



Terra Universal, Inc.

700 N. Harbor Blvd., Anaheim, CA 92805 USA
TerraUniversal.com • info@TerraUniversal.com
Tel: (714) 526-0100 • Fax: (714) 992-2179

Catalog 105 sections available for download from TerraUniversal.com

General Information
Visual Index
Automated Storage/Retrieval Systems
Desiccators
Cleanroom Storage Systems
Cleanrooms & Accessories
Cleaning Products
Gowning Room Products
Cleanroom Work Stations
Cleanroom Chairs
Hoods
Glove Boxes & Vacuum Chambers
Pumps
Ovens
Packaging & Handling
Carts
Wet Processing & Cleaning
Safety Equipment
Measuring & Recording
Ionizing Equipment
Tweezers & Tools
Appendices

Download files are in PDF format and require Adobe Acrobat® Reader 3.0 or higher. Files may open within your browser window, depending on how your browser is configured.



Appendix I: FED-STD-209E - September 11, 1992 Airborne Particulate Cleanliness Classes

Class limits are given for each class name. The limits designate specific concentrations (particles per unit volume) of airborne particles with sizes equal to and larger than the particle sizes shown.*

- * The class limits shown in Table I are defined for classification purposes only and do not necessarily represent the size distribution to be found in any particular situation.
- ** Concentration limits for intermediate classes can be calculated, approximately, from the following equations:
 $particles/m^3 = 10^M(0.5/d)^{2.2}$
 where M is the numerical designation of the class based on SI units, and d is the particle size in micrometers, or
 $particles/ft^3 = N_C(0.5/d)^{2.2}$
 where N_C is the numerical designation of the class based on English (U.S. customary) units, and d is the particle size in micrometers.
- *** For naming and describing the classes, SI names and units are preferred; however, English (U.S. customary) units may be used.

Class Name**		Class Limits									
		0.1 µm Volume Units		0.2 µm Volume Units		0.3 µm Volume Units		0.5 µm Volume Units		5 µm Volume Units	
SI	English***	(m ³)	(ft ³)	(m ³)	(ft ³)	(m ³)	(ft ³)	(m ³)	(ft ³)	(m ³)	(ft ³)
M 1		350	9.91	75.7	2.14	30.9	0.875	10.0	0.283	—	—
M 1.5	1	1,240	35.0	265	7.50	106	3.00	35.3	1.00	—	—
M 2		3,500	99.1	757	21.4	309	8.75	100	2.83	—	—
M 2.5	10	12,400	350	2,650	75.0	1,060	30.0	353	10.0	—	—
M 3		35,000	991	7,570	214	3,090	87.5	1,000	28.3	—	—
M 3.5	100	—	—	26,500	750	10,600	300	3,530	100	—	—
M 4		—	—	75,700	2,140	30,900	875	10,000	283	—	—
M 4.5	1,000	—	—	—	—	—	—	35,300	1,000	247	7.0
M 5		—	—	—	—	—	—	100,000	2,830	618	17.5
M 5.5	10,000	—	—	—	—	—	—	353,000	10,000	2,470	70.0
M 6		—	—	—	—	—	—	1,000,000	28,300	6,180	175
M 6.5	100,000	—	—	—	—	—	—	3,530,000	100,000	24,700	700
M 7		—	—	—	—	—	—	10,000,000	283,000	61,800	1,750

Appendix II: Conversion Tables

Temperature

°C = 5/9 (°F - 32)
 °F = 9/5 °C + 32

Fluid Flow

To Convert	Into	Multiply By
Cubic Feet/Min.	Liters/Sec.	4.720 x 10 ⁻¹
Cubic Yards/Min.	Liters/Sec.	1.274 x 10 ⁻¹
Cubic Yards/Min.	Cubic Ft./Sec.	4.5 x 10 ⁻¹
Cubic Yards/Min.	Gallons/Sec.	3.367

One SCFM is one cubic foot of a gas flowing for one minute past a point at which the temperature is 60°F and the pressure is 30.00 inches of Mercury (from American Gas Association).

