

Personal Protective Equipment Policy

Personal protective equipment (PPE) is made readily available in the laboratories and, based on laboratory hazard assessments, are to be used by all faculty, students, and staff. Colgate University conducts required laboratory hazard assessments in accordance with OSHA 29 CFR 1910 Subpart I *Personal Protective Equipment* using the suggested method in Appendix B to Subpart I (Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection). Laboratories are also to provide appropriate PPE for all visitors.

General laboratory hazard assessments are conducted annually by the Environmental Health and Safety Office (EHSO) and include a survey of each individual laboratory. Laboratory surveys include consideration of the following basic hazard categories:

- Chemical
- Heat / Flammability
- Particulates
- Impact
- Penetration
- Compression (roll-over)
- Light (optical) radiation

Laboratory hazard assessments include a walk-through and evaluation of chemical, equipment, and process hazards present in each laboratory. Consideration of the chemical hazards present is performed through (1) an annual inventory of the chemicals in each laboratory and (2) daily monitoring of all chemical orders and chemical stockroom deliveries to each laboratory. Material safety data sheet (MSDS) review of the chemicals present in each laboratory, conducted annually and at the time of chemical receipt, is carefully considered in the PPE analysis and selection process. Documentation and communication of the laboratory hazard assessments is achieved through hazard identification / emergency contact signage posted at the entrance to each laboratory (See Appendix A for example signage).

Experiment specific laboratory hazard assessments for academic and/or research work are conducted as necessary by faculty and laboratory instructors or, by request, in collaboration with the EHSO. Experiment specific laboratory hazard assessments provide a mechanism for faculty and laboratory instructors to increase or decrease the general laboratory hazard assessment PPE requirements based on experiment specific protocols and associated safety considerations. For instructional laboratories, experiment specific laboratory hazard assessments are to be documented, sent to the EHSO for record-keeping, and clearly communicated to all experiment participants. For research laboratories, deviations from the general laboratory hazard assessment PPE requirements can be made at the discretion of the faculty supervisor based on the specific procedures being conducted. EHSO can provide guidance on appropriate levels of PPE across the range of experimental procedures encountered in the research setting.

Eye and Face Protection

Eye and face protection are to be worn by all persons whenever any one person in the laboratory is conducting an activity that involves potential eye and face hazards. Activities that present potential eye and face hazards include, but are not limited to, work involving the following:

- hazardous chemicals
- flying particles
- hot solids, liquids, or molten metals
- milling, sawing, turning, shaping, cutting, or stamping of any solid materials
- heat treatment, tempering, or kiln firing of any metal or other materials
- gas or electric welding
- potentially injurious light radiation

All protective eyewear in the laboratory must meet the ANSI Z87.1-2003 standard. Work involving laser outputs must also meet the ANSI Z136.1-2007 standard. The below explanatory information and Appendix B (ANSI Z87.1-2003 Occupational and Educational Personal Eye Protection Devices Selection Chart) are intended to aid in identifying and selecting eye and face protection to match the hazard source.

Safety Glasses

Safety glasses provide eye and face protection from moderate impact and particle hazards associated with grinding, sawing, scaling, broken glass, minor chemical splashes, etc. Side protectors are required when there is a hazard from flying objects. Although safety glasses meeting the ANSI Z87.1-2003 standard provide adequate splash protection, splash goggles are an approved alternative for additional eye protection from chemical splash hazards.

Regular prescription eyeglasses (with or without side shields) and contact lenses are not a substitution for safety glasses or splash goggles. Contact lenses can be worn without increased risk in most laboratory environments. Use of contact lenses in the laboratory will be approved by the laboratory supervisor prior to commencing any activity involving a potential eye or face hazard. Faculty and staff who wear prescription eyeglasses or contact lenses should consider obtaining a pair of prescription safety glasses. Faculty and staff may obtain prescription safety glasses through the Colgate Prescription Safety Glasses Program by contacting the EHSO. Students, faculty, and staff who do not obtain prescription safety glasses are to wear safety glasses (for impact hazards) or safety goggles (for splash hazards) designed to go over their prescription glasses.

Splash Goggles

Splash goggles provide adequate eye protection from hazards including potential chemical splash, use of concentrated corrosive material, and bulk chemical transfer. Goggles are

available with clear or tinted lenses, fog proofing, and vented or non-vented frames. If working with a chemical splash hazard, ensure the goggles are rated for use with chemicals. Be aware that goggles designed for woodworking are not appropriate for working with chemicals. These goggles can be identified by the numerous small holes throughout the face piece. In the event of a splash, the potential exists for chemicals to enter into the small holes resulting in a chemical exposure to the face.

