1.0; *fume* 0.02)
‡ Wood dust (hardwood 1.0 ; softwood 5.0)
(F) Fume
§ Nuisance Particulate

PHYSICAL HAZARD

A: This material is an acid.
B: This material is a base.
Corr: This material is corrosive.
CS: This material is a combustible solid.
Exp: This material is readily explosive.
FG: This material is a flammable gas.
OX: This material is an oxidizer.
P: This material can polymerize.
Pyr: This material is pyrophoric (ignites spontaneously in air).
PX: This material is a peroxide.
ShS: This material is shock sensitive.
CIAFL (Class IA Flammable Liquid): Flashpoint < 73 °F (22.8 °C); boiling point < 100 °F (37.8 °C)
CIBFL (Class IB Flammable Liquid): Flashpoint < 73 °F (22.8 °C); boiling point > 100 °F (37.8 °C)
CICFL (Class IC Flammable Liquid): Flashpoint ≥ 73 °F (22.8 °C) & < 100 °F (37.8 °C)
CIICL (Class II Combustible Liquid): Flashpoint ≥ 100 °F (37.8 °C) & < 140 °F (60 °C)
CIIIACL (Class IIIA Combustible Liquid): Flashpoint > 140 °F (60 °C) & < 200 °F (93.4 °C)
CIIIBCL (Class IIIB Combustible Liquid): Flashpoint ≥ 200 °F (93.4)

* Mineral spirits: Class depends on flashpoint
** Petroleum Ether: Class depends on flashpoint and boiling point
*** Liquid and solid forms

FLASHPOINT

* Varies with grade
† Chlordane: Noncombustible; F.P. varies depending on solvent
‡ DDT: Noncombustible; F.P. varies depending on solvent
§ Dinitrophenol: Varies depending on isomer

AUTOIGNITION TEMPERATURE

* Gaseous form
† Powder
‡ 572 °F (300 °C), *gas*
‡‡ Varies; dependent on solvent
§ dust layer
†† 300-500 °F (199-260 °C) typical white pine

LEL/UEL

* Gaseous form
† Powder
‡ 572 °F (300 °C), *gas*
‡‡ Varies; dependent on solvent
§ dust layer
†† 300-500 °F (199-260 °C) typical white pine

STORAGE AND HANDLING

This list of chemical incompatibilities and storage/handling procedures is to be used as a guideline. It is not all inclusive as it is beyond the scope of this poster to list everything. General categories are given and where a particular hazard exists, a specific chemical name may be given. For more detailed information, read the MSDS.

A: Acids
AA: Acid Anhydrides
AC: Alcohols
AD: Aldehydes
Al: Amines
Am: Ammonia
B: Bases
C: Plastics, Rubber, & Coatings
CN: Cyanides
D: Do not store on wood floors
DP: Do not store under pressure
G: Glass
I: Ignition sources
K: Store inhibited
L: Halogens
M: Metals
Md: Finely divided metal
N: Store under inert gas such as argon or nitrogen
NP: Do not store on porous floors (including unsealed cement)
O: Organic, combustible, or other strong reducing materials
OX: Oxidizers
P: Polymerizes
PL: Plastics
PX: Peroxides
R: Forms explosive peroxides when exposed to air
Ru: Rubber
S: Store in a standard flammable liquids storage cabinet
Sh: Shock/friction
SSC: Store in stainless steel containers
V: Store in ventilated containers (pressure build-up)
W(E): Explodes on contact with water
W(F): Forms flammable gas (hydrogen) on contact with water
W(H): Generates heat on contact with water
W(T): Produces toxic gas on contact with water

GLOSSARY

Asphyxiant: Vapor or gas that can cause unconsciousness or death by suffocation (lack of oxygen). They are harmful to the body only when present in sufficient concentrations to displace the available oxygen in the air.
Autoignition Temperature: Minimum temperature at which a substance ignites without application of a flame or spark.
CNS: Central Nervous System
COC: Cleveland open cup
CVS: Cardiovascular System
Corrosive: In general, corrosive materials are strong acids or bases which cause visible destruction to living tissue by chemical reaction or corrodes metals such as steel or aluminum.
Flashpoint: Lowest temperature at which a flammable liquid gives off sufficient vapor to form an ignitable mixture with air near its surface or within a vessel. Determined by laboratory tests in cups.
GI: Gastrointestinal Tract
LEL (lower explosive limit): Lowest concentration of a material in air that explodes if an ignition source is present at ambient temperatures.
Oxidizer: Substance that yields oxygen readily to cause or enhance the combustion (oxidation) of other materials. *Peroxides* are strong oxidizing agents.
PNS: Peripheral Nervous System
Polymerization: Chemical reaction in which one or more small molecules combine to form larger molecules. *Hazardous polymerization* takes place at a rate that releases large amounts of energy that can cause fires, explosions, or burst containers (pressure).
Pyrophoric: Describes materials which can ignite spontaneously in air.
Shock Sensitive: Materials which are physically unstable and which may explode if exposed to shock or friction.
TCC: Tag closed cup
UEL (upper explosive limit): Highest concentration of a material in air that explodes if an ignition source is present at ambient temperatures. Any concentration above this level is "too rich" to be ignited.