Power

To Convert	Into	Multiply By
Horsepower	Kilowatts	.746
Horsepower	Foot-Lb./Min.	3.3 x 10 ⁴
Horsepower	BTU/Min.	42.41

Illumination

To Convert	Into	Multiply By
Lux	Lumen/Ft. ²	0.0929
Lumens/Ft. ²	Foot-Candles	1.0
Lambert	Candles/In. ²	2.054

Length

To Convert	Into	Multiply By
Feet	Meters	0.3048
Feet	Centimeters	30.48
Yards	Inches	36.00

Pressure/Vacuum

To Convert	Into	Multiply By
Pounds/Sq. in.	Atmospheres	0.06804
Pounds/Sq. in.	Feet of Water	2.307
Pounds/Sq. in.	Inches of Mercury	2.036
Pounds/Sq. in.	Pounds/Sq. ft.	144.0
mm of Mercury	Atmospheres	760
mm of Mercury	Torr	1.00
Torr	mbar	0.75
Atmospheres	Inches of Mercury	29.92
Bars	Atmospheres	9.869 x 10 ⁻¹
Bars	Pounds/Sq. in.	14.5
Inches of Water	Inches of Mercury	7.355 x 10 ⁻²
Millibars	Inches of Mercury	2.953 x 10 ⁻²