Welder / Chipper Goggles

Welder goggles provide protection from flying sparks, metal spatter, slag chips, and harmful radiant energy. Lenses are impact resistant and are available in graduated lens shades depending on the nature of the work. Minimum protective shade numbers based on the type of welding operations can be found in the OSHA 29 CFR 1910.133 *Eye and Face Protection* standard (see chart below).

Filter Lenses for Protection Against Radiant Energy

Welding Operations	Electrode Size (inches)	Arc Current (amps)	Minimum* Protective Shade
Shielded metal arc	<3/32	<60	7
	3/32 to 5/32	60 to 160	8
	4/32 to 1/4	160 to 250	10
	>1/4	250 to 550	11
Gas metal arc and flux cored arc welding		<60	7
		60 to 160	10
		160 to 250	10
		250 to 550	10
Gas Tungsten arc welding		<50	8
		50 to 150	8
		150 to 500	10
Air carbon arc cutting	(light)	<500	10
	(heavy)	500 to 1000	11
Plasma arc welding		<20	6
		20 to 100	8
		100 to 400	10
		400 to 800	11
Plasma arc cutting	(light)	<300	
	(medium)	300 to 400	
	(heavy)	400 to 800	
Torch brazing			3
Torch soldering			2
Carbon arc welding			14
Welding Operations	Plate Thickness (inches)	Plate Thickness (mm)	Minimum* Protective Shade
Gas welding (light)	< 1/8	< 3.2	4
Gas welding (medium)	1/8 to 1/4	3.2 to 12.7	5
Gas welding (heavy)	> 1/4	>12.7	6
Oxygen cutting (light)	<1	> 25	3
Oxygen cutting (medium)	1 to 6	25 to 150	4
Oxygen cutting (heavy)	> 6	> 150	5

* As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade that gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

Face Shields

Face shields provide additional protection to the eyes and face when used in combination with safety glasses or splash goggles. Face shields consist of an adjustable headgear and a face shield with either tinted or clear lenses, or a mesh wire screen. Face shields should be used in operations when the entire face needs protection from flying particles, metal sparks, liquid cryogenics, or chemical / biological splashes. Face shields are not a substitute for appropriate eyewear and should always be worn in conjunction with a primary form of eye protection such as safety glasses or goggles.

Welding Shields

Welding shields are similar in design to face shields but offer additional protection from radiant light burns, flying sparks, metal splatter, and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding, and oxyacetylene welding and cutting operations. Equipment fitted with appropriate filter lenses are to be used to protect against light radiation. Tinted and shaded lenses are not filter lenses unless they are marked or clearly identified as such.

Laser Eye Protection

A single pair of safety glasses is not available for protection from all laser outputs. The type of eye protection required for laser operations is dependent on the spectral frequency and specific wavelength of the laser sources. Contact the Colgate University Laser Safety Officer (Professor Galvez) or the EHSO for additional guidance on laser PPE selection.

Hand Protection

Gloves are to be used when handling hazardous chemicals in the laboratories. Typically, the requirements of the general laboratory hazard assessment should be followed. However, deviations may be made as outlined in the paragraph on experiment specific laboratory hazard assessments. EHSO can provide guidance on appropriate hand protection in instructional and research lab settings. There is no one glove material that protects against all chemicals. It is important that the appropriate glove is used when handling chemicals. Gloves should be carefully selected for their degradation and permeation characteristics to provide proper protection. Consult chemical compatibility charts, MSDS, and protective equipment manufacturer resources to aid in the selection of the proper glove protection level based on the chemicals being handled (Note: see Appendix C for a university approved manufacturer chemical compatibility chart). In situations involving extremely hazardous chemicals, double gloves in combination with sleeve protectors and other chemically resistant PPE are recommended. The thin latex, vinyl, or nitrile gloves, popular for their dexterity, are not appropriate for highly toxic chemicals or solvents. Gloves should always be inspected before use and replaced immediately if they are contaminated or torn. Gloves are to be removed before handling telephones,

doorknobs, computers, etc. Gloves shall also be removed before leaving the laboratory, with an exception being made for persons actively transporting chemical / biological material between labs. Persons transporting chemicals should either have a second person available to open / close doors for them, or they should employ the "one glove" rule, in which one hand is un-gloved and used to touch door handles, elevator buttons, etc., while the gloved hand handles the chemical / biological material. Glove protection is not required during the transport of chemicals in a lab cart, bottle carrier, or clean secondary container.

Colgate practices "Universal Precautions" for glove disposal. In practical terms, this means that ALL gloves will be treated as if they are contaminated (i.e. for disposal purposes, there will be no separation of contaminated and non-contaminated gloves). Every lab at Colgate is equipped with foot operated self-closing receptacles, that are both fire safe and odor control effective, for glove waste disposal. The Universal Precaution glove disposal policy simplifies glove disposal, increases overall lab safety, and prevents inadvertent disposal of contaminated gloves in non-hazardous waste receptacles (and any related custodial chemical contact). It should be noted that classroom and research gloves contaminated with biologicals will be separated from gloves contaminated with chemical hazardous waste. Biological contaminated gloves will then be either autoclaved prior to disposal as a contaminated glove or sent out for disposal via the university's bio-waste service provider.

Protective Clothing

Lab coats and lab aprons prevent skin contact exposure to chemicals by providing a protective barrier between the hazard and the laboratory user's torso, waist, and extremities.

Lab Coats

Lab coats are to be used when handling hazardous chemicals in the laboratories. Typically, the requirements of the general laboratory hazard assessment should be followed. However, deviations may be made as outlined in the paragraph on experiment specific laboratory hazard assessments. EHSO can provide guidance on appropriate protective clothing in instructional and research lab settings. Faculty, staff, and student lab coats are provided and maintained by the EHSO. Colgate University's lab coats have the following protective qualities:

- Flame resistant fabric
- High tensile strength thread material
- NFPA 70E, HRC 2 compliant
- Arc Rated to 8 cal / cm²
- Thermal and electrical arc hazard rated to ASTM 1506-02a standard
- Covered gripper snap front for quick and safe garment removal
- Covered gripper snap cuffs to prevent garment interference during chemical handling / experimentation work
- Lightweight (7 oz) Indura Ultra Soft fabric for unrestricted movement / user comfort

- 42 inches in length for maximum skin exposure protection

Lab coats are maintained, cleaned, and replaced, when necessary, by the EHSO. Lab coats will be cleaned by a qualified commercial laundry service provider at the end of each semester and at the end of the summer to ensure periodic removal of any potential chemical contaminants. Additional cleanings will be coordinated by the EHSO as necessary upon request. In the event a lab coat becomes contaminated, deteriorated, or damaged prior to the scheduled tri-annual cleaning, contact the EHSO for replacement and/or disposal of the garment.

Lab Apron

Plastic or rubber lab aprons provide additional protection from skin contact exposure to chemicals, especially when working with splash hazards and corrosive liquids. Lab aprons do not protect the user's extremities and should be used as an additional layer of protection, not as a substitute, for a lab coat.

CAUTION

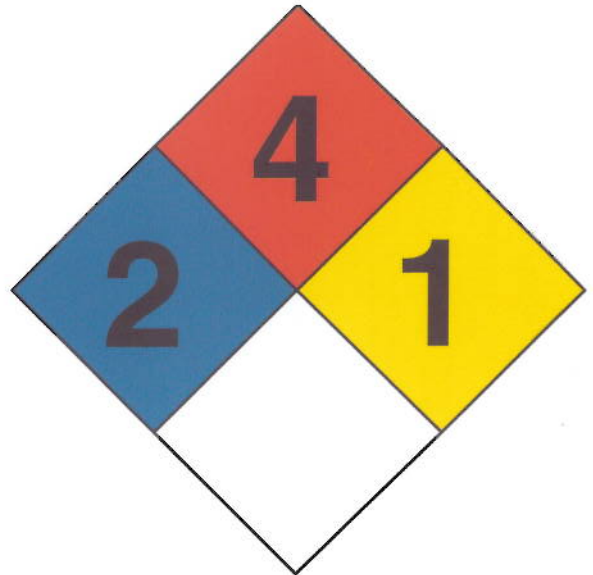
AUTHORIZED PERSONNEL ONLY

This room contains hazardous
materials

In case of emergency

DIAL 911

From cell phones: **315-228-7911**



RESPONSIBLE PERSON: Dan Gough

EMERGENCY CONTACT: Dan Gough / Michelle Butzgy

TELEPHONE: 315-825-8550 / 315-825-5997

LOCATION: McGregory Hall – Chemical Bunker #3



ANSI Z87.1-2003 Occupational and Educational Personal Eye Protection Devices Selection Chart