Electric Charge

To Convert	Into	Multiply By
Coulombs	Faraday	9.652 x 10 ⁴
Amp-Hr.	Faraday	26.81

Volume

To Convert	Into	Multiply By
Cubic Feet	Cubic Inches	1728
Cubic Feet	Liters	28.32



Appendix III: Trademarks

ACA1™ (Automatic Count Accuracy Improvement) — California Scales
Adjust-A-Shelf™ (Desiccator) — Terra Universal, Inc.
AirFlow™ — Excelta Corp.
AirGard® — Alnor Instrument Co.
Altima® — Excelta Corp.
ASD-600™ — Terra Universal, Inc.
Auto-Strat™ (Desiccator) — Terra Universal, Inc.
Automatic IonWatch™ — Terra Universal, Inc.
Automatic RB® Valve — Terra Universal, Inc.
BCR® — Berkshire Corp.
Berkshire® — Berkshire Corp.
BLUESORB® — Berkshire Corp.
Bow Guard™ — Terra Universal, Inc.
Buna-N® — Pittway Corp.
Celcon® — Celanese Corp.
ChemStat® 909A — Stern and Stern Industries, Inc.
CleanCube™ — Terra Universal, Inc.
Clean Phone™ — GAI-Tronics Corp.
Clean Stocker™ — Terra Universal, Inc.
Cleanline® — Controlled Environmental Equipment
CleaNotes® — Berkshire Corp.
Cobaltima® — Excelta Corp.
CompuDat® — Alnor Instruments
CompuFlow® — Alnor Instruments
Delrin® — E. I. du Pont de Nemours & Co.
DesiCart™ — Terra Universal, Inc.
DewWatch™ — Terra Universal, Inc.
DoorGuard™ — Terra Universal, Inc.
Double Agent Desiccator™ — Terra Universal, Inc.
DOW Corning® — Dow Corning
DownDraft™ — Terra Universal, Inc.
Dryex™ — Terra Universal, Inc.
Dual-Lock Velcro® — 3M Corp.
Dual Purge™ System — Terra Universal, Inc.
Duo-Vac® — Lab-Line
DURX® — Berkshire Corp.
EnviroWatch™ — Terra Universal, Inc.
ErgoHeight™ — Terra Universal, Inc.
Excelta® — Excelta Corp.
EXSORBX® — Berkshire Corp.
Faraccator™ — Terra Universal, Inc.
FASTSORB® — Berkshire Corp.
FreeFlow™ — Terra Universal, Inc.
Freon™ — E. I. du Pont de Nemours & Co.
GAMMA WIPE® — Berkshire Corp.
Gore-Tex® — W. L. Gore
GroundWatch™ — Terra Universal, Inc.
Humex™ — Terra Universal, Inc.
Hump-Free Bow Guard™ — Terra Universal, Inc.
Hypalon® — Manostat Corp.
Hypoclean Critical™ — Safeskin Corp.
Implants™ — Excelta Corp.
Ionizing AeroBar® — Ion Systems, Inc.
IsoClean® — Kappler
IsoStat® — Kappler
IsoVent™ — Terra Universal, Inc.
Kiliccator™ — Terra Universal, Inc.
Kynar® — Pennwalt Corp.
LAB-TIPS® — Berkshire Corp.
Lexan® — General Electric Co.
LockBar™ — Terra Universal, Inc.
LockLatch™ — Terra Universal, Inc.
Magnahelic® — Dwyer Instruments
Microccator™ — Terra Universal, Inc.
MicroFirst® — Berkshire Corp.
MicroPrinter™ — Alnor Instrument Co.