Selection Chart	Protector Category and Styles	Limitations	Not Recommended	Protective Devices
<p>Activity and Assessment</p> <p>● IMPACT Chipping, grinding, machining, masonry work, nailing and sanding Firing fragments, outside large chips, particle, sand, dirt, etc.</p>	<p>Care shall be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of the hazards must be provided.</p>	<p>Limitations</p> <p>Protective devices do not provide unlimited protection.</p> <p>Note: Certain factors that restrict the use of most types of eye protection are electrical hazards, metal frame protective devices, electrical sparks, electrical arcs, electrical arcs through contact with the frame, and electrical arcs through contact with the frame.</p> <p>Amberlens cartridges and the restricted protection of the protector can cause lens fog to fog. Frequent cleaning may be required.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from side exposure.</p> <p>Filter or tinted lenses that restrict light transmittance, unless it is determined that a glare hazard exists. Refer to OPTICAL RADIATION.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>
<p>● HEAT Furnace operations, pouring, casting, hot dipping, gas welding, and welding. For sparks Sparks from molten metals High temperature exposure</p>	<p>Operations involving heat may also involve critical radiation. (See electric arc, gas, and cover under Optical Radiation below.) Protection from both hazards shall be provided. Face shields and only cover spectacles or goggles.</p> <p>Goggles, goggles B, C, D, E, F, G, H, J, K, L. For severe exposure add N. Respirators R, T.</p> <p>Face shields worn over goggles H, K. Respirators R, T or S. Optical radiation hazards exist.</p> <p>Spectacles, spectacles, reflective visors over spectacles or goggles.</p>	<p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>
<p>● CHEMICAL Acid and chemical handling, degreasing, plating, etching, and etching metals.</p>	<p>Indirect contact goggles, eyecup and cover types G, H, K. For severe exposure, add N. Respirators R, T.</p> <p>Intensive Mist-Special purpose goggles: G, Cover goggles - No ventilation, Respirators R, T.</p>	<p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>
<p>● DUST Woodworking, buffing, grinding, dust condenser, nuisance cart.</p>	<p>Goggles, eyecup and cover types: G, H, K, Respirators R, T.</p>	<p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from side exposure.</p> <p>Use of face shields alone without spectacles or goggles.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>
<p>● OPTICAL RADIATION WELDING: Electric Arc Welding electric arc fumes and boilers</p>	<p>Note: Welding helmets or face shields shall be used only over spectacles or goggles.</p> <p>TYPICAL FILTER LENS SHADE: O-14 PROTECTORS, Welding helmets or Welding Shields, O, P, Q, Respirators S, U</p>	<p>Protective devices that do not provide protection from critical radiation.</p> <p>Note: Filter lenses shall meet the requirements for critical radiation in Table 1.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from critical radiation.</p> <p>Note: Filter lenses shall meet the requirements for critical radiation in Table 1.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>
<p>WELDING: Cox, and welding gas fumes furnace and boilers CUTTING TOUCH-BRAZING TOUCH-SOLDERING GLARE</p>	<p>TYPICAL FILTER LENS SHADE: 4-6 PROTECTORS: Welding goggles, Helmets, Welding face shields over spectacles or goggles: J, K, L, M, X, P, Q or Respirators S, U TYPICAL FILTER LENS SHADE: 3-9 PROTECTORS: Welding goggles, Helmets, welding face shields: J, K, L, M, N, O, P, Q, or Respirators S, U. TYPICAL FILTER LENS SHADE: 0-4 PROTECTORS: Welding goggles, Helmets, Welding face shields: J, K, L, M, N, O, P, Q, or Respirators S, U. TYPICAL FILTER LENS SHADE: 1-5 PROTECTORS: Spectacles or Welding Face shields over spectacles: B, C, D, E, F, N, or Respirators S, U. Spectacles A, B, Face shield: N over spectacles or goggles.</p>	<p>Protective devices that do not provide protection from critical radiation.</p> <p>Note: Filter lenses shall meet the requirements for critical radiation in Table 1.</p>	<p>Not Recommended</p> <p>Protective devices that do not provide protection from critical radiation.</p> <p>Note: Filter lenses shall meet the requirements for critical radiation in Table 1.</p>	<p>Protective Devices</p> <p>A. Spectacles, No sidefield B. Spectacles, Full Sidefield C. Spectacles, Full Sidefield D. Spectacles, Partial Sidefield E. Spectacles, Non-removable Lens F. Spectacles, Lift Front G. Cover Goggles, No Ventilation H. Cover Goggles, Indirect Ventilation I. Cover Goggles, Direct Ventilation J. Cup Goggles, Direct Ventilation K. Cup Goggles, Indirect Ventilation L. Spectacles, Fullside Field M. Cover Goggles, Indirect Ventilation N. Respirator O. Welding Helmet, Stationary Window P. Welding Helmet, Stationary Window Q. Respirator R. Respirator S. Respirator T. Respirator U. Respirator V. Respirator</p>

APPENDIX C

Ansell 8th Edition Glove Chemical Resistance Guide

8th EDITION

Permeation/Degradation Resistance Guide for Ansell Gloves

The first square in each column for each glove type is color coded to provide an overall rating for both Degradation and Permeation. The letter in each colored square is for Degradation alone.

GREEN: The glove is very well suited for application with that chemical.

YELLOW: The glove is suitable for that application under careful control of its use.

RED: Avoid use of the glove with this chemical.

SPECIAL NOTE: The chemicals in this guide highlighted in BLUE are experimental carcinogens, according to the ninth edition of Sax' *Dangerous Properties of Industrial Materials*. Chemicals highlighted in GRAY are listed as suspected carcinogens, experimental carcinogens at extremely high dosages, and other materials which pose a lesser risk of cancer.



CHEMICAL	LAMINATE FILM BARRIER™		NITRILE SOL-VEX®		UNSUPPORTED NEOPRENE 29-SERIES		SUPPORTED POLYVINYL ALCOHOL PVA™		POLYVINYL CHLORIDE (Vinyl) SNORKEL®		NATURAL RUBBER *CANNERS AND HANDLERS™		NEOPRENE/NATURAL RUBBER BLEND *CHEMI-PRO®		BUTYL UNSUPPORTED CHEMITEK™ BUTYL		VITON/BUTYL UNSUPPORTED CHEMITEK™ VITON/BUTYL	
	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough	Degradation Rating	Permeation: Breakthrough
1. Acetaldehyde	▲	380 E	▲	158 G	▲	10 F	▲	NR	▲	NR	▲	E 13 F	▲	E 10 F	▲	—	▲	—
2. Acetic Acid, Glacial, 99.7%	▲	150 —	▲	158 G	▲	390 —	▲	NR	▲	F 45 G	▲	E 110 —	▲	E 263 —	▲	E >480 —	▲	DD >480 —
3. Acetone	▲	>480 E	▲	NR	▲	10 F	▲	P 143 G	▲	NR <5 G	▲	E 10 F	▲	G 12 G	▲	E >480 E	▲	DD 93 VG
4. Acetonitrile	▲	>480 E	▲	F 30 F	▲	20 VG	▲	■ 150 G	▲	NR —	▲	E 4 VG	▲	E 13 VG	▲	E >480 E	▲	DD 70 E
5. Acrylic Acid	▲	—	▲	G 120	▲	395 —	▲	NR	▲	NR —	▲	E 80 —	▲	E 67 —	▲	—	▲	—
6. Acrylonitrile	▲	>480 E	▲	—	▲	—	▲	>480 —	▲	—	▲	E 5 F	▲	—	▲	—	▲	—
7. Allyl Alcohol	▲	>480 E	▲	F 140 F	▲	140 VG	▲	P —	▲	P 60 G	▲	E 10 VG	▲	E 20 VG	▲	E >480 —	▲	E >480 —
8. Ammonia Gas	▲	19 E	▲	>480 E	▲	>480 —	▲	—	▲	—	▲	—	▲	—	▲	—	▲	—
9. Ammonium Fluoride, 40%	▲	>480 E	▲	>360 —	▲	—	▲	NR	▲	>360 —	▲	E >360 —	▲	E >360 —	▲	—	▲	—