MicroSeal® — Berkshire Corp.
Microtemp™ — Thermo-O-Disc
MicroVac™ — Terra Universal, Inc.
MultiSONIK™ — CAE Blackstone, Inc.
NEGA-STAT® — E. I. du Pont de Nemours & Co.
NEGA-WIPE® — Berkshire Corp.
Neverust® — Excelta Corp.
NitroPlex™ — Terra Universal, Inc.
NITRO WATCH® System — Terra Universal, Inc.
NoGlare™ — Excelta Corp.
No Sweat® NVR® — Quality Rubber Products, Inc.
Norprene™ — Norton Co.
Noryl™ — General Electric Co.
NSR® — Kappler USA
OpenTop™ — Terra Universal, Inc.
Optima® — Excelta Corp.
Paddle Tip™ — Excelta Corp.
Particle Vision® — Pacific Scientific
Pen-Vac™ — Virtual Industries, Inc.
Photohelic® — Dwyer Instruments
Plasma Preen Etcher™ — Terra Universal, Inc.
Polaroid® — Polaroid Corp.
POLX® — Berkshire Corp.
Poly-D® — Ansell Edmont Industrial, Inc.
Poly-Flo® — Bellpipe
Poly-Tuff® — Quality Rubber Products, Inc.
PortAll™ — Pacific Scientific
Portable Clean Booth™ — Terra Universal, Inc.
Porta-Wand™ — Virtual Industries, Inc.
Precista® — Excelta Corp.
ProClean® — Kappler
Pro/Shield® — Kappler
PureDry™ — Terra Universal, Inc.
PureFlow™ — Terra Universal, Inc.
Purifier® — Labconco
Qualatril® — QRP Inc.
QUICK-SEAL™ — Accu-Seal
QuietTop™ — Terra Universal, Inc.
Roto-Pic® — Excelta Corp.
SatPax™ — Berkshire Corp.
Selecta™ — Excelta Corp.
Selguard® — Teijin, Ltd.
Sensatherm™ — Hankison® div. of Hansen, Inc.
SiteSelect™ — Intermetro Industries
SmartDesiccator™ — Terra Universal, Inc.
Snap-Tite™ — Terra Universal, Inc.
Sneeze Guard™ — Terra Universal, Inc.
Sno Gun™ — Va-Tran Systems, Inc.
SnowBox™ — Terra Universal, Inc.
Soft Tip™ — Excelta Corp.
Sole Cleaner™ — Terra Universal, Inc.
Squaroid™ — Lab-Line Instruments
Stand Easy™ — Charvoz
Sticky Mats® — Controlled Environmental Equipment
SUNSORB® — Berkshire Corp.
Super Adjustable™ — Intermetro Industries
SUPER POLX® — Berkshire Corp.
SUREX® — Berkshire Corp.
SweepSONIK 2D™ — CAE Blackstone Inc.
Tape-and-Reel™ — Terra Universal, Inc. (Desiccator)
Teflon® — E. I. du Pont de Nemours & Co.
Tray Packs® — Quality Rubber Products, Inc.
TWILLX® — Berkshire Corp.
Twist-O-Flex® — Hirsh Speidel, Inc.
Tygon® — Norton Co.
Tyvek® — E. I. du Pont de Nemours & Co.
Ultimate Acid/ALKALI™ — QRP Inc.
Ultimax® — Ircon Inc.
ULTRA-SEAL® — Berkshire Corp.
UltraClean™ — Terra Universal, Inc.
Universal Card Holder™ — Terra Universal, Inc. (Desiccators)
ValuSeal™ — Berkshire Corp.
Viton® — E. I. du Pont de Nemours & Co.