10. Ammonium Hydroxide, Conc. (28-30% Ammonia)	▲	30 —	▲	E >360 —	▲	250 —	▲	NR	▲	E 240 —	▲	E 90 —	▲	E 247 —	▲	—	▲	—
11. n-Amyl Acetate	▲	470 E	▲	E 198 G	▲	NR	▲	G >360 E	▲	P —	▲	NR	▲	P —	▲	E >480 —	▲	E >480 —
12. Amyl Alcohol	▲	>480 E	▲	E >480 E	▲	348 VG	▲	G 180 G	▲	G 12 E	▲	E 25 VG	▲	E 52 VG	▲	E >480 E	▲	E >480 E
13. Aniline	▲	>480 E	▲	NR	▲	145 F	▲	F >360 E	▲	F 62 G	▲	E 25 VG	▲	E 82 G	▲	E >480 E	▲	E >480 E
14. Aqua Regia	▲	—	▲	F >360 —	▲	>480 —	▲	NR	▲	G 120 —	▲	NR	▲	G 193 —	▲	E >480 —	▲	E >480 —
15. Benzaldehyde	▲	>480 E	▲	NR	▲	NR	▲	G >360 E	▲	NR —	▲	E 10 VG	▲	E 27 F	▲	E >480 E	▲	E 100 E
16. Benzene (Benzol)	▲	>480 E	▲	P —	▲	NR	▲	E >360 E	▲	NR —	▲	NR	▲	NR	▲	E 20 F	▲	E 253 VG
17. Benzotrifluoride	▲	>480 E	▲	E >480 E	▲	NR	▲	—	▲	G <10 F	▲	NR	▲	NR	▲	—	▲	—
18. Benzotrifluoride	▲	>480 E	▲	E 170 G	▲	—	▲	—	▲	G <10 F	▲	NR	▲	NR	▲	—	▲	—
19. Bromine Water	▲	—	▲	E >480 E	▲	>480 E	▲	NR	▲	—	▲	—	▲	—	▲	—	▲	—
20. 1-Bromopropane (Propyl Bromide)	▲	>480 E	▲	F 23 F	▲	<10 P	▲	>480 E	▲	F <10 F	▲	<10 P	▲	P <10 P	▲	—	▲	182 VG
21. 2-Bromopropionic Acid	▲	>480 —	▲	F 120 —	▲	460 —	▲	—	▲	G 180 —	▲	E 190 —	▲	G 190 —	▲	—	▲	—
22. n-Butyl Acetate	▲	>480 E	▲	F 75 F	▲	NR	▲	G >360 E	▲	NR —	▲	NR	▲	P —	▲	E 80 G	▲	DD <10 F
23. n-Butyl Alcohol	▲	>480 E	▲	E >360 E	▲	270 E	▲	F 75 G	▲	G 180 VG	▲	E 35 VG	▲	E 75 VG	▲	E >480 E	▲	E >480 E
24. Butyl Carbitol	▲	—	▲	E >323 E	▲	188 F	▲	E >480 E	▲	G 397 VG	▲	E 44 G	▲	E 148 G	▲	—	▲	—
25. Butyl Cellulosolve	▲	>480 E	▲	E 470 VG	▲	180 G	▲	■ 120 G	▲	P 60 G	▲	E 45 G	▲	E 48 G	▲	E >480 —	▲	E >480 —
26. gamma-Butyrolactone	▲	>480 E	▲	NR	▲	245 G	▲	NR	▲	NR —	▲	E 60 G	▲	E 104 F	▲	E >480 E	▲	E >480 E
27. Carbon Disulfide	▲	>480 E	▲	G 30 F	▲	NR	▲	E >360 E	▲	NR <5 G	▲	NR	▲	NR	▲	—	▲	—
28. Carbon Tetrachloride	▲	—	▲	G 150 G	▲	NR	▲	E >360 E	▲	F 25 F	▲	NR	▲	NR	▲	—	▲	—
29. Cellosolve® (Ethyl Glycol Ether, 2-Ethoxyethanol)	▲	>480 E	▲	G 293 G	▲	128 G	▲	■ 75 G	▲	P 38 G	▲	E 25 VG	▲	E 25 VG	▲	E >480 E	▲	E 465 E
30. Cellosolve Acetate® (2-Ethoxyethyl Acetate, EGEEA)	▲	>480 E	▲	F 90 G	▲	40 F	▲	■ >360 E	▲	NR —	▲	E 10 G	▲	E 23 G	▲	E >480 E	▲	DD 105 VG