Appendix IV: Chemical Compatibility Chart

This chart is intended as a general guide for various materials and chemicals. It shows some of the materials used in Terra's products and chemicals likely to be used with them. Testing is strongly recommended for extreme conditions of use, such as prolonged exposure or immersion, high temperatures and high concentrations. The acids, caustics and salts in this chart are assumed to be in solution. Materials may react differently to the pure substances (glacial acetic acid, for example).

Explanation for symbols:

- = No noticeable effect.
- ◐ = Minor effect or slight change in appearance or properties. Test before repeated exposure.
- * = No noticeable effect at low concentration and room temperature. Moderate to severe effect at high concentration and/or high temperature. Test before using.
- = Severe effect or degradation, exposure not recommended.

Hazards (Only the primary ones are shown. For example, chlorine is not shown as an asphyxiant because its toxicity will kill you first).

- A** = Asphyxiant (gases and vapors only)
- C** = Corrosive
- F** = Flammable
- O** = Oxidizer
- T** = Toxic

		METALS					PLASTICS								
		Aluminum	Brass	Bronze	Copper	304 Stainless Steel	316 Stainless Steel	Acrylic (plexiglass)	ABS	CPVC	Noryl	Nylon	Polycarbonate	Polyethylene	
		-HAZARDS-													
ACIDS	Acetic	C	◐	●	◐	◐	●	*	●	*	*	○	●	*	
	Aqua Regia	C	●	●	●	●	●	●	●		◐	●	●	●	
	Chromic	C	●	●	●	●	◐	◐	◐	*	*	●	*	*	
	Hydrochloric	C	●	●	●	●	●	*	○	*	○	●	*	*	
	Hydrofluoric	C	●		◐	◐	◐	●	◐	●	*	●	●	*	
	Nitric	C	●	●	○	●	○	○	●	*	*	*	●	*	
	Phosphoric	C	◐	●	◐	●	●	●		*	○	●	○	*	
	Sulfuric	C	●		◐	●	●	●	*	*	*	○	●	*	
CAUSTICS	Ammonium Hydroxide	C	◐	●	●	○	○	◐	○	*	○	○	●	*	
	Potassium Hydroxide	C	●	●	●	◐	◐	◐	◐	○	○	◐	●	○	
	Sodium Hydroxide	C	●	●	◐	●	◐	◐	◐	*	○	*	*	*	
GASES	Air	O	○	○	○	○	○	○	○	○	○	○	○	○	
	Ammonia	C,F,T	○	●	●	○	○	◐		*	◐	○	●	●	
	Argon	A	○	○	○	○	○	○	○	○	○	○	○	○	
	Carbon Dioxide	A	○	○	○	○	○	◐		*	○	○	○	*	
	Carbon Monoxide	F,T	○	○	○	○	○			*	○	○		*	
	Chlorine	C,T	●	●	●	●	○	○		●	●	●	○	●	
	Flourine	C,O,T	*	*	◐	*	○	○		*		●	◐	●	
	Helium	A	○	○	○	○	○	○	○	*	○	○	○	○	
	Hydrogen	A,F	○	○	○	○	○	○		*	○	○	○	◐	
	Hydrogen Sulfide	C,F,T	○	○			○	○	◐	*		●	◐	*	
	Methane	A,F	○	○	○	○	○	○		*	●	○		○	
	Nitrogen	A	○	○	○	○	○	○	○	○	○	○	○	○	
	Nitrous Oxide	O	○	○	○	○	○	○		*		◐		○	
Ozone	O	◐		◐	◐	◐	○		○	○	●	●	○		
Propane	A,F	○	○	○	○	○	○		○	○	○	◐	○		
OXIDANTS	Hydrogen Peroxide	O	○	●	◐	●	◐	○	○	*	○	●	○	○	
	Sodium Hypochlorite	O	●	●	◐		*	*	◐	*	○	●	◐	*	
SALTS	Ammonium Nitrate		◐	●	●	●	○	○		*	○	●	○	*	
	Ammonium Persulfate		●	●	●	●	◐	○		*	○	●		*	
	Sodium Carbonate		●	◐	○	○	○	*	○	*	○	○	○	○	
SOLVENTS	Acetone	F	○	○	○	○	○	○	●	●	●	○	●	●	
	Carbon Tetrachloride	T	●	○	○		◐	◐	●	●	●	●	●	●	
	DI Water		○	○		◐	○	○	○	○	○	○	○	○	
	Ethyl Alcohol	F	◐	○	○	○	○	○	◐	◐	○	○	◐	*	
	Ethylene Glycol		○	◐	○	○	◐	◐		*	○	○	○	◐	
	Glycerine		○	◐	○	○	○	◐		*	○	○	○	◐	
	Isopropyl Alcohol	F	◐		○	◐	◐	◐		◐	○	●	○	*	
	Kerosene	F	○	○	○	◐	○	○	◐	*	●	○	*	*	
	Methyl Alcohol	F,T	○	○	○	◐	○	○	●	◐	*	○	○	◐	
	Methyl Ethyl Ketone	F	◐	○	○	○	○	◐	●	●	●	●	◐	●	
	Toluene	F	○	○	○	○	○	○	●	●	●	○	●	●	
Trichloroethane	A	●		○		◐	◐			●	◐	●	○		



- Explanation for symbols:
- = No noticeable effect.
 - ◐ = Minor effect or slight change in appearance or properties. Test before repeated exposure.
 - * = No noticeable effect at low concentration and room temperature. Moderate to severe effect at high concentration and/or high temperature. Test before using.
 - = Severe effect or degradation, exposure not recommended.

		PLASTICS (Cont.)							RUBBER & SYNTHETICS (ELASTOMERS)												
		Polymethylpentene (TPX)	Polypropylene	Polystyrene	PPS (Ryton)	PVC, Static Dissipative	PVC	Styrene Acrylonitrile	PVDF (Kynar)	Teflon, PTFE	Buna N	EPDM	Hypalon	Natural Rubber	Neoprene	Nitrile	PVA (Polyvinyl Alcohol)	Tygon	Silicone	Viton	
ACIDS	Acetic	*	*	○	*	*	○	*	○	○	◐	○	*	*	*	◐	●	●	◐	*	
	Aqua Regia		●		●	●		○		○	●	◐	◐	●	*	*	●	●	●	*	
	Chromic	*	*	●	○	*		○	*	○	●	◐	◐	●	●	◐	●	◐	◐	*	
	Hydrochloric	*	*	*	●	*	○	*	○	○	◐	*	*	○	*	◐	●	●	●	*	
	Hydrofluoric	*	○	*	○	*	*	*		○	●	●	◐	*	●	○	●	●	●	*	
	Nitric	*	*	●	●	*	○	*	◐	○	●	*	*	●	●	*	●	●	●	*	
	Phosphoric	○	◐	○	●	◐	○	*		○	●	◐	◐	◐	*	*	●	●	●	*	
	Sulfuric	○	*	*	*	*	*	*	○	○	*	*	*	*	*	*	●	●	●	*	
CAUSTICS	Ammonium Hydroxide	○	○		○	*	○	*	○	○	○	○	○	*	*	○	●	○	○	●	
	Potassium Hydroxide		○		*	*	○	*		○	◐	○	○	○	○	○	●	◐	◐	◐	
	Sodium Hydroxide	○	◐	○	◐	*	○	*		○	*	◐	○	○	*	○	●	◐	○	*	
GASES	Air	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	Ammonia	○	◐		*	○	○	*		○	◐	○	●	●	○	○		○	◐	●	
	Argon	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
	Carbon Dioxide	○	◐	○	○	*	○	*		○	*	*	*	*	*	*			*	*	
	Carbon Monoxide		◐		○	*	○	*		○	○	○	◐	●	*	*			○	*	
	Chlorine	●	●		●	●	●	*		○	◐	○	●	●	●				◐	●	*
	Flourine		●		○	●	●	*		●	●	○		◐	●				●	*	
	Helium	○	◐	○	○	*	○	*	○	○	○	○	○	○	*	○	○	○	○	○	
	Hydrogen		◐		*	*	○	◐		○	○		○	*	*			○	◐	*	
	Hydrogen Sulfide		◐		◐	*		*		○	●	◐	◐	◐	●			●	◐	*	
	Methane		◐		○	*		*		○	○	●	◐	●	*				●	*	
	Nitrogen	○	○	○	○	○	○	●		○	○	○	○	○	*	○			○	*	
	Nitrous Oxide		●		○	*		○		○	○				●					*	
	Ozone		◐		◐		○			○	●	○	○	●	◐				○	*	
Propane		◐		○	*	○	*		○	○	●		●	*				●	*		
OXIDANTS	Hydrogen Peroxide	*	*	○	●	●	*	*		○	●	*	●	◐	●	○	●	◐	*	*	
	Sodium Hypochlorite	○	*	○	●	*	○	*	○	○	◐	◐	*	◐	*		●	◐	◐	*	
SALTS	Ammonium Nitrate	○	*	○	○	*	○	*	○	○	○	○	○	◐	◐	○	●	○	◐	*	
	Ammonium Persulfate		*		○	*	○	*	○	○	◐	○	○	*	○	●	○	●	*		
	Sodium Carbonate	○	*	○	*	*	○	*	○	○	○	○	○	*		●	◐	○	*		
SOLVENTS	Acetone		○	●	*	●	●	●	○	●	○	◐	◐	*	*	●	●	◐	●		
	Carbon Tetrachloride	●	●	●	○	●	●	*	○	◐	◐	●	●	*	*	○		●	*		
	DI Water		○		○	○	○	○	○	○	○	○	○	○	○		●	○	○		
	Ethyl Alcohol		*		○	◐	○	○	◐	○	○	○	○	*	○	●	◐	◐	*		
	Ethylene Glycol	○	◐	○	*	*	○	*		○	○	○	○	*	○	◐	◐	○	*		
	Glycerine		◐		*	*	○	*	○	○	○	○	○	*	○	◐	○	○	*		
	Isopropyl Alcohol		*			◐	○	*		○	◐	○	○	*	○	●	○	○	*		
	Kerosene		●		*	◐	○	*		○	○	●	●	●	●	○	◐	●	●	*	
	Methyl Alcohol		*		○	◐	○	*	●	○	◐	○	○	*	○	●	○	◐	*		
	Methyl Ethyl Ketone	◐	*	●	*	●	●	●	●	○	●	○	●	*	●	●	◐	●	●	●	
	Toluene	●	●	●	*	●	●	*	●	○	●	●	●	●	*	*	◐	●	●	*	
Trichloroethane		◐			●	○	○	○	○	●	●	●	●	*	*	◐		●	○